

**SCHOOL OF ENGINEERING AND TECHNOLOGY
SRI PADMAVATI MAHILA VISVAVIDYALAYAM
(Women's University)
TIRUPATI – 517 502, ANDHRA PRADESH**



B.TECH - SCHEME AND SYLLABUS – R16

**Department of Computer Science and Engineering
Effective from 2016-17 under CBCS**

SCHEME OF EVALUATION

SCHOOL OF ENGINEERING AND TECHNOLOGY
SRI PADMAVATI MAHILA VISVAVISYALAYAM
(SCHEME OF INSTRUCTION AND EVALUATION OF B.TECH (CSE))
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
I YEAR – I SEMESTER (2016-17)

THEORY												
S.No	Course Code	Course Title	Hours per Week			Credits	Evaluation				Total Marks	
			L	T	P		Internal Test (30Marks)		External (70 Marks)			
							Duration (Hrs)	Max. Marks	Duration	Max.		
1	BST02	Environmental Studies	4	-	-	4	2	30	3	70	100	
2	BST03	Engineering Mathematics – I	4	-	-	4	2	30	3	70	100	
3	BST04	Engineering Chemistry	4	-	-	4	2	30	3	70	100	
4	CST01	Problem Solving and Computer Programming	4	-	-	4	2	30	3	70	100	
5	ECT01	Electronic Materials and Devices	4	-	-	4	2	30	3	70	100	
PRACTICALS												
S.No	Course Code	Course Title	Hours per Week			Credits	Evaluation				Total Marks	
			L	T	P		Internal (40 Marks)		External (60 Marks)			
							Continuous	Test	Max. Marks	Duration		Max.
6	MEP01	Engineering Graphics	-	-	4	2	20	2	20	3	60	100
7	MEP02	Work Shop Practice	-	-	2	1	20	2	20	3	60	100
8	BSP02	Engineering Chemistry Lab	-	-	2	1	20	2	20	3	60	100
9	CSP01	Computer Programming Lab	-	-	2	1	20	2	20	3	60	100
Total				20	10	25						900

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DEPARTMENT COMPUTER SCIENCE AND ENGINEERING
I YEAR – II SEMESTER (2016-17)

THEORY												
S.No	Course Code	Course Title	Hours per Week			Credits	Evaluation				Total Marks	
			L	T	P		Internal Test(30Marks)		External (70 Marks)			
							Duration (Hrs)	Max.	Duration	Max.		
1	BST01	English	4	-	-	4	2	30	3	70	100	
2	BST06	Engineering Mathematics – II	4	-	-	4	2	30	3	70	100	
3	BST05	Engineering Physics	4	-	-	4	2	30	3	70	100	
4	CST02	Data Structures	4	-	-	4	2	30	3	70	100	
5	MET19	Elements of Mechanical Engineering	4	-	-	4	2	30	3	70	100	
6	CST03	Discrete Mathematical Structures	4	-	-	4	2	30	3	70	100	
PRACTICALS												
S.No	Course Code	Course Title	Hours per Week			Credits	Evaluation				Total Marks	
			L	T	P		Internal (40 Marks)		External (60 Marks)			
							Continuous	Test	Max. Marks	Duration		Max.
7	BSP01	English Language Lab	-	-	2	1	20	2	20	3	60	100
8	BSP03	Engineering Physics Lab	-	-	2	1	20	2	20	3	60	100
9	CSP02	Data Structures Lab	-	-	2	1	20	2	20	3	60	100
Total				24	6	27						900

**SCHOOL OF ENGINEERING AND TECHNOLOGY
SRI PADMAVATI MAHILA VISVAVIDYALAYAM
SCHEME OF INSTRUCTION AND EVALUATION OF 4 YEARS B. TECH (C.S.E) DEGREE
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING 2016- 17**

S.No.	Course Number	Name of the Course	Instructions (hrs) per week)			Evaluation				Total Marks	
			Theory / Tutorial	Practical	Credits	Internal Exam		External Exam			
						Duration (hrs)	Max. Marks	Duration (hrs)	Max. Marks		
1	BST08	Probability and Statistics	4	-	4	2	30	3	70	100	
2	BST09	Managerial Economics And Financial Analysis	4	-	4	2	30	3	70	100	
3	CST04	Java Programming	4	-	4	2	30	3	70	100	
4	ECT21	Digital Logic Design	4	-	4	2	30	3	70	100	
5	EET17	Basic Electrical Engineering	4	-	4	2	30	3	70	100	
6	CST05	Database Management Systems	4	-	4	2	30	3	70	100	
PRACTICALS											
S.No.	Course Number	Name of the Course	Instructions (hrs) per week)			Evaluation				Total Marks	
			Theory / Tutorial	Practical	Credits	Continuous Evaluation Max Marks	Internal Exam		External Exam		
							Duration (hrs)	Max. Marks	Duration in (hrs)		Max. Marks
7	CSP03	Java Programming Lab	-	2	1	20	2	20	3	60	100
8	CSP04	Database Management Systems Lab	-	2	1	20	2	20	3	60	100
TOTAL			24	4	26	-	-	-	-	800	

II YEAR- I SEMESTER

SCHOOL OF ENGINEERING AND TECHNOLOGY
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COMPUTER SCIENCE & ENGINEERING 2016- 17

S.No.	Course Number	Name of the Course	Instructions ((hrs) per week)			Evaluation				Total Marks	
			Theory / Tutorial	Practical	Credits	Internal Exam		External Exam			
						Duration (hrs)	Max. Marks	Duration (hrs)	Max. Marks		
1	CST06	Data Communication	4	-	4	2	30	3	70	100	
2	CST07	Unix and Shell Programming	4	-	4	2	30	3	70	100	
3	CST08	Computer Organization	4	-	4	2	30	3	70	100	
4	CST09	Operating Systems	4	-	4	2	30	3	70	100	
5	CST10	Principles of Programming Language	4	-	4	2	30	3	70	100	
6	BST11	Industrial Management Science	4	-	4	2	30	3	70	100	
PRACTICALS											
S.No.	Course Number	Name of the Course	Instructions ((hrs) per week)			Evaluation				Total Marks	
			Theory / Tutorial	Practical	Credits	Continuous Evaluation Max Marks	Internal Exam		External Exam		
							Duration (hrs)	Max. Marks	Duration in (hrs)		Max. Marks
7	CSP05	Unix and Shell Programming Lab	-	2	1	20	2	20	3	60	100
8	CSP06	Operating Systems Lab	-	2	1	20	2	20	3	60	100
TOTAL			24	4	26	-		-	-	-	800

II YEAR- II SEMESTER

SCHOOL OF ENGINEERING AND TECHNOLOGY
SRI PADMAVATI MAHILA VISVAVIDYALAYAM
(WOMEN'S UNIVERSITY), TIRUPATI- 517 502
SCHEME OF INSTRUCTION AND EVALUATION OF 4 YEARS B. TECH (C.S.E) DEGREE
COMPUTER SCIENCE & ENGINEERING 2016- 17

S.No.	Course Number	Name of the Course	Instructions (hrs per week)			Evaluation				Total Marks	
			Theory / Tutorial	Practical	Credits	Internal Exam		External Exam			
						Duration (hrs)	Max. Marks	Duration (hrs)	Max. Marks		
1	CST11	Cryptography and Network Security	4	-	4	2	30	3	70	100	
2	CST12	Theory Of Computation	4	-	4	2	30	3	70	100	
3	CST13	Object Oriented Software Design	4	-	4	2	30	3	70	100	
4	CST14	Artificial Intelligence	4	-	4	2	30	3	70	100	
5	CST15	Systems Programming	4	-	4	2	30	3	70	100	
6	CST16	Design and Analysis of Algorithms	4	-	4	2	30	3	70	100	
PRACTICALS											
S.No.	Course Number	Name of the Course	Instructions (hrs per week)			Continuous Evaluation Max Marks	Evaluation				Total Marks
			Theory / Tutorial	Practical	Credits		Internal Exam		External Exam		
							Duration (hrs)	Max. Marks	Duration in (hrs)	Max. Marks	
7	CSP07	Object Oriented Software Design & Systems Programming Lab	-	2	1	20	2	20	3	60	100
8	CSP08	Design and Analysis of Algorithms & Artificial Intelligence Lab	-	2	1	20	2	20	3	60	100
TOTAL			24	4	26	-	-	-	-	800	

III YEAR- I SEMESTER

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COMPUTER SCIENCE & ENGINEERING 2016- 17

S.No.	Course Number	Name of the Course	Instructions ((hrs) per week)			Evaluation				Total Marks	
			Theory / Tutorial	Practical	Credits	Internal Exam		External Exam			
						Duration (hrs)	Max. Marks	Duration (hrs)	Max. Marks		
1	MET18	Operations Research	4	-	4	2	30	3	70	100	
2	CST17	Computer Networks	4	-	4	2	30	3	70	100	
3	ECT26	Microprocessors and Applications	4	-	4	2	30	3	70	100	
4	CST18	Software Engineering	3	-	3	2	30	3	70	100	
5		Elective I	3	-	3	2	30	3	70	100	
6		Elective II	3	-	3	2	30	3	70	100	
PRACTICALS											
S.No.	Course Number	Name of the Course	Instructions ((hrs) per week)			Evaluation				Total Marks	
			Theory / Tutorial	Practical	Credits	Continuous Evaluation Max Marks	Internal Exam		External Exam		
							Duration (hrs)	Max. Marks	Duration in (hrs)		Max. Marks
7	CSP09	Computer Networks Lab	-	2	1	20	2	20	3	60	100
8	ECP17	Microprocessors and Applications Lab	-	2	1	20	2	20	3	60	100
9	BSP04	Soft skills Lab	-	2	1	20	2	20	3	60	100
TOTAL			21	6	24						900

III YEAR- II SEMESTER

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COMPUTER SCIENCE & ENGINEERING 2016- 17

S.No.	Course Number	Name of the Course	Instructions (hrs per week)			Evaluation				Total Marks	
			Theory / Tutorial	Practical	Credits	Internal Exam		External Exam			
						Duration (hrs)	Max. Marks	Duration (hrs)	Max. Marks		
1	CST19	Web Technologies	4	-	4	2	30	3	70	100	
2	CST20	Compiler Design	4	-	4	2	30	3	70	100	
3	CST21	Data Mining	4	-	4	2	30	3	70	100	
4	CST22	Distributed Systems	4	-	4	2	30	3	70	100	
5		Elective III	3	-	3	2	30	3	70	100	
6		Elective IV	3	-	3	2	30	3	70	100	
PRACTICALS											
S.No.	Course Number	Name of the Course	Instructions (hrs per week)			Evaluation				Total Marks	
			Theory / Tutorial	Practical	Credits	Continuous Evaluation Max Marks	Internal Exam		External Exam		
							Duration (hrs)	Max. Marks	Duration in (hrs)		Max. Marks
7	CSP10	Compiler Design Lab	-	2	1	20	2	20	3	60	100
8	CSP11	Web Technologies & Data Mining Lab	-	2	1	20	2	20	3	60	100
TOTAL			22	4	24	-		-	-	-	800

IV YEAR- I SEMESTER

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COMPUTER SCIENCE & ENGINEERING 2016- 17**

S.No.	Course Number	Name of the Course	Instructions ((hrs) per week)			Evaluation				Total Marks	
			Theory / Tutorial	Practical	Credits	Internal Exam		External Exam			
						Duration (hrs)	Max. Marks	Duration (hrs)	Max. Marks		
1	CST23	Cloud Computing	4	-	4	2	30	3	70	100	
2		Elective-V	3	-	3	2	30	3	70	100	
3		Elective-VI	3	-	3	2	30	3	70	100	
PRACTICALS											
S.No.	Course Number	Name of the Course	Instructions ((hrs) per week)			Evaluation				Total Marks	
			Theory / Tutorial	Practical	Credits	Continuous Evaluation Max Marks	Internal Exam		External Exam		
							Duration (hrs)	Max. Marks	Duration in (hrs)		Max. Marks
5	CSP12	Project Work	-	-	6	20	2	20	3	60	100
TOTAL			10		16	-		-	-	-	400

IV YEAR- II SEMESTER

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SCHEME OF INSTRUCTION AND EVALUATION OF 4 YEARS B. TECH (C.S.E) DEGREE

COMPUTER SCIENCE & ENGINEERING 2016- 17

III YEAR-II SEMESTER

LIST OF ELECTIVES

S.No.	Course Number	Name of the Course	Instructions (hrs) per week)			Evaluation				Total Marks
			Theory / Tutorial	Practical	Credits	Internal Exam		External Exam		
						Duration (hrs)	Max. Marks	Duration (hrs)	Max. Marks	
		Elective I								
1	CST24	Python Programming	3	-	3	2	30	3	70	100
2	CST25	Enterprise Resource Planning	3	-	3	2	30	3	70	100
3	CST26	Soft Computing	3	-	3	2	30	3	70	100
4	CST27	Mobile Computing	3	-	3	2	30	3	70	100
5	CSP13	Advanced Programming Lab	3	-	3	2	40	3	60	100
		Elective II								
1	CST28	Cyber Physical Systems	3	-	3	2	30	3	70	100
2	CST29	Design Patterns	3	-	3	2	30	3	70	100
3	ECT10	Digital Signal Processing	3	-	3	2	30	3	70	100
4	MUP01	Music(Open Elective)			4		40	3	60	100
5	MUP02	Dance-Bharathanatyam(Open Elective)			4		40	3	60	100
6	MUP03	Dance-Kuchipudi(Open Elective)			4		40	3	60	100

IV YEAR-I SEMESTER LIST OF ELECTIVES

S.No.	Course Number	Name of the Course	Instructions (hrs) per week			Evaluation				Total Marks
			Theory / Tutorial	Practical	Credits	Internal Exam		External Exam		
						Duration (hrs)	Max. Marks	Duration (hrs)	Max. Marks	
		Elective III								
1	CST30	Cyber Security	3	-	3	2	30	3	70	100
2	CST31	Software Project Management	3	-	3	2	30	3	70	100
3	MET33	Industrial Robotics	3	-	3	2	30	3	70	100
4	CST32	Big Data Analytics	3	-	3	2	30	3	70	100
		Elective IV								
1	CST33	R Programming	3	-	3	2	30	3	70	100
2	ECT36	Digital Image Processing	3	-	3	2	30	3	70	100
3	CST34	Natural Language Processing	3	-	3	2	30	3	70	100
4	CST35	Android Application Development	3	-	3	2	30	3	70	100

IV YEAR-II SEMESTER LIST OF ELECTIVES

S.No.	Course Number	Name of the Course	Instructions (hrs per week)			Evaluation				Total Marks
			Theory / Tutorial	Practical	Credits	Internal Exam		External Exam		
						Duration (hrs)	Max. Marks	Duration (hrs)	Max. Marks	
		Elective-V	3	-	3	2	30	3	70	100
1	CST36	Internet of Things	3	-	3	2	30	3	70	100
2	CST37	Wireless Networks	3	-	3	2	30	3	70	100
3	CST38	Software Testing	3	-	3	2	30	3	70	100
4	CST39	Real-time Systems	3	-	3	2	30	3	70	100
		Elective-VI	3	-	3	2	30	3	70	100
1	CST40	Ethical Hacking	3	-	3	2	30	3	70	100
2	CST41	Multimedia Systems	3	-	3	2	30	3	70	100
3	ECT19	Embedded Systems	3	-	3	2	30	3	70	100
4	CST42	Computer Graphics	3	-	3	2	30	3	70	100

Syllabus

B.Tech I year I Semester

S.NO	Course Number	Name of the Course
1	BST02	Environmental Studies
2	BST03	Engineering Mathematics – I
3	BST04	Engineering Chemistry
4	CST01	Problem Solving and Computer Programming
5	ECT01	Electronic Materials and Devices
6	MEP01	Engineering Graphics
7	MEP02	Workshop Practice
8	BSP02	Engineering Chemistry Lab
9	CSP01	Computer Programming Lab

BST02 ENVIRONMENTAL STUDIES

Credits: 4

Internal Marks: 30
University Examination Marks: 70

UNIT I

Environmental Studies and Natural Resources-Definition of environment, Scope and importance of Environment, Environmental studies, Need for public awareness.

Renewable and Non Renewable Resources and associated problems and case studies- Uses, consequences of exploitation and remedial measures- (i) Water resources, (ii) Forest resources, (iii) Land resources, (iv) Mineral resources, (v) Food resources, (vi) Energy resources.

UNIT II

Environmental pollution and Global Effects- Definition, Causes, Effects, and control measures of pollution- Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution.

Solid waste Management- Causes, effects and disposal methods; **Role of an individual in prevention of pollution**; case studies.

Climate changes- Global warming, Acid rain, Ozone depletion

UNIT III

Disaster management- Earthquakes, cyclone, avalanches, land slides, Tsunami.

Environment and Human health- Epidemic diseases and pathology of Hepatitis-b, HIV/AIDS, Malaria, Typhoi, Chikungunya, Avian Flue, anthrax, *etc.*

Water Conservation- Rain water harvesting- watershed management.

Waste land

reclamation.

UNIT IV

Ecosystem- Definition -Structure and functions of an ecosystem; types of ecosystems.

Biodiversity and its conservation- Importance of biodiversity -Hot-spots of biodiversity,

India as a mega-diversity nation; Threats and Conservation of biodiversity. Case Studies.

UNIT V

Social Issues- Population Explosion, Sustainable Development

Environmental Impact Assessment, Environmental Risk assessment (ERA), Clean Production and Life cycle assessment.**Environment Legislation:** Environmental Protection Act, Water Act, Air Act, Wild Life Protection Act, Forest Conservation Act, Issues involved in Enforcement of Environmental legislation.

REFERENCE BOOKS:

1. Kaushik & Kaushik Environmental Studies” McGraw Hill, New York, 1996.
2. Canter, L.W., “Handbook of Environmental Impact Assessment Vol.I and II”, The World Bank, Washington, 1991.
3. Pelczer, Jr., M. J., Chan, e. C. S., Krieg, R. Noel., and Pelczar Maerna Foss, “Microbiology”, 5th Edn., Tata McGraw Hill Publishing Company Limited, New Delhi – 1996.
4. METCALF & EDDY, INC. “Wastewater Engineering Treatment Disposal, and Reuse”, Third Edition, Taya McGraw Hill Publishing Company Limited, New Delhi- 1995.
5. CSSEY.I.J. „Unit Treatment processes in and Waste water Engineering”, John Wiley & Sons England 1993.
6. B.R.Shah and Snehal Popli, „Environmental Studies”, 9th Edition Mahajan Publishing House.
7. C.S.Rao „Environmental Pollution Control Engineering, 2nd Edition, New age International Publishers.

BST03 - ENGINEERING MATHEMATICS – I

Credits: 4

Internal Marks: 30
University Examinations Marks: 70

UNIT – I

Calculus: Roll's and Mean value theorems, Taylor's theorem, Maclaurin's theorem - Maxima & minima for functions of two variables – Curve tracing.

UNIT - II

Multiple integrals: Double and triple integrals, Change of order of integration, Change of variables – Simple applications – areas & volumes.

UNIT – III

Differential Equations-I: Exact, Linear and Bernoulli's equations, orthogonal trajectories; Homogeneous and Non-Homogeneous linear differential equations of second and higher order with constant coefficients.

UNIT – IV

Differential Equations-II: Linear equations with variable coefficients - Euler equations, Method of variation of parameters, Simultaneous equations.

UNIT – V

Vector Calculus: Gradient, Divergence, Curl and related properties; Line, surface and volume integrals; Stokes, Greens and Gauss-Divergence theorems.

Text books:

1. Higher Engineering Mathematics, 42nd Edition, Grewal, B.S., Khanna Publications, New Delhi.
2. Engineering Mathematics, Vol-I, II, Dr. M.K. Venkata Raman, National Publishing Co., Madras.
3. Advanced Engineering Mathematics, 9th Edition, Erwin Kresyng, Wiley Eastern Ltd., New Delhi.
4. Engineering Mathematics, 6th Edition, B.V. Ramana, Tata McGraw Hill, New Delhi.

BST04 ENGINEERING CHEMISTRY

Credits: 4

Internal Marks: 30

University Examinations Marks: 70

UNIT 1 : WATER TREATMENT

Impurities in water, Hardness of water and its units, Disadvantages of hard water, Boiler feed water, scale and sludge formation in boilers, priming and foaming, Caustic embrittlement and boiler corrosion. Softening methods-lime soda, Zeolite and ion-exchange process, specification of potable water and purification of Drinking water.

UNIT 2: ELETRO CHEMISTRY AND CORROSION

Galvanic cells, Nernst equation, electrode potential, reference electrodes: hydrogen, calomel and glass electrode, Batteries: Rechargeable batteries (Lead acid, Ni-cd, Lithium ion Batteries), Fuels cells : (Hydrogen-oxygen and Methanol-oxygen, solid oxide)

Corrosion: Introduction, Type of corrosion, factors affecting the corrosion, Prevention: cathodic protection, Inhibitors (Anodic and Cathodic), electroplating.

UNIT 3: POLYMERS

Basic concepts of polymerization, Types of polymerization, Plastomers: Thermosetting and Thermoplastics, preparation, properties and applications of polythene, Nylon, Teflon and Bakelite, Natural Rubbers: Processing of natural rubbers, compounding of Rubber Synthetic Rubber: Preparation, properties and applications of Buna-N, Thiokol and silicon rubbers, Polymers in medicine and surgery

UNIT4: FUELS AND COMBUSTION

Introduction, Classification of fuels, calorific value and its determination, bomb calorimeter, boys gas calorimeter, theoretical calculation of calorific value of fuel, coal-classification and Analysis, Metallurgical coke, petroleum-refining of petroleum, synthetic petrol, combustion, mass analysis from volume analysis and vice versa, analysis of flue gas by Orsat's apparatus.

UNIT-5 CHEMISTRY OF ENGENEERING MATERIALS

Cement: Composition, classification, preparation, setting and Hardening and analysis of cement. Refractories: Introduction, classification, properties and engineering applications.

Ceramics-Classification, properties and engineering applications.

Lubricants: Introduction, Classification, theory of lubrication, properties and engineering applications.

Text books:

1.Engineerning chemistry , First Edition, Jayaveera KN, Subba Reddy GV and

Ramachandraiah C, McGraw Hill Higher Education, New Delhi,2013

2.A Text Book of Engineering Chemistry, 15th Edition , Jain and Jain, Dhanapathi Rai Publications, New Delhi,2013

References:

1. A Text Book of Engineering Chemistry 12th Edition, SS Dhara,Uma, S. Chand Publications, New Delhi, 2010.

2. A Text Book of Engineering Chemistry, First Edition, K.B. Chandra Sekhar, UN.Das and sujatha fMishra, SCITECH Publications India Pvt Limited, 2010.

3. Engineering Chemistry, First Edition, Seshamaheswaramma K and Mridula Chugh, Pearson Education, 2013.

CST01 PROBLEM SOLVING AND COMPUTER PROGRAMMING

Credits: 4

Internal Marks: 30
University Examinations Marks: 70

UNIT I

Introduction to Problem Solving: Introduction to Computer Systems, Computer Environments, Computer Languages, Problem Solving Aspects, Top-Down Design, Development of Algorithms, Representation of Algorithm, Flow Chart, Pseudo Code, Coding, Testing and Debugging.

UNIT II

History of C programming Language, form of a C program - Comments, pre-processor statements, function header statements, variable declaration statements and executable statements.

C character set, C tokens- constants, identifiers, operators, punctuations and keywords. Basic data types, modifiers, identifiers, variables, C Scopes, Type qualifiers, Storage Class Specifiers, variable initializations and constants, I/O statements, operators, expressions, operator precedence and associativity.

Category of Statements - Selection, Iteration, Jump, Label, Expression and Block.

UNIT III

Functions - Declaration, Prototype definition, calling by value and address, Standard Library Functions, Recursive Functions.

Arrays and strings - Declaration, Initialization, Reading and Writing, Accessing, and Passing as a parameter to functions, Multidimensional arrays, String functions.

UNIT IV

Pointers - pointer expressions, pointer and arrays, multiple indirection, initializing pointers, pointers to functions, Dynamic memory allocation functions.

Structures - declaration, initialization, accessing, array of structures and passing structures to functions, structure pointers, arrays and structures within structures, Unions, Bit-fields, typedef, and enumerations.

UNIT V

Files - I/O and processing operations on Text and binary files, Pre-processor directives and Command Line Arguments.

Text Books:

1. Schildt H, C: The Complete Reference, 4th Edition, Tata McGraw-Hill, 2002.
2. Balagurusamy E, Programming in ANSI C, 4th Edition, Tata McGraw-Hill, 2008
3. R.G.Dromey, How to Solve it by Computer, PHI.

Reference Books:

1. Let us C, Yeswanth Kanitkar, Ninth Edition, BPB Publications.
2. Programming In C, Second Edition- Pradip Dey, Manas Ghosh, Oxford University Press.

ECT01 ELECTRONIC MATERIALS AND DEVICES

Credits: 4

Internal Marks: 30

University Examinations Marks: 70

UNIT – I

ELECTRON DYNAMICS AND CRO: Motion of charged particles in electric and magnetic fields. Simple problems involving Electric and Magnetic fields only. Principles of CRT. Deflection sensitivity Electrostatic and magnetic deflection systems. Applications of CRO.

UNIT - II

SEMICONDUCTORS AND PN JUNCTION DIODE: Conductors, Semiconductors and Insulators. Conductivity and mobility. Intrinsic and extrinsic semiconductors. Fermi level and carrier concentration of p and n type semiconductors. Drift and diffusion currents. Hall effect.

PN Junction diode. Volt-ampere characteristic and its temperature dependence – Diode resistance and capacitance, zener diode, varactor diode, Half-wave and full-wave rectifiers.

UNIT – III

BIPOLAR JUNCTION TRANSISTOR: Transistor action, NPN and PNP transistors CB, CE, CC configurations and their characteristics and parameters. Transistor as an amplifier. CB, CE and CC amplifiers and their comparison.

UNIT - IV

FIELD EFFECT TRANSISTOR: Characteristics and parameters of JFET, depletion and enhancement type MOSFETS. FET amplifier CS, CD, and CG amplifiers and their comparison.

Comparison of BJT and FET amplifiers, Characteristics and parameters of UJT and SCR.

UNIT V

OPTO ELECTRONIC DEVICES: Principles of operation and characteristics of Photo conductors, Photo diodes and transistors, Photovoltaic cells, Display devices LED and LCD. Seven segment display, Spontaneous emission, stimulated emission, population inversion, optical resonant cavity, Semiconductor Lasers.

TEXT BOOKS:

1. Millman and Halkias, “ Electronic Devices and Circuits”. Tata Mc Graw Hill & Co.
2. R.L. Boylestad and Louis Nashelsky, “ Electronic Devices and Circuit Theory”, Pearson Education.
3. Floyd, “ Electronic Devices”. Pearson Education.

MEP01 ENGINEERING GRAPHICS

Credits: 2

Internal Marks: 40

University Examinations Marks: 60

UNIT I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance- Conventions in Drawing-Lettering – BIS Conventions.

Scales: Plain scales and Diagonal scales

Conics: Construction of ellipse, parabola and hyperbola using eccentricity method

Ellipse: Concentric circles method, Oblong method, arcs of circles method

Parabola: - Rectangular method, parallelogram method, Rectangular hyperbola

UNIT II

Special curves: - Cycloids, Epicycloids and Hypocycloids

Involutes:- Involute of a circle and polygons

Projection of Points: Principles of orthographic projection – Convention – First angle projections, projections of points.

UNIT III

Projections of Straight Lines: Projections of lines inclined to single plane
Projections of lines inclined to both planes - True lengths and true inclinations.

Projections of Planes: Projections of regular plane surfaces (polygons, circular lamina) - plane surfaces inclined to one plane- plane surfaces inclined to both planes.

UNIT IV

Projections of Solids: Projections of Right Regular Solids (prisms, pyramids, cone, and cylinder) axis inclined to one plane

Sections of Solids: Sections of simple Solids in simple vertical position
Cutting plane inclined to one plane and perpendicular to the other plane.

Developments of Surfaces: Development of Surfaces of Right Regular solids like prism, Cylinder, Pyramid, Cone.

UNIT V

Isometric and Orthographic Projections: Principles of isometric projection- Isometric Scale- Isometric Views- Conventions- Isometric Views of lines, Planes, Simple solids (cube, cylinder and cone).

Conversion of isometric Views to Orthographic Views of simple objects

Text Books:

1. Engineering Drawing, N.D. Bhat, Charotar Publishers
2. Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai.

References:

1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers,2014
2. Engineering Drawing, N.S Patha sarathy, vela murali, Oxford University Press,2015
3. Engineering Graphics D.A.Hindoliya, BSP publications, 2014,Engineering Graphics, K.C.John, PHI,2014

MEP02 : WORKSHOP PRACTICE
(COMMON TO ALL BRANCHES)

Credits: 1

Internal Marks: 40

University Examinations Marks: 60

Carpentry

Wood sizing exercise in planning, marking, sawing, chiseling and grooving to prepare Half – lap joint

1. Dove – tail joint
2. Tenon joint

Fitting

Markings, cutting and filing to prepare

1. Straight fitting
2. V – fitting
3. Square fitting

Tin smithy

Markings, bending and cutting to prepare

1. Round tin
2. Square tin

Foundry

Ramming and placing of riser and runner to prepare the moulds for the following

1. Two – stepped pulley
2. Three – stepped pulley
3. Dumbbell

Electrical Wiring Shop:

Safety rules and practices in wiring, basic circuits, Common House wiring connections such as parallel and series connections, bell circuit.

Reference Text Books:

1. Workshop Manual by K. Venkat Reddy
2. Elementary Workshop Technology by Hazara Chowdary & Bhattaaaacharya
3. Workshop Technology Vol I & II by Raghuvamsi.

BSP02 ENGINEERING CHEMISTRY LAB

Credits: 1

Internal Marks: 40
University Examinations Marks: 60

LIST OF EXPERIMENTS
(Minimum Seven are Mandatory)

1. To determine the strength of KMnO_4 solution by titrating it against a standard solution of Oxalic acid.
2. Determination of hardness of water by EDTA method.
3. Estimation of acidity of Water
4. Estimation of Dissolved oxygen in water sample
5. Determination of Iron by using potassium dichromate
6. Estimation of copper by EDTA method
7. Estimation of chloride in water sample.
8. Conductometric titration of strong acid with strong base
9. Potentiometric titration of Iron by dichrometry method
10. Colorimetric estimation of manganese
11. Estimation of Glucose

CSP01 COMPUTER PROGRAMMING LAB

Credits: 1

Internal Marks: 40

University Examinations Marks: 60

List of Experiments:

1. Write, Edit, Debug, Compile and Execute Sample C programs to understand the programming environment.
2. Practice programs: Finding the sum of three numbers, exchange of two numbers, maximum of two numbers, To read and print variable values of all data types of C language, to find the size of all data types, to understand the priority and associativity of operators using expressions, to use different library functions of C language.
3. Write a program to find the roots of a Quadratic equation.
4. Write a program to compute the factorial of a given number.
5. Write a program to check whether the number is prime or not.
6. Write a program to find the series of prime numbers in the given range.
7. Write a program to generate Fibonacci numbers in the given range.
8. Write a program to find the maximum of a set of numbers.
9. Write a program to reverse the digits of a number.
10. Write a program to find the sum of the digits of a number.
11. Write a program to find the sum of positive and negative numbers in a given set of numbers.
12. Write a program to check for number palindrome.
13. Write a program to evaluate the sum of the following series up to "n" terms
$$x=1+x+x^2/2!+x^3/3!+x^4/4!+-----$$
14. Write a program to generate Pascal Triangle.
15. Write a program to read two matrices and print their sum and product in the matrix form.
16. Write a program to read matrix and perform the following operations.
 - i. Find the sum of Diagonal Elements of a matrix.
 - ii. Print Transpose of a matrix.
 - iii. Print sum of even and odd numbers in a given matrix.
17. Write a program to accept a line of characters and print the number of Vowels, Consonants, blank spaces, digits and special characters.
18. Write a program to insert a substring in to a given string and delete few characters from the string. Don't use library functions related to strings.
19. Write a program to perform the operations addition, subtraction, multiplication of complex numbers.
20. Write a program to split a „file“ in to two files, say file1 and file2. Read lines into the „file“ from standard input. File1 should consist of odd numbered lines and file2 should consist of even numbered lines.
21. Write a program to merge two files.

22. Write a program to implement numerical methods Lagrange's interpolation, Trapezoidal rule.
23. Write a program to read a set of strings and sort them in alphabetical order.
24. Write a program to exchange two numbers using pointers.
25. Write a program to read student records into a file. Record consists of roll no , name and marks of a student in six subjects and class. Class field is empty initially. Compute the class of a student. The calculation of the class is as per JNTUA rules. Write the first class, second class, third class and failed students lists separately to another file.
26. A file consists of information about employee salary with fields employee id, name, Basic, HRA, DA, IT, other deductions, Gross and Net salary. Initially only employee id, name, and basic have valid values. HRA is taken as 10% of the basic, DA is taken as 80% of basic, IT is 20% of the basic, other deductions is user specified. Compute the Gross and Net salary of the employee and update the file.
27. Write a program to perform Base (decimal, octal, hexadecimal, etc) conversion.
28. Write a program to find the square root of a number without using built-in library function.
29. Write a program to convert from string to number.
30. Write a program to implement pseudo random generator.
31. Write a program to generate multiplication tables from 11 to 20.
32. Write a program to express a four digit number in words. For example 1546 should be written as one thousand five hundred and forty six.
33. Write a program to generate a telephone bill. The contents of it and the rate calculation etc should be as per BSNL rules. Student is expected to gather the required information through the BSNL website.
34. Write a program to find the execution time of a program.
35. Design a file format to store a person's name, address, and other information. Write a program to read this file and produce a set of mailing labels.

B.Tech

I Year II Semester

S.NO	Course Number	Name of the Course
1	BST01	English
2	BST06	Engineering Mathematics – II
3	BST05	Engineering Physics
4	CST02	Data Structures
5	MET19	Elements of Mechanical Engineering
6	CST03	Discrete Mathematical Structures
7	BSP01	English Language Lab
8	BSP03	Engineering Physics Lab
9	CSP02	Data Structures Lab

BST01 ENGLISH

Credits: 4

Internal Marks: 30
University Examination Marks: 70

UNIT – I

Inspiration: Reaching for the Stars. Comprehension, Vocabulary, Grammar, Listening, Speaking, Reading and Writing.

Information Technology: A Very Short History of Computer Ethics. Comprehension, Vocabulary, Grammar, Listening, Speaking, Reading and Writing.

UNIT – II

Writing English: Letter Writing, Résumé writing, Electronic Mode of Writing, Information Transfer, Note Taking & Reading Comprehensive.

UNIT-III

Travel and Transport: The Climb to Annapurna. Comprehension, Vocabulary, Grammar, Listening, Speaking, Reading and Writing.

Media: Freedom of Press, Comprehension, Vocabulary, Grammar, Listening, Speaking, Reading and Writing.

UNIT – IV

Human Interest: A Service of Love. Comprehension, Vocabulary, Grammar, Listening, Speaking, Reading and Writing.

Environment: Water. Comprehension, Vocabulary, Grammar, Listening, Speaking, Reading and Writing.

UNIT - V

Grammar: Tenses: Past and Present, Fundamentals of Grammar, Correction of Sentences.

TEXT BOOKS:

Learning English: A communicative Approach – Orient Longman

A Manual for English Language Laboratories – D.Sudha Rani - Pearson

REFERENCES:

1. Hancock, Mark, English Pronunciation in Use - CUP
2. Murphy, Raymond, Essential English Grammar - CUP
3. English vocabulary in use – CUP
4. M. Gnanamurali. English Grammar at a Glance – S.Chand& Company Ltd.
5. LeenaSen, Communication Skills – Prentice – Hall of India

BST06 ENGINEERING MATHEMATICS – II

Credits: 4

Internal Marks: 30

University Examinations Marks: 70

UNIT – I

Laplace Transforms: Laplace transforms of standard functions, Transform of Periodic functions, Step function, Inverse transforms of derivatives and integrals, Convolution theorem, applications to solutions of ordinary differential equations.

UNIT - II

Matrices: Rank, solution of system of linear equations, Eigen values, Eigen vectors, Cayley Hamilton theorem, Quadratic forms – Diagonalization.

UNIT – III

Partial Differential Equations: Formation of PDEs by elimination of arbitrary constants and arbitrary functions, Method of separation of variables, one dimensional wave equation, heat equation, Laplace equation.

UNIT – IV

Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position– Newton-Raphson Method, Solution of linear simultaneous equation by Gauss elimination method, Gauss matrix and Gauss – Seidal iteration method.

Interpolation: Newton’s forward and backward interpolation formulae – Lagrange’s formulae.

UNIT – V

Numerical Integration: Trapezoidal rule – Simpson’s 1/3 Rule – Simpson’s 3/8 Rule.

Numerical solution of Ordinary Differential equations: Solution by Taylor’s series- Picard’s Method of successive Approximations-Euler’s Method, Runge-Kutta Methods, Predictor-Corrector Method-Milne’s Method.

Text books:

1. Higher Engineering Mathematics, 42nd Edition, Grewal, B.S., Khanna Publications, New Delhi.
2. Engineering Mathematics, Vol-I, II, Dr. M.K. Venkata Raman, National Publishing Co., Madras.
3. Advanced Engineering Mathematics, 9th Edition, Erwin Kresyzyng, Wiley Eastern Ltd., New Delhi.
4. Engineering Mathematics, 6th Edition, B.V. Ramana, Tata McGraw Hill, New Delhi.

BST05 ENGINEERING PHYSICS

Credits: 4

Internal Marks: 30

University Examinations Marks: 70

UNIT I:

Principles of Quantum Mechanics: Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, Heisenberg's Uncertainty Principle

Schrödinger's Time depended and Independent Wave Equation - Physical Significance of the Wave Function – Particle in a one dimensional infinite potential well

UNIT-II:

Band Theory of Solids: Classical free electron theory of metals-Success and Failures-Quantum free electron theory-Fermi Factor-Electron in periodic potential-Bloch Theorem-Kronig-Penny Model

Distinction between metals, Insulators and semiconductors-Intrinsic and Extrinsic semiconductors-Hall effect

UNIT – III:

Semiconductors : Introduction, intrinsic and extrinsic semiconductors, direct and indirect band gap semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion, Hall effect, p-n junction diode, diode equation, LED, LCD and photo diode

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

UNIT IV:

Lasers & Fiber Optics: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Einstein's Coefficients and Relation between them, Population Inversion, Lasing Action, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers

Principle of Optical Fiber, Construction of fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers: Step Index and Graded Index Fibers, Attenuation in Optical Fibers, Application of Optical Fiber in communication systems.

UNIT V:

Nano Materials: Introduction-properties: optical properties-quantum confinement-electrical properties-synthesis of nano materials: Ball milling, arc deposition, chemical vapour deposition, pulsed laser deposition methods

characteristics of C (zero dimensional), Carbon nanotubes (1 dimensional), Graphene (2 dimensional). Applications of nanomaterials.

Text Books:

1. Engineering Physics – V. Rajendran, K.Thyagarajan Tata MacGraw Hill Publishers, III Edition, 2012.
2. Engineering physics – M.N. Avadhanulu and P.G. KshirSagar, S.Chand and Co, Revised Edition, 2013.
3. Engineering Physics – M. Arumugam, Anuradha Publications II Edition, 1997
4. Engineering Physics – Hitendra K Mallik and AK Singh, McGraw Hill Education Pvt. Ltd, New Delhi , I Edition, 2010

Reference Books:

1. Modern Physics- R.Murugesan, Er.Kiruthiga Sivaprasath, S.Chand and Co, Revised Edition, 2013.
2. A Text book of Quantum Mechanics- Sathya prakash
3. Introduction to solid state physics, Kittel, Wiley Eastern Ltd., 2003
4. Principles of Electronics-V.K.Mehta, S.Chand and Co, Revised Edition 2008.
5. Fiber Optics & Laser The Two Revolutions-Ajoy Ghatak & K.Thiyagarajan, Macmillan Publishers India Ltd, 2006.
6. Text book of Nanoscience and Nanotechnology: B S Murthy, P.Shankar, Baldev Raj B B Rath, James Murday, University Press, I Edition, 2012.

CST02 DATA STRUCTURES

Credits: 4

Internal Marks: 30
University Examinations Marks: 70

UNIT-I

An overview of C++ Programming, OOPS Concepts, Data Abstraction with C++, Concept of the Inheritance, Concept of Polymorphism, Friend Functions, Inline Functions, Exception Handling.

UNIT – II

Introduction to Data Structures, Types of Data Structures, Abstract Data Types, Complexity of an algorithm, Arrays; Linked Lists : Introduction, Single Linked List, Double, Circular Lists, Stacks, Queues and their Operations and Applications.

UNIT – III

Trees: Basic Terminologies- Definition and Concepts- Representations of Binary Tree- Operation on a Binary Tree- Types of Binary Trees-Binary Search Trees, Heap Trees, Height Balanced Trees, AVL Trees, B-Trees.

Graphs: Introduction- Graph terminologies- Representation of graphs- Operations on Graphs- Application of Graph Structures: Shortest path problem- topological sorting.

UNIT – IV

Hashing: Basic Concepts of Hashing Methods, Hash Tables, Choosing a hash Function, Collision Resolutions, File Organisation- Sequential File Organization, ISAM, Direct Files.

UNIT - V

Sorting: Internal Sorting Techniques: Selection sort, Bubble sort ,Merge sort Quick sort, heap sort and Radix sort; Introduction to external sorting; Searching Techniques; Linear and Binary search.

Text Books:

1. Herbert Schildt; C++ ;Complete Reference C++.Fourth edition 2003
2. S.Sahni, “Data Structures, Algorithms and Applications in C+ +” Second Edifion, Orient Longman Pvt.ltd
3. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C + +”, Pearson Education, Second Edition.
4. 1. “Classic Data Structures”, Second Edition by DebasisSamanta, PHI.

Reference Books:

1. J.P. Trembly and P.G. Sorensen, “An Introduction to Data Structures with Applications”. Tata McGraw Hill, Third edition.
2. E.Horowitz and S. Sahani, “Fundamentals of Data Structures”, Galgotia Book Source.
3. SartajSahni, “Data Structures, Algorithms and Applications in C++” Tata McGraw- Hill International Editions

MET19 ELEMENTS OF MECHANICAL ENGINEERING

Credits: 4

Internal Marks: 30

University Examinations Marks: 70

UNIT – I

Introduction to Thermodynamics – Concept of a system – Types of Systems, Thermodynamic Equilibrium – Properties, State, Process and Cycle, Zeroth Law, Energy Interactions – Heat and work, Types of work. First and Second Laws of Thermodynamics: First law, Cycle and process, Specific heats, Heat interactions in a closed system for various processes, Limitations of First law, Concept of Heat Engine (H.E.) and reversed heat engine (Heat pump and refrigerator) , Efficiency/COP, Second Law: Kelvin – Planck and Clausius Statements , Carnot Cycle, Carnot Efficiency, Property of Entropy – T- S and P – V diagrams

UNIT – II

Thermal Power Plant: Thermal power plant layout – Four circuits – Rankine cycle, Boilers: Fire tube Vs Water Tube; Bob Cock and Wilcox, Cochran Boilers, Steam Turbines, Impulse Vs. Reaction Turbines, Compounding of Turbines.

UNIT – III

Internal Combustion Engines (IC): I.C. 2 – Stroke and 4 – Stroke engines – S.I. engines and engines – Differences Heat transfer – Modes – Thermal resistance concept, Conduction, Composite walls and Cylinders. Combined Conduction and Convection – Overall Heat transfer Coefficient, Simple Numerical Problems in Heat transfer.

UNIT – IV

Manufacturing Processes : Engineering Materials ; Classification , Properties of materials, Metal Casting, Moulding, Patterns, Hot working and Cold working , Extrusion, Forging, Rolling and Drawing. Machine Tools and Machining Processes – Lathe Machines and Lathe operations, Milling machines, Types – Milling operations , Shaper, Planer, Drilling and Grinding machines. Welding – Gas welding, Arc Welding, Soldering and Brazing

UNIT – V

Power Transmission – Transmission of Mechanical Power, Belt drives, Simple Numerical Problems, Gear Drives – Simple Numerical Problems

Basics of Automotive vehicle – Brakes – Types - Clutch and Differential.

Text Books:

1. Mathur, M.L., Mehta F.S. and Tiwari R.P., Elements of Mechanical Engineering, Jain Brothers, New Delhi, 2011.
2. Roy K.P. and HazraChowdary, S.K., Elements of Mechanical Engineering, Media Promoters and Publishers Pvt., Ltd, 2002.
3. Rudramoorthy R., Thermal Engineering, Tata McGrawHill Book Company, New Delhi, 2003.
4. Hazra Chowdary, S.K., and Bose, Workshop Technology , Vol. I and II, Media Promoters and Publishers Pvt. Ltd., 2002.

CST03 DISCRETE MATHEMATICAL STRUCTURES

Credits: 4

Internal Marks: 30

University Examinations Marks: 70

UNIT – I

Mathematical logics: Statement and Notations, Connectives, Normal forms, Theory of inference for statement calculus, Quantifiers, Inference theory of Predicate calculus.

UNIT – II

Algebraic Structures: Algebraic systems, Examples and General properties, Semigroups and Monoids, Grammars and Languages, Polish Expressions and their Compilation.

UNIT – III

Boolean Algebra: Boolean algebra, Boolean functions, Representation and minimization of Boolean functions, Design example using Boolean algebra, Finite state machines.

Set Theory: Properties of binary relations, Equivalence, compatibility, Partial ordering relations, Hasse diagram.

UNIT – IV

Graph Theory: Basic concepts of graph theory, Representation of graphs, Isomorphic graphs, Subgraphs, DFS, BFS, Spanning trees, Chromatic numbers, Eulers circuit, Hamilton circuits, planar graphs.

UNIT – V

Combinatorics: Basic Combinatorial numbers, Generating functions, Recurrence relations, Binomial theorem, Multinomials, Inclusion and Exclusion principle, Permutations and Combinations.

Text Books:

1. **Kenneth H Rosen**, “Discrete Mathematics and its Applications”, TATA.
2. **J.K. Sharma**, “Discrete Mathematics”, 3rd Edition.

Reference Books:

1. **J.P. Tremblay and R. Manohar**, “Discrete Mathematical Structures with application to computers science”, Mc Graw-Hill, 1988.
2. **J.L. Mott, A. Kandel, T.P. Baker**, “Discrete Mathematics for Computer Scientists and Mathematicians”, PHI, Second edition.
3. **Edgar G.Goodaire and Michael M**, “Discrete Mathematics with Graph theory”, Second edition, Prentice-Hall of India.
4. **V. Krishna murthy**, “Combinatorics Theory and Application”, East-West.

BSP01 ENGLISH LANGUAGE LAB

Credits: 1

Internal Marks: 40

University Examination Marks: 60

UNIT-I SPEAKING

- i) Speech Sounds: Vowels and Consonants
- ii) Accent & Rhythm: Word and Sentence Accent
- iii) Intonation: rising tone, falling tone.

Number of Hours: 8

UNIT – II WRITING

- i) Spelling and Punctuation
- ii) Dialogue Writing and Paragraph writing

Number of Hours: 6

UNIT- III ORAL PRESENTATIONS

- i) Panel Discussions (Group Discussion)
- ii) Just a minute (JAM), Debate, Role Play

Number of Hours: 12

UNIT – IV VOCABULARY

Missing words, Phrasal verbs and Idiomatic expressions, Proverbs

BSP03 ENGINEERING PHYSICS LAB

Credits: 1

Internal Marks: 40

University Examinations Marks: 60

LIST OF EXPERIMENTS (Minimum Six are mandatory)

1. Determination of Numerical aperture of an optical fiber
2. Youngs modulus - non uniform bending - optic lever
3. Calibration of voltmeter / ammeter using potentiometer
4. Spectrometer-Determination of angle of prism.
5. Laser-Determination of wavelength using grating.
6. Bending losses of fibres & Evaluation of numerical aperture of a given fibre
7. Rigidity Modulus-Torsional pendulum
8. Post office box – Determination of Band gap of a semiconductor

CSP02 DATA STRUCTURES LAB

Credits: 1

Internal Marks: 40

University Examinations Marks: 60

List of Experiments/Tasks

1. Write a program to sort the elements of an array using sorting by exchange.
2. Write a program to sort the elements of an array using Selection Sort.
3. Write a program to implement heap sort.
4. Write a program to perform Linear Search on the elements of a given array.
5. Write a program to perform Binary Search on the elements of a given array.
6. Write a program to convert infix expression to postfix expression and evaluate postfix expression.
7. Write a program to implement stack, queue, circular queue using arrays and linked lists.
8. Write a program to perform the operations creation, insertion, deletion, and traversing a singly linked list.
9. Write a program to perform the operations creation, insertion, deletion, and traversing a Doubly linked list.
10. Write a program to remove duplicates from ordered and unordered arrays.
11. Write a program to sort numbers using insertion sort.
12. Write a program to implement quick sort using non-recursive and recursive approaches. Use randomized element as partitioning element.
13. Write a program to search a word in a given file and display all its positions.
14. Write a program for tic-tac-toe game.
15. Write a program to perform operations creation, insertion, deletion and traversing on a binary search tree.
16. Write a program to implement depth first search and breadth first search on graphs.
17. Write a program to perform different operations on Red Black trees.
18. Write a program to implement external sorting.
19. Write a program to perform different operations of B Tree.

References:

1. Fundamentals of Data Structures in C”, Horowitz, Sahni, Anderson-freed, Second Edition, Universities Press.
2. Data structures and Algorithms using C++, Ananda Rao Akepogu and Radhika Raju Palagiri, Pearson Education

B.Tech

II Year I Semester

S.No.	Course Number	Name of the Course
1	BST08	Probability and Statistics
2	BST09	Managerial Economics And Financial Analysis
3	CST04	Java Programming
4	ECT21	Digital Logic Design
5	EET17	Basic Electrical Engineering
6	CST05	Database Management Systems
7	CSP03	Java Programming Lab
8	CSP04	Database Management Systems Lab

BST08: PROBABILITY AND STATISTICS

Credits: 4

Internal Marks: 30

Univ. Examinations Marks: 70

UNIT – I

Probability & Random Variables:

Probability- Axioms of Probability-some elementary Theorems-Conditional probability-Bayes's theorem. Random Variables: Discrete and Continuous random variables, Distribution function of random variable, Properties, Probability mass function, Probability density function, Mathematical expectation, Properties of Mathematical expectations, Mean and Variance.

UNIT – II

Probability Distributions

Binomial Distribution, Mean and Standard Deviations of Binomial Distribution, Poisson distribution, Mean and Standard Deviations of Poisson Distribution. Continuous Distributions: Normal Distribution, Mean, Variance and area properties.

UNIT – III

Sampling Distributions, Inferences concerning means , Inferences concerning variances

Populations and Samples, The Sampling Distribution of the Mean (σ Known), The Sampling Distribution of the Mean (σ Unknown), The Sampling Distribution of the Variance. Point Estimation, Interval Estimation, Bayesian Estimation, Tests of Hypotheses, Null Hypotheses and Significance Tests, Hypotheses Concerning One Mean, Operating Characteristic Curves, Hypotheses Concerning Two Means, The Estimation of Variances, Hypotheses Concerning One Variance, Hypotheses Concerning Two Variances.

UNIT – IV

Inferences concerning proportions and Curve fitting

Estimation of proportions, Bayesian Estimation, Hypotheses Concerning One Proportion, Hypotheses Concerning Several Proportions, The analysis of $r \times c$ Tables, Goodness of fit. Curve fitting: The method of least squares-inferences based on the least squares estimators, Curvilinear Regression – Multiple Regressions, Correlation.

UNIT – V

ANOVA:

Analysis of variance one way classification and two way classification Completely Randomized Designs. Reliability – Failure – Time Distributions-The exponential Model Reliability –The Weibull Model in Life Testing.

Text books:

1. Probability and Statistics for Engineers by Irwin Miller, John E. Freund.
2. Probability and Statistics by T.K.V. Iyengar & B. Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S C Gupta and V.K. Kapoor
4. A text book of Probability and Statistics, Shahnaz Bathul, Ridge Publications.
5. Fundamentals of Applied Statistics, S.C. Gupta and V.K. Kapoor ,
6. Engineering Mathematics B.V. Ramana – Tata McGrawHill.

BST09: MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Internal Marks: 30

Credits: 4

Univ. Examinations Marks: 70

UNIT – I

INTRODUCTION TO MANAGERIAL ECONOMICS: Management Economics: Definition, Nature and Scope. **DEMAND ANALYSIS:** Law of Demand, Demand Determinants **ELASTICITY OF DEMAND:** Definition, Types and Demand Forecasting methods.

UNIT – II

THEORY OF PRODUCTION: Firm and Industry- Production Function – Cobb Douglas Production Function- Laws of returns- internal and external economies of scale. **COST ANALYSIS:** Cost Concepts: Fixed Vs Variable costs, explicit Vs implicit costs, Out-of-pocket costs Vs imputed costs, Opportunity cost, Sunk costs and abandonment costs. **BREAK-EVEN ANALYSIS:** Concept of Break-even point (BEP)- Break-even Chart, Determination of BEP in volume and value. Assumptions underlying and practical significance of BEP (Simple problems).

UNIT- III

INTRODUCTION TO MARKET AND BUSINESS ORGANISATIONS: Market structure, types of competition, features of Perfect competition, Monopoly, Monopolistic competition- Price output determination. **TYPES OF BUSINESS ORGANISATIONS:** Features, Merits and Demerits of Sole Trading Proprietorship, Partnership, Joint Stock Companies including Public and Private sector companies.

UNIT – IV

INTRODUCTION TO FINANCIAL ACCOUNTING AND FINANCIAL ANALYSIS: Double Entry Book Keeping- Journal, Ledger, Trial Balance, Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments. **RATIO ANALYSIS:** Computation of Liquidity Ratios (current ratio and quick ratio), Activity Ratios (Inventory Turnover ratio, Debtors Turnover ratio) Capital Structure Ratios (Debt-equity Ratio and Interest Coverage Ratio) and Profitability Ratios (Gross Profit Ratio, Net Profit Ratio, Operating Ratio, P/E Ratio and EPS) Analysis and interpretation.

UNIT – V

FUNDAMENTALS OF FINANCE AND CAPITAL BUDGETING: Capital and its significance- Types of Capital, Estimation of Fixed and Working Capital, requirements and methods of raising capital.

CAPITAL BUDGETING METHODS: Pay back method, Accounting Rate of Return (ARR) and Net Present Value (NPV) and IRR methods (simple problems).

TEXT BOOKS:

1. Joel Dean, 'Managerial Economics', PHI 2001
2. James C. Van Home, 'Financial Management Policy'
3. I.M Pandey, Management Accounting. Third Revised Edition.

CST04: JAVA PROGRAMMING

Internal Marks: 30

Univ. Examinations Marks: 70

Credits: 4

UNIT I

The History and Evolution of Java: Java's Lineage, The Creation of java, how java changed the internet, Java's magic: The byte code, Servlets: java on the server side, java Buzzwords, Evolution of java.

An Overview of Java: Object Oriented Programming, Two control statements, Using blocks of codes, Lexical issues,

The java class Libraries.

Data Types, Arrays and Variables: Primitive Types, Integers, Floating-point Types, Characters, Booleans, literals, variables, Type conversion and casting, Automatic Type Promotion in Expressions, Arrays, strings, Pointers.

UNIT II

Operators: Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logic operators, The assignment operator, The ? Operator, Operator Precedence, Using Parentheses.

Control Statements: Java's selection Statements, Iteration statements, Jump Statements.

Introducing Classes: Class Fundamentals, Declaring Objects, Assuming Object reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, The Finalize() method, A Stack class. Overloading Methods, Using Object as Parameter, Argument Passing, Returning Objects, Recursion, Introducing Access control, Understanding static, Introducing Nested and Inner classes, Exploring the String class, Using Command line Arguments, Varargs: variable-Length Arguments.

UNIT III

Inheritance: Basics, Using super, creating a multi level hierarchy, when constructors are executed, method overriding, dynamic method dispatch, using abstract class, using final with inheritance, the object class.

Packages and Interfaces: Packages, Access protection, Importing Packages, Interfaces, Default Interfaces, Default interface methods, Use static methods in an Interface, Final thoughts on Packages and interfaces.

Exception Handling: Exception handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch clauses, Nested try statements, throw, throws, finally, Java Built-in Exceptions, Creating your own exception subclasses, Chained Exceptions, Three Recently added Exceptions features, Using Exceptions.

UNIT IV

Multithreaded Programming: The java Thread Model, The main thread , Creating Thread, Creating Multiple Threads, Using isAlive() and join(), Thread Priorities, Synchronization, Interthread Communication, Suspending, resuming and stopping threads, Obtaining a thread state, Using Multithreading.

I/O, Applets, and Other Topic: I/O basics, Reading Console input, Writing console Output, The PrintWriter class, Reading and writing files, Automatically closing a file, Applet fundamentals, enumerations type wrappers auto boxing annotations, Generics: The general form of a generics class, creating a generic method, generics interfaces.

UNIT V

Introduction the AWT: Working with windows, graphics and Text: AWT classes, window fundamentals, working with frame windows, creating a frame window in a an AWT Based applet, creating a window program, displaying information within a window, Graphics, working with color, setting the paint mode, working with fonts, managing text output using font metrics,.

Using AWT controls, Layout Mangers, and Menus: AWT control fundamentals, Labels, using buttons, applying check boxes, check box group, choice controls, using lists, Managing scroll bars, using a Text field, Using a Text area, understanding layout managers, Menu bars and Menus, dialog boxes, file dialog, Overriding paint().

TEXT BOOKS:

1. Java The Complete Reference, Herbert Schildt, MC GRAW HILL Education, 9th Edition, 2016.

REFERENCE BOOKS:

1. —Programming with Java T.V.Suresh Kumar, B.Eswara Reddy, P.Raghavan Pearson Edition.
2. —Java Fundamentals - A Comprehensive Introduction, Herbert Schildt and Dale Skrien, Special Indian Edition, McGrawHill, 2013.
3. —Java – How to Program, Paul Deitel, Harvey Deitel, PHI.
5. —Core Java, NageswarRao, Wiley Publishers.
5. —Thinking in Java, Bruce Eckel, Pearson Education.
6. —A Programmers Guide to Java SCJP, Third Edition, Mughal, Rasmussen, Pearson.
8. —Head First Java, Kathy Sierra, Bert Bates, O'Reilly –SCJP – Sun Certified Programmer for Java
9. Study guidel – Kathy Sierra, Bert Bates, McGrawHill.

ECT21: DIGITAL LOGIC DESIGN

Internal Marks: 30

Credits: 4

Univ. Examinations Marks: 70

UNIT-I

Binary Systems: Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, Complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary 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, Integrated circuits.

UNIT-II

Gate Level Minimization: The map method, Four-variable map, Five variable map, Product of sums simplification, Don't care conditions, NAND and NOR implementation, Other Two level implementations, Exclusive-OR function,

Combinational Logic: Combinational Circuits, Analysis procedure, Design procedure, Binary Adder-Subtractor Decimal Adder, Binary multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexer.

UNIT-III

Synchronous Sequential Logic: Sequential circuits, latches, Flip-flops, Analysis of clocked sequential, Hardware Description Language (HDL), HDL for Sequential circuits, HDL for logic circuits, State reduction and Assignment: Design procedure, Registers, Shift Registers,

UNIT-IV

Ripple counters, Synchronous counters, Other Counters, HDL for Registers and Counters. Introduction, Random-Access Memory Decoding, Error Detection and Correction, Read-Only Memory, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices.

UNIT-V

Asynchronous Sequential Logic: Introduction, Analysis, procedure, Circuits with Latches, Design procedure, Reduction of state and flow tables, Race free state assignment Hazards, Design Example.

TEXT BOOKS:

1. M.MorrisMano,Digital Logic and Computer Design- 3rd Edition, Pearson Education /PHI
2. Thomson\Fundamentals of Logic Design\, Roth, 5th Edition.

REFERENCES:

- 1.Zvi.Kohavi,\Switching and finite automata Theory\, Tata Mc Graw Hill
- 2.C.V.S.Rao,\Switching and Logic Design -,Pearson Education.
- 3.Donlad D.Givone,\Digital Principles and Design\, Tata Mc Graw Hill, Edition.
- 4.M.RafiquzzamanHohn Wiley, "Fundamantals of Digital Logic & Micro Computer Design". 5th Edition

EET17: BASIC ELECTRICAL ENGINEERING

(Common for CSE& ME Branches)

Internal Marks: 30

Credits: 4

Univ. Examinations Marks: 70

UNIT-I

DC Circuits: Active and passive elements – Ideal and practical sources – V –I Characteristics of R,L and C elements – Kirchhoffs laws, Mesh and nodal analysis – Concept of super mesh and super node.

Magnetic circuits: Basic definitions, Analogy between electric and magnetic circuits, magnetization characteristics of ferromagnetic materials, self inductance, mutual inductance, energy in linear magnetic systems, coils connected in series attracting force of electro magnets. Concept of coupling and dot convention.

UNIT-II

AC Circuits: Principle of AC voltages, wave forms and basic definitions, relationship between frequency, speed and number of poles, root mean square and average values of alternating current and voltage, form factor and peak factor, phasor representation of Alternating Quantities, the j operator and phasor algebra, analysis of AC circuits with single basic network element, single phase series circuits, single phase parallel circuits, single phase series parallel circuits, power in AC circuits.

UNIT-III

Network Theorems: Super position theorem, Thevinin's & Norton's theorem, Maximum power transfer theorems, Tellegan's Theorem, Millman's Theorem and problems.

UNIT-IV

TRANSFORMERS:

Principle of operation, constructional details, ideal transformer, and practical transformer, losses, transformer testing, efficiency, and regulation calculations (all the above topics are elementary treatment and simple problems).

Direct Current Machines: principle of operation of DC machines, armature windings, EMF equation in DC machines, torque production in a DC machine, operation of a DC machine as a generator, operation of a DC machine as a motor.

UNIT-V

A.C MACHINES

Single phase induction motor: principle of operation, types of single phase induction motor and working.

Three phase induction motor: principle of operation, production of rotating magnetic field, slip and rotor frequency, torque (simple problems).

TEXT BOOKS

1. Basic Electrical Engineering-By M.S Naidu and S.Kamakshaiah-TMH
2. Basic Electrical Engineering-By T.K.Nagsarkar and M.S.Sukhija, Oxford University press

REFERENCES

1. Theory And Problems of Basic Electrical Engineering-By D.P.Kothari & I.J.Nagrath PHI.
2. Principles of Electrical Engineering –By V.K.Mehta, S.Chand publications.
3. Essentials of Electrical and computer Engineering –By David V.Kems, JRJ.David Irwin pearson.

CST05: DATABASE MANAGEMENT SYSTEMS

Internal Marks: 30

Credits: 4

Univ. Examinations Marks: 70

UNIT – I

INTRODUCTION: Database system, Characteristics (Database Vs File System), Database Users, Advantages of Data base systems, Database applications. Data Models, Concepts of Schema, Instance and data independence, Three tier schema architecture for data independence, Database system structure, environment, Centralized and Client Server architecture for the database.

UNIT – II

RELATIONAL MODEL : Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance
BASIC SQL : Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions(Date and Time, Numeric, String conversion).

UNIT – III

Entity Relationship Model: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams.

SQL: Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, view(updatable and non-updatable), relational set operations.

SCHEMA REFINEMENT (NORMALIZATION) : Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

UNIT – IV

TRANSACTION MANAGEMENT AND CONCURRENCY CONTROL: Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and save point. Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler.

Concurrency control with locking methods : lock granularity, lock types, two phase locking for ensuring serializability, deadlocks, Concurrency control with time stamp ordering : Wait/Die and Wound/Wait Schemes,

UNIT-V

Database Recovery management : Transaction recovery. SQL constructs that grant access or revoke access from user or user groups. **Distributed Databases:** Structure of Distributed databases, Trade-off in distributing the database, Design of distributed databases, Security and Integrity, Violations, Authorizations & views, security in SQL, Encryption.

Basic PL/SQL : Introduction, Triggers. Procedures, functions.

Text Book:

1. Database Management Systems by Raghu Rama krishna, Jhonnans Gherke TMH, 3rd edition, 2003.

2.Database concepts by A.silbertschatz,H.F.Korth,s.sudarshan,MCgraw Hill ,VI Edition 2006.

References:

- 1.C.J.Date"An introduction to database systems",6 th edition Addison Wesley.
2. ElmaasriNavathe, "Fundamentals of database managemntSystems",Addisonwelesy 2nd edition.

CSP03: JAVA PROGRAMMING LABORATORY

Internal Marks: 40

Credits: 1

Univ. Examinations Marks: 60

- 1) Preparing and practice – Installation of Java software, study of any Integrated development environment, sample programs on operator precedence and associativity, class and package concept, scope concept, control structures, constructors and destructors. Learn to compile, debug and execute java programs.
- 2) Write Java program(s) on use of inheritance, preventing inheritance using final, abstract classes.
- 3) Write Java program(s) on dynamic binding, differentiating method overloading and overriding.
- 4) Write Java program(s) on ways of implementing interface.
- 5) Write a program for the following
 - Develop an applet that displays a simple message.
 - Develop an applet for waving a Flag using Applets and Threads.
- 6) Write Java program(s) which uses the exception handling features of the language, creates exceptions and handles them properly, uses the predefined exceptions, and create own exceptions
- 7) Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read. Display the complete set of unique values input after the user enters each new value.
- 8) Write Java program(s) on creating multiple threads, assigning priority to threads, synchronizing threads, suspend and resume threads
- 10) Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part<n> where n is the sequence number of the part file.
- 11) Write a java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and second is Triangle. Each of the sub classes override area() so that it returns the area of a rectangle and triangle respectively.
- 12) Write a Java program that creates three threads. First thread displays -Good Morning! every one second, the second thread displays -Hello! every two seconds and the third thread displays -Welcome! every three seconds
- 13) Design a simple calculator which performs all arithmetic operations. The interface should look like the calculator application of the operating system. Handle the exceptions if any.
- 14) Write a java program to handle mouse events
- 15) Write a java program to handle keyboard events
- 16) Write a java program that allows conduction of object type examination containing multiple choice questions, and true/false questions. At the end of the examination when the user clicks a button the total marks have to be displayed in the form of the message.

- 17) Write a java program that creates menu which appears similar to the menu of notepad application of the Microsoft windows or any editor of your choice.
- 18) Write a java program that creates dialog box which is similar to the save dialog box of the Microsoft windows or any word processor of your choice.
- 19) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication
- 20) Write a java program to find and replace pattern in a given file.

CSP04: DATA BASE MANAGEMENT SYSTEMS LABORATORY

Internal Marks: 40

Univ. Examinations Marks: 60

Credits: 1

1. Queries on DDL commands.
2. Queries on DML Commands.
3. Queries on TCL & DCL Commands.
4. Computations on Queries.
5. Queries on DDL,DML commands using Key Constraints.
6. Pattern Matching Queries.
7. SQL Queries using Oracle Functions.
8. Implementing Group By, Having, Order By Clause.
9. Sub Queries on SQL.
10. Queries on Joins.
11. Creation and updation, deletion of views.
12. Creation and updation, deletion of Sequence.
13. Creation and updation, deletion of Synonyms
14. Creation and updation, deletion of Clusters.
15. Creation and updation, deletion of Index.
16. Simple Programs on PL/SQL
17. Queries on triggers using PL/SQL.
18. Draw the ER- Diagrams for following questions:
 - Hospital Billing Entity Relationship Diagram.
 - Department Relationship Diagram.
 - Internet Sales relationship Diagram.

B.Tech

II Year II Semester

S.No.	Course Number	Name of the Course
1	CST06	Data Communication
2	CST07	Unix and Shell Programming
3	CST08	Computer Organization
4	CST09	Operating Systems
5	CST10	Principles of Programming Language
6	BST11	Industrial Management Science
7	CSP05	Unix and Shell Programming Lab
8	CSP06	Operating Systems Lab

II YEAR B.TECH –II SEMESTER

CST06: DATA COMMUNICATION

Internal Marks: 30

Credits: 4

Univ. Examinations Marks: 70

UNIT – I

Data Communication Introduction, Basic Concepts, The OSI model, Signals, Encoding and modulation.

UNIT – II

Data Communication standards, Circuits, Codes, Error control, Synchronization, Serial and parallel interface hardware, Data modems (CCITT recommendations are not needed), Data Communication protocols, Asynchronous and synchronous protocols.

UNIT – III

Local Area Networks, Ethernet, switched Ethernet, fast Ethernet, Gigabit Ethernet, to Token bus, Token ring, FOOL, metropolitan area network, DQDB, SMDS, Point-to-point protocols, PPP layers, LCP, NCP, Authentication.

UNIT – IV

Switching, Circuit, Packet and message switching, ISDN, Subscriber access to ISDN, ISDN layers, B-ISDN.

UNIT – V

Frame relay. Operation Layers, ATM, Architecture of ATM, Switching in ATM. networks, ATM layer, ATM service classes, SONET, Configuration of SONET, SONET layers, SONET frame.

Text Books:

1. B.A. Forouzan, ‘‘Data Communications, and Networking’’, 2nd Edition TMH
2. W. Tomasi, ‘‘Electronic Communications Systems’’, 4th Edition, Pearson Education

Reference books:

1. Fred Halsall, ‘‘Data Communications, Computer Networks and Open systems’’, 4th Edition, Pearson Education.
2. W.Stallings, ‘‘Data and Computer Communications’’, 6th Edition, Pearson Education.
3. A.S. Godbole, ‘‘Data Communications and Networking’’, TMH

CST07: UNIX AND SHELL PROGRAMMING

Internal Marks: 30

Credits: 4

Univ. Examinations Marks: 70

UNIT-I

INTRODUCTION TO UNIX: The UNIX Operating System, The UNIX Architecture, Features of UNIX, Internal And External Commands, Command Structure.

GENERAL-PURPOSE UTILITIES: cal, date, echo, printf, bc, script, passwd, PATH, who, uname, tty, 25om, pwd, cd, mkdir, rmdir, od.

HANDLING FILES: The File System, cat, cp, rm, mv, more, file, ls, wc, pg, cmp, 25omm., diff, gzip, tar, zip, df, du, mount, umount, chmod, The vi editor, security by file Permissions.

NETWORKING COMMANDS: ping, telnet, ftp, finger, arp, rlogin.

UNIT-II

INTRODUCTION TO SHELLS: Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization. **Filters:** Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.

UNIT-III

REGULAR EXPRESSIONS: Atoms, operators

GREP: Operation, grep Family, Searching for File Content.

SED: Scripts, Operation, Addresses, commands, Applications, grep and sed.

AWK: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk.

UNIT-IV

INTERACTIVE KORN SHELL: Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process.

KORN SHELL PROGRAMMING: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

UNIT-V

INTERACTIVE C SHELL: C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startup and Shutdown Scripts, Command History, Command Execution Scripts.

C SHELL PROGRAMMING: Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.

FILE MANAGEMENT: File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

TEXT BOOKS:

1. Sumitabha Das, “*Unix Concepts And Applications*”, 4th Edition. TMH, 2006. (1, 2 units)
2. Behrouz A. Forouzan, Richard F. Gilbery, “*Unix and shell Programming*”, 1st Edition, Cengage Learning India, 2003.

REFERENCES:

1. Graham Glass, King Ables, “*Unix for programmers and users*”, 3rd Edition, Pearson Education, 2009.
2. N.B Venkateswarlu, “*Advanced Unix programming*”, 2nd Edition, BS Publications, 2010.
3. Yashwanth Kanitkar, “*Unix Shell programming*”, 1st Edition, BPB Publisher, 2010.

CST08: COMPUTER ORGANIZATION

Internal Marks: 30

Credits: 4

Univ. Examinations Marks: 70

UNIT-I

BASIC Structure of Computers, computer types, functional unit, bus structures, software & performance, multiprocessors & multi-computers. **Basic Computer Organization** - Functions of CPU, I/O Units, Memory Instruction: Instruction Formats - One address, two addresses, zero addresses and three addresses and comparison; addressing modes, conditional branch instructions, Program Interrupts: Types of Interrupts.

UNIT-II

Register Transfer Language(RTL) and micro operations: RTL, register transfer, bus and memory transfer, arithmetic micro operations, shift micro operations, logic micro operations, arithmetic logic shift unit, instruction codes, computer registers, instruction cycle, memory reference instructions, I/O and interrupts, Stack organization, Data transfer and manipulation, Risc/Cisc introduction

UNIT-III

Memory Organizations

Memory hierarchy, Main Memory, RAM, ROM Chips, Memory Address Map, Memory Connection to CPU, associate memory, Cache Memory, Data Cache, Instruction cache, Miss and Hit ratio, Access time associative, set associative, mapping, waiting into cache, Introduction to virtual memory, direct memory access.

UNIT-IV

8086 CPU Pin Diagram- Special functions of general purpose registers. Segment register, concept of pipelining, 8086 Flag register, Addressing modes of 8086.

8086-Instruction formats: assembly Language Programs involving branch & Call instructions, sorting, evaluation of arithmetic expressions.

UNIT-V

Pipeline :Introduction, arithmetic pipeline, instruction pipeline, RISC pipeline **Vector Processing:** Vector processing, array processors, **Multiprocessors:** characteristics, interconnection structures, Interprocessor arbitration, interprocessor communication and synchronization, cache coherence, shared memory multiprocessors.

TEXT BOOKS:

1. Computer System Architecture: Moris Mano
2. Advanced Micro Processor and Peripherals - Hall/ A K Ray
3. Computer Organization by Carl Hamacher, zvonkovranesic, safwatzaky

REFERENCE BOOKS:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
2. Structured Computer Organization and Design - Andrew S. Tanenbaum, 4th Edition PHI/Pearson.

CST09: OPERATING SYSTEMS

Internal Marks: 30

Credits: 4

Univ. Examinations Marks: 70

UNIT-I

Operating Systems Overview: Operating systems functions, Overview of computer operating systems, protection and security, distributed systems, special purpose systems.

Operating Systems Structures: Operating system services and systems calls, system programs, operating system structure, operating systems generation.

UNIT-II

Process Management: Process concepts, threads, scheduling-criteria, algorithms, and their evaluation, thread scheduling, case studies UNIX, Linux, Windows.

Concurrency: Process synchronization, the critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Case studies UNIX, Linux, and Windows.

UNIT-III

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement, algorithms, Allocation of frames, Thrashing

Principles of deadlock: system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock.

UNIT-IV

File system Interface: The concept of a file, Access Methods, Directory structure, File system mounting, File sharing, protection.

File System implementation: File system structure, file system implementation, Directory implementation, allocation methods, free-space management, efficiency and performance

Mass-storage structure: overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

UNIT-V

I/O systems: Hardware, application I/o interface, kernel I/O subsystem, Transforming I/O requests to Hardware operations, STREAMS, performance.

Protection: Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights.

Security: The Security problem, program threats, user authentication, firewalling to protect systems and networks.

TEXT BOOKS:

Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.2. Operating Systems, A Concept based Approach-D.M.Dhamdhere, Second Edition, TMH.

REFERENCES:

1. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition–2009, Pearson Education.
2. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
3. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
4. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
5. Operating Systems, A.S.Godbole, Second Edition, TMH.
6. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
7. Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
8. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, McGraw Hill.

CST10: PRINCIPLES OF PROGRAMMING LANGUAGES

Internal Marks: 30

Credits: 4

Univ. Examinations Marks: 70

UNIT-I

Preliminaries: Reasons for studying concepts of programming Languages, Programming Domains, Language Evaluation criteria, Influences on language Design, Language categories, Language categories, Language design trade – offs, Implementation methods, Programming Environments. Describing syntax and semantics: Introduction, the general problems for describing syntax, formal methods of describing syntax, attribute grammars, dynamic semantics. Concept of Binding, Strong typing, type compatibility.

UNIT-II

Scope and life time, referencing environments, Named constants, variable Initialization.

Data Types: Introduction, Primitive Data Types, character String types, User – defined ordinal Types, Array Types, Associative arrays, Record types, Union Set, pointer types. Overloaded operators, type conversion, short circuit evaluation, mixed mode Assignments.

UNIT-III

Branching sub programs: Fundamentals, Design issues, Local referencing environment, Parameter passing methods, Parameters that are subprogram names, Overloaded sub programs, Generic sub programs, separate and Independent compilation, Design issues for functions, Accessing non-local environments, User Defined overloaded operators, Coroutines.

UNIT-IV

Abstract data types: Concept of abstraction, Introduction to data abstraction, Design issues, language Examples, Parameterized Abstract Data Types, Encapsulation. **Concurrency:** Introduction, Introduction to subprogram level concurrency in Ada 95, Statement – level Concurrency. **Exception Handling:** Introduction, Exception Handling in PL/I, Ada, C++ and Java.

UNIT-V

Support for Object – Oriented Programming: Object Oriented Programming, Design Issues, Overview of smalltalk, Introduction to smalltalk, Example programs, Evaluation of smalltalk. Support for object oriented programming in C++, java, Ada95, Eiffel. **Logical Programming Languages:** Overview, Origins of prolog, Basic elements of prolog, Deficiencies of prolog, Applications of prolog.

Text Books:

1. Robert W. Sebesta, Concepts of programming Languages Fourth edition Pearson Education Asia.

BST11: INDUSTRIAL MANAGEMENT SCIENCE

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

INTRODUCTION TO MANAGEMENT Concept of Management and organization – Functions of Management - Evolution of Management Thought: Taylor's Scientific Management .Fayol's principles of Management Dourglas Mc Gregor's theory X and Theory Y. Maslow's Hierarchy of human needs- Principles of Organization – Types of Organization

TYPES OF ORGANIZATIONAL STRUCTURE:Line Organization, Functional Organization and Line and Staff Organization

UNIT-II

INTRODUCTION TO OPERATIONS MANAGEMENT:Plant location and Layout, Methods of Production. Work-study: Method Study-Procedure and charts. Work measurement – Procedure, time study and work sampling. Principles of Motion Economy. Materials Management: Objectives of inventory control. EOQ and ABC analysis

UNIT-III

INTRODUCTION TO HUMAN RESOURCE MANAGEMENTThe concept of HRM.Functions of the HR Manager. Manpower planning. Recruitment, Selection. Training and Development .Performance Appraisal, grievance handling and welfare administration .Job evaluation and merit ranking.**MARKETING:** Marketing Vs Selling, Marketing Mix, stages in Product Life Cycle ,Channels of Distribution.

UNIT-IV

NATURE AND IMPORTANCE OF ENTREPRENEURSHIP: Process of entrepreneurship sickness of Entrepreneurs, Types of entrepreneurship, entrepreneur Vs Intrapreneurship Vs Manager. Problems faced by women entrepreneurs **BUSINESS PLAN** Scope and Value of Business Plan, Resource and information needs and writing & development of a business plan.

UNIT-V

INTRODUCTION TO NETWORK ANALYSISPERT/CPM,Statistical Quality Control, X and R chart , P chart and C chart. Introduction to TQM and six sigma approach.

TEXT BOOKS:

- 1.Koontz and O'Donnel, Principals of Management. McGrawHill,2001
- 2.Philip Kotler, Marketing, Management(11th Ed 2002) Prentice Hall of India.

REFERENCE:

1. 3.GaryDessler, Human Resource Management , Pearson Education Asis, 2002.
2. 4.L.S.Srinath .PERT/CPM.Affiliated East-West Press, New Delhi, 2002.

3. 5.W.Glueck&L.R.Jauch, Business Policy and Strategic Management, McGraw Hill, 1986.
A.R.Aryasri Management Science For JNTU (B.Tech).Tata McGraw-Hill,2002
4. 6.O.P.Khanna, Industrial Engineering & Management. Dhanpat Rai 1999
5. 7.Chandra Bose, Management and Administration,Prentice Hall,2002.
6. 8.S.S.Khanka Entrepreneurial Development S Chand & Company Ltd.New Delhi.

CSP05: UNIX AND SHELL PROGRAMMING LABORATORY

Internal Marks: 40

Credits: 1

Univ. Examinations Marks: 60

1. Use of Basic Unix Shell Commands: ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit.
2. Commands related to inode, I/O redirection and piping, process control commands, mails.
3. Shell Programming: Shell script exercises based on following
 - (i) Interactive shell scripts (ii) Positional parameters (iii) Arithmetic
 - (iv) if-then-fi, if-then-else-fi, nested if-else (v) Logical operators
 - (vi) else + if equals elif, case structure (vii) while, until, for loops, use of break
4. Write a shell script to create a file in \$USER /class/batch directory. Follow the instructions
 - (i) Input a page profile to yourself, copy it into other existing file;
 - (ii) Start printing file at certain line
 - (iii) Print all the difference between two file, copy the two files at \$USER/CSC/2007 directory.
 - (iv) Print lines matching certain word pattern.
5. Write shell script for-
 - (i) Showing the count of users logged in,
 - (ii) Printing Column list of files in your home directory
 - (iii) Listing your job with below normal priority
 - (iv) Continue running your job after logging out.
6. Write a shell script to change data format .Show the time taken in execution of this script
7. Write a shell script to count lines, words and characters in its input (do not use wc).
8. Write a shell script to print end of a Glossary file in reverse order using Array. (Use awk tail)
9. Write a shell script to check whether Ram logged in, Continue checking further after every 30 seconds till success.
10. Write a shell script to compute gcd & lcm of two numbers. Use the basic function to Find GCD & LCM of N numbers.
11. Write a shell script to find whether a given number is prime. Take a large number such as 15 digits or higher and use a proper algorithm.
12. Write a shell script to find reverse a given number.
13. Write a shell script to list the files in descending order based on their size.
14. Write a shell script to print the contents of file from given line number to next given line number.

15. Write a shell script to print the pattern

```
1
2  2
3  3  3
4  4  4  4
5  5  5  5  5
```

CSP06: OPERATING SYSTEMS LABORATORY

Internal Marks: 40

Credits: 1

Univ. Examinations Marks: 60

1. Write a c program for CPU scheduling algorithm in round robin fashion.
2. Write a c program for CPU scheduling algorithm in SJF fashion.
3. Write a c program for CPU scheduling algorithm in FCFS fashion.
4. Write a c program for CPU scheduling algorithm in Priority fashion.
5. Write a c program for file allocation in Sequential strategy.
6. Write a c program for file allocation in Indexed strategy.
7. Write a c program for file allocation in Linked strategy.
8. Write a c program to Simulate MVT and MFT.
9. Write a c program for File Organization using Single level directory.
10. Write a c program for File Organization using Two level directory
11. Write a c program for File Organization using Hierarchical Technique
12. Write a c program for File Organization using DAG Technique.
13. Write a c program to Simulate Bankers Algorithm for Dead Lock Avoidance.
14. Write a c program to Simulate Bankers Algorithm for Dead Lock Prevention
15. Write a c program to simulate Page Replacement algorithm using FIFO method.
16. Write a c program to simulate Page Replacement algorithm using LRU method.
17. Write a c program to simulate Page Replacement algorithm using LFU method.
18. Write a c program to simulate Paging Technique of memory management.

B.Tech

III Year I Semester

S.No.	Course Number	Name of the Course
1	CST11	Cryptography and Network Security
2	CST12	Theory Of Computation
3	CST13	Object Oriented Software Design
4	CST14	Artificial Intelligence
5	CST15	Systems Programming
6	CST16	Design and Analysis of Algorithms
7	CSP07	Object Oriented Software Design & Systems Programming Lab
8	CSP08	Design and Analysis of Algorithms & Artificial Intelligence Lab

CST11: CRYPTOGRAPHY AND NETWORK SECURITY

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT- I

INTRODUCTION & NUMBER THEORY: Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, and steganography).

FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid's algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat's and Euler's theorem-Testing for primality -The Chinese remainder theorem- Discrete logarithms.

UNIT-II

BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY: Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm.

PUBLIC KEY CRYPTOGRAPHY: Principles of public key cryptosystems-The RSA algorithm-Key management –Diffie-Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

UNIT- III

HASH FUNCTIONS AND DIGITAL SIGNATURES : Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS – El Gamal – Schnorr.

UNIT- IV

SECURITY PRACTICE & SYSTEM SECURITY: Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

UNIT- V

E-MAIL, IP & WEB SECURITY: E-mail Security: Security Services for E-mail-attacks possible through E-mail - establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME.

IP Security: Overview of IPSec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding).

Web Security: SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSL Attacks fixed in v3- Exportability-Encoding-Secure Electronic Transaction (SET).

TEXT BOOKS

1. William Stallings, _‘Cryptography and Network Security‘, 6th Edition, Pearson Education, 2014.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, -Network Securityl, Prentice Hall of India, 2002.

REFERENCES

1. Behrouz A. Ferouzan, -Cryptography and Network Security‘, Tata McGraw Hill, 2010.
2. <http://williamstallings.com/Cryptography/>

CST12: THEORY OF COMPUTATION

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Finite Automata: Alphabets, Strings, Grammar and Languages, Chomsky Hierarchy, Finite Automata, Representation of FA, Types of Finite Automata, Conversion of NFA into DFA, Equivalence of DFA and NFA, Finite Automata with Epsilon transitions (ϵ -NFA or NFA- ϵ), Finite Automata with output, Conversion of one machine to another, Minimization of Finite Automata, Myhill-Nerode Theorem, Applications and Limitation of Finite Automata.

UNIT-II

Regular Expressions Regular Expressions (RE), Identity Rules, The Arden's Theorem, Applications of Pumping Lemma, Equivalence of Two FAs, Equivalence of Two REs, Construction of Regular Grammar from RE, Constructing FA from Regular Grammar, Closure properties of RLs, Pumping Lemma for RLs, Decision problems of RLS, Applications of REs and FAs.

UNIT-III

Context Free Grammars Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars, Left recursion and Left factoring, Linear Grammar, Conversion Methods of Linear Grammar, Normal Forms for Context Free Grammars, Pumping Lemma for CFLs, Closure Properties, Applications of Context Free Grammars.

UNIT-IV

Pushdown Automata Pushdown Automata, Instantaneous Description, Language Acceptance of pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Conversion of CFG to PDA and PDA to CFG, Equivalence of Pushdown Automata, Two Stack Pushdown Automata.

UNIT-V

Turing Machine Turing Machine, Instantaneous Descriptions, Representation of TMs, Language Acceptance of a Turing Machine, Design of Turing Machines, Variations of Turing Machines, Church's Thesis, Universal Turing Machine, Linear Bounded Automata, TM Languages, Unrestricted grammar, Properties of Recursive and Recursively enumerable languages, Undecidability, Reducibility, Undecidable problems about TMs, Post Correspondence Problem (PCP), Modified PCP.

TEXT BOOKS:

1. ShyamalenduKandar, -Introduction to Automata Theory, Formal Languages and Computation, Pearson education, 2013.
2. Linz, Peter.—An introduction to formal languages and automata / Peter Linz. Cathleen Sether 5th ed, 2012.

REFERENCE BOOKS:

1. K.V.N.Sunitha and N.Kalyani, -Formal Language and Automata Theory, Pearson education, 2015.
2. V.Kulkarni —Theory of Computation, Oxford University Press, 2013.
3. RajendraKumar Theory of Automata, Languages and Computation McGraw Hill, 2014.
4. John E.Hopcroft, Rajeev Motwani, Jeffery D. Ullman by Introduction to Automata Theory, Languages, and Computation, Third Edition, 2011, Pearson education.

CST13: OBJECT ORIENTED SOFTWARE DESIGN

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT – I

Object Oriented Analysis and Design: Concepts, Complexity of Software and Structure of complex systems, designing complex system.

Introduction to UML: The meaning of object orientation, object identity Encapsulation, Information hiding, polymorphism, Genericity Importance of modeling, Principles of modeling, Object Oriented Modeling, Conceptual model of the UML- Architecture.

UNIT – II

Basic Structural modeling: Classes, relationships, common mechanisms, diagrams, advanced structural modeling: advance relationships interfaces roles, packages, instances.

UNIT – III

Class and Object diagrams: Terms, concepts, examples, modeling techniques class and object diagrams.

Collaboration diagrams: Terms, concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self – in messages.

Sequence diagrams: Terms, concepts, difference between collaboration and sequence diagrams, depicting synchronous messages with/ without priority callback mechanism, broadcast messages.

UNIT – IV

Behavioural Modeling: Interaction, Use cases, Use case diagrams, Activity diagrams.

Advanced Behavioural modeling: Events and Signals, state machines, Process and Thread, time and space, state chart diagrams.

UNIT – V

Architectural Modeling: Terms, Concepts, examples, modeling, techniques for component diagrams and deployment diagrams.

TEXT BOOKS:

1. Object oriented Analysis and Design with Application – Pearson Ednasia, Grady Booch^{3rd} Edition 2009.

REFERENCES

1. The Unified Modeling Language user guide-Addison Wisely, 1999, Grady Booch, James Rumbaugh, Ivar Jacobson.
2. Fundamentals of Object Oriented Design in UML, Addison Wisely, 2000, Meilir Page-Jones.

CST14: ARTIFICIAL INTELLIGENCE

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT – I

Introduction to AI: The AI problems, Underlying assumption, What is an AI technique, problem, problem spaces and search, production systems, Control strategies, Issues in the design of search programs.

Heuristic search techniques: Generate and test, Hill climbing, Best-first-search.

UNIT-II

Knowledge representation: Knowledge representation issues, Representations in Mappings, approaches to Knowledge representation, issues in Knowledge representation.

Predicate logic: Represents simple facts and logic, representing instance and a relationships, computable function and predicates, Resolutions, Natural deductions.

Representing knowledge using rules: Procedural Vs declaration Knowledge, logic programming, forward Vs backward reasoning, matching.

UNIT – III

Symbolic reasoning under uncertainty: Introduction to non-monotonic reasoning, logics for non-monotonic reasoning, implementation issues in depth first search and breadth first search.

UNIT – IV

Semantic Nets, Frames, Conceptual dependencies.

UNIT – V

Game playing: Min-max search procedure, adding alpha Beta cutoffs.

Natural Language Processing: Syntactic Processing, semantic processing.

TEXT BOOKS:

Artificial intelligence by Elaine rich, Kevin knight, Shivashankar.B.nair, third Edition, McGraw Hill Education Pvt., Ltd, Oct 2008.

REFERENCES:

1. Artificial Intelligence by sarojkoushik, first edition, cengage learning, 2011
2. Artificial Intelligence by Elakumar, first edition, I.K. International publishing house., 2008.
3. Artificial Intelligence : A Practical Approach (Revised edition) by Dr. Rajiv Chopra, Fifth edition, S.Chand & Co publishing ltd., 2012.

CST15: SYSTEMS PROGRAMMING

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT – I

Machine Architecture: System Software and Machine Architecture, The Simplified Instructional Computer (SIC) - SIC Machine architecture, Data and Instruction Formats, Addressing Modes Instruction Sets, I/O and Programming.

UNIT-II

ASSEMBLERS Basic Assembler Functions: A Simple SIC Assembler, Assembler Algorithm and Data Structures, Machine-Dependent Assembler Features Instruction Formats and Addressing Modes, Program Relocation, Machine Independent

Assembler Features: Literals, Symbol – Defining Statements, Expressions, One-Pass Assemblers, Multi-Pass Assemblers, Implementation Example - MASM Assembler.

UNIT-III

Loaders and Linkers: Basic Loader Functions – Design of an Absolute Loader, A Simple Bootstrap Loader, Machine-Dependent Loader Features – Relocation, Program Linking, Algorithm and Data Structures for Linking Loader, Machine Independent Loader Features – Automatic Library Search, Loader Options, Loader

Design Options: Linkage Editors, Dynamic Linking, Bootstrap Loaders, Implementation Example – MS-DOS Linker.

UNIT-IV

Macro Processors: Macro Instructions, Features of a Macro Facility- Macro Instruction Arguments, Conditional Macro Expansion, Macro Calls within Macros, Macro Instructions Defining Macros, Implementation-Implementation of a Restricted Facility: A Two-Pass Algorithm, A Single-Pass Algorithm.

UNIT-V

Block Drivers I: A Test Data Generator-Design Issues, Driver. Block Drivers II: A RAM Disk Drive-Design Issues, Driver. Block Drivers III: A SCSI Disk Driver -Design Issues, Driver.

TEXT BOOKS:

1. Leland L. Beck, –System Software – Introduction to Systems Programming, || Third Edition, Pearson Education Asia, 2016.
2. George Pajari, Writing UNIX Drivers, First Revised Edition, Addison-Wesley 2014.

REFERENCE BOOKS: 1. D. M. Dhamdhere, –Systems Programming and Operating Systems, Second Revised Edition, Tata McGraw-Hill, 2015.

CST16: DESIGN AND ANALYSIS OF ALGORITHMS

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Introduction: What is an Algorithm, Algorithm specification, Performance analysis. Divide and Conquer: General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection sort, Strassen's matrix multiplication.

UNIT-II

Greedy Method: General method, Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, Single-source shortest paths. **Dynamic programming**: General Method, Multistage graphs, All-pairs shortest paths, Optimal binary search trees, 0/1 knapsack, The traveling sales person problem.

UNIT-III

Basic Traversal and Search Techniques: Techniques for binary trees, Techniques for Graphs, Connected components and Spanning trees, Bi-connected components and DFS Back tracking: General Method, **8 – queens problem**, Sum of subsets problem, Graph colouring and Hamiltonian cycles, Knapsack Problem.

UNIT-IV

Branch and Bound: The method, Travelling salesperson, 0/1 Knapsack problem, Efficiency considerations. **Lower Bound Theory**: Comparison trees, Lower bounds through reductions – Multiplying triangular matrices, Inverting a lower triangular matrix, Computing the transitive closure.

UNIT-V

NP – Hard and NP – Complete Problems: NP Hardness, NP Completeness, Consequences of being in P, Cook's Theorem, Reduction Source Problems, Reductions: Reductions for some known problems.

TEXT BOOKS:

1. Ellis Horowitz, S. SatrajSahani andRajasekhran., Fundamentals of Computer Algorithms ,2nd edition, University Press, 2012.
2. ParagHimanshu Dave, HimanshuBhalchandra Dave, –Design and Analysis of Algorithmsl, Second Edition, Pearson Education, 2009.

REFERENCE BOOKS :

- 1.T.H.Cormen,C.E.Leiserson,R.L.Rivest and C.Stein, –Introduction to Algorithmsl,,PHI , Pearson Education, 2003.
- 2.R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, –Introduction to Design and Analysis of Algorithms A strategic approachl, McGraw Hill,2005.
3. Allen Weiss, Second edition, –Data structures and Algorithm Analysis in C++l, Pearson education. 2002.
4. Aho, Ullman and Hopcroft, –Design and Analysis of algorithmsl , Pearson education, fourth edition ,2009.

**CSP07: OBJECT ORIENTED SOFTWARE DESIGN LABORATORY AND
SYSTEMS PROGRAMMING LAB**

Credits: 1

**Internal Marks: 40
University Examination Marks: 60**

1. Design an Online Banking Operation System. Represent the design using UML.
2. Design an Online Movie Ticketing System. Represent the design using UML.
3. Design the Student Attendance Information System. Represent the design using UML.
4. Design an Online Voter Registration System. Represent the design using UML.
5. Design a B.Tech Degree Programme results processing system. Represent the design using UML.
6. Design a Financial Accounting System. Represent the design using UML.
7. Design an Online Flight Ticketing system. Represent the design using UML
8. Design a Computer based Vehicle Registration by AP Road Transport Department. Represent the design using UML
9. Design EAMCET Online Book Ordering system. Represent the design using UML
10. Design Online EAMCET Admission Options capturing System. Represent the design using UML
11. Design Online ordering system for Supermarket. Represent the design using UML.
12. Design Placing order in Flipkart. Represent the design using UML
13. Design Online Hotel Booking. Represent the design using UML
14. Design Online Railway Reservation System. Represent the design using UML
15. Design Online Red Bus Reservation system. Represent the design using UML
16. Design Online Ticket booking in TTD. Represent the design using UML
17. Design Online Road Map Navigation. Represent the design using UML
18. Design Online ATM Transaction (incl. Deposit). Represent the design using UML
19. Design Online Banking of Transferring money from one account to another. Represent the design using UML
20. Design Online Library Management System. Represent the design using UML
21. Design Online Hospital Management System. Represent the design using UML.
22. Design Online Job recruitment System. Represent the design using UML.

LIST OF EXPERIMENTS IN SYSTEMS PROGRAMMING

1. Write a c program to design and develop one pass assembler in c program
2. Develop a program in c to design and develop two pass assembler
3. Write a program in c to design and develop absolute loader
4. Write a program in c to design a macro processor to process argument tab and macro expansion
5. Write a program in c count number of characters, words, lines in a given text of lines
6. Design and develop a program in c implement file operations
7. Design and develop a program in c to develop relative loader
8. Write a program in Assembly language to perform addition of two 16 bit numbers
9. Write a program in Assembly language to perform complement of a given negative number
10. Write a program in Assembly language to reverse a given number

**CSP08: DESIGN AND ANALYSIS OF ALGORITHMS & ARTIFICIAL
INTELLIGENCE LAB**

Credits: 1

Internal Marks: 40
University Examination Marks: 60

List of Experiments in DAA:

1. Sort a given set of elements using the Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.
2. Using OpenMP, implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.
- 3.a. Obtain the Topological ordering of vertices in a given digraph
b. Compute the transitive closure of a given directed graph using Warshall's algorithm.
4. Implement 0/1 Knapsack problem using Dynamic Programming.
5. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
6. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.
7. a. Print all the nodes reachable from a given starting node in a digraph using BFS method.
b. Check whether a given graph is connected or not using DFS method.
8. Find a subset of a given set $S = \{s_1, s_2, \dots, s_n\}$ of n positive integers whose sum is equal to a given positive integer d. For example, if $S = \{1, 2, 5, 6, 8\}$ and $d = 9$ there are two solutions $\{1, 2, 6\}$ and $\{1, 8\}$. A suitable message is to be displayed if the given problem instance doesn't have a solution.
9. Implement any scheme to find the optimal solution for the Traveling Salesperson problem and then solve the same problem instance using any approximation algorithm and determine the error in the approximation.
10. Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.

List of Experiments in AI:

1. Write a Program For DEPTH FIRST SEARCH.
2. Write a Program For BEST FIRST SEARCH.
3. Write a Program to Generate the output for A* Algorithm.
4. Write a Program to solve Water Jug Problem Using Heuristic Function.
5. Write a Program To Show the Tic Tac Toe Game for 0 and X.
6. Write a Program in PROLOG to solve water jug problem.
7. Write a program to implement N-Queen problem using Iterative method.
8. Write a program to implement N-Queen problem using Array.
9. Write a program to implement Min-max problem.
10. Write a program to implement Hill Climbing Algorithm.
11. Write a program to demonstrate Family relationships in PROLOG.
12. Write a program to show Concept of List in PROLOG.

B.Tech

III Year II Semester

S.No.	Course Number	Name of the Course
1	MET18	Operations Research
2	CST17	Computer Networks
3	ECT26	Micro Processors and Applications
4	CST18	Software Engineering
5		Elective I
6		Elective II
7	CSP09	Computer Networks Lab
8	ECP17	Micro Processors and Applications Lab
	BSP04	Soft skills Lab

B.TECH III YEAR II SEMESTER

MET18: OPERATIONS RESEARCH

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT – I

Introduction to Operations Research, Development; classification of models and different techniques; Applications of OR; Decision Environments, Decision Making under Certainty, Decision Making under Risk. Decision making under Uncertainty.

UNIT – II

Linear Programming (LP)-Mathematical formulation, Graphical solution, Standard form and Basic solution, Simplex Method, Big M method, Two phase method; Duality and Dual Relations

UNIT – III

Transportation models, Degeneracy, Assignment models, Traveling Salesman problem; Network models. Spanning tree, shortest route, and maximum flow.

UNIT – IV

Queuing Theory-Basic Structure of Queuing Models, Examples of Real Queuing Systems, Role of Exponential Distribution, Birth-and-Death Process based of Queuing Models. Queuing Models involving Single Server Multiple Queues, Single Server Single stage, Multi server-Single stage.

UNIT V

Game Theory: Introduction, Two person Zero-Sum Games, Some Basic Terms, the Maximum-Minimax principle Games without Saddle points, Dominance property- mixed strategies, graphic solution of $2 \times m$ and $m \times 2$ games; Sequencing Models and Priority rules, Johnson rule, n -jobs and 2 machines; n -jobs and 3 machines; n -jobs and m machines; and 2 jobs and m machines.

TEXT BOOKS:

1. PannnerSelvam, Operation Research, PHI Publication.
2. Vohra, Quantative Techniques, Tata McGrawHill.

REFERENCES:

1. P.K. Gupta and Man Mohan, _'Problem solving in Operation Research, Sultan Chand, 1990.
2. A. TahaHamdy, _'Operation Research', Macmillan, Publishing Company, New York 1997, Sixth Edition.
3. Hiller and Lieberman, _'Introduction to Operations Research: Seventh Edition, Tata McGraw-Hill.

CST17: COMPUTER NETWORKS

Credits: 4

**Internal Marks: 30
Univ. Examinations Marks: 70**

UNIT –I

THE DATA LINK LAYER: Data Link Layer: Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols, Example Data Link Protocols.

UNIT –II

THE MEDIUM ACCESS CONTROL SUBLAYER: The Medium Access Sub Layer: Channel Allocation Problem, Multiple Access Protocols (ALOHA, CSMA, Collision Free Protocols, WDMA, Wireless LAN protocols), Review of IEEE Standards for LANS, Data Link Layer Switching.

UNIT –III

THE NETWORK LAYER: The Network layer: Design Issues, Routing Algorithms (Optimality Principal, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing), Congestion Control Algorithms, Internetworking, The Network Layer in the Internet.

UNIT –IV

THE TRANSPORT LAYER: The Transport Layer: The Transport Service, Elements of Transport Protocols, A Simple Transport Protocol, The Internet Transport Protocols: UDP, The Internet Transport Protocols: TCP

UNIT –V

THE APPLICATION LAYER: The Application Layer: DNS, E-Mail, WWW, Multimedia, SMTP, HTTP, Fundamentals of Network Security.

TEXT BOOKS:

1. Computer Networks: Computer Networks, 5th Edition, Andrew S. Tanenbaum, David J. Wetherall, 2011, Pearson

REFERENCES:

1. Data communication and networking, Behrouz A. Forouzan, 5th Edition, TMH, 2013
2. Computer networks and internets with internet applications, DOUGLASE. Corner, 5th Edition, Pearson Education, 2008.

ECT26: MICROPROCESSORS AND APPLICATIONS

Credits: 4

**Internal Marks: 30
Univ. Examinations Marks: 70**

UNIT- I

Architecture of 8086/88 Processor - Signal Description - Addressing - Basic memory and I/O organization – Minimum and Maximum modes – Minimum modes timing diagrams for machines cycles such as Fetch,Read,Write,interrupt,DMA,and Reset – clock generator 8284, Bus controller 8288, Bus arbiter 8289.

UNIT- II

Interfacing Static and Dynamic RAMs – Programmable Peripheral interface (8255), Programmable interval/timer (8253) Programmable interrupt controller (8259),DMA controller (8237),Programmable communication interface (8251 USART)

UNIT- III

Interfacing ADC and DAC, Keyboard and display controller (8279), Floppy disk controller (8272), CRT controller (6845), Numeric Processor (8087),I/O processor (8086) – Bus arbitration and control.

UNIT- IV

Microprocessor Development Systems and its monitor software – introduction to the microcontroller 80196,its Architecture, Signal description, instruction set, addressing modes, memory and I/O interfacing, interrupts and DMA.

UNIT- V

Study of Intel 80286, 80386, 80486 and Pentium processors with respect to the following features- Internal Architecture, register organization, addressing modes (real & protected virtual), Instruction set, memory organization (privilege, protection), Interfacing memory and I/O devices.

TEXT BOOKS:

1. A.K.Rayu and K.M. Bhurchandi, Advanced Microprocessors and Peripherals, Tata MC GrawHill, 2000
2. Douglas V. Hall, Microprocessors and Interfacing, McGraw Hill International Edition 2nd edition 2002.

CST18: SOFTWARE ENGINEERING

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT I

Software and Software Engineering: The Nature of Software, the Unique Nature of WebApps, Software Engineering, The Software Process, Software Engineering Practice, Software Myths.

Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, the Unified Process, Personal and Team Process Models, Process Technology, Product and Process.

Agile Development: Agility, Agility and the Cost of Change, Agile Process, Extreme Programming, Other Agile Process Models

UNIT II

Software Measurement: process metrics, project metrics, and product metrics for Software quality, integrating metrics with the software process.

Software Project Planning: Software Project Estimation, Decomposition Techniques and Estimation models, Software Risk Management, Project Scheduling and Tracking, Software Quality Assurance, Reliability, Software Configuration Management.

UNIT III

Requirements Engineering: Establishing the Groundwork, Eliciting Requirements, Developing use cases, Building the requirements model, Negotiating, Validating Requirements.

Requirements Modeling (Scenarios, Information and Analysis Classes): Requirements Analysis, Scenario-Based Modeling, UML Models that Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling.

Requirements Modeling (Flow, Behavior, Patterns and WEBAPPS): Requirements Modeling Strategies, Flow-Oriented Modeling, Creating a Behavioral Model, Patterns for Requirements Modeling, Requirements Modeling for WebApps.

UNIT IV

Design Concepts: Design with Context of Software Engineering, The Design Process, Design Concepts, The Design Model.

Architectural Design: Software Architecture, Architecture Genres, Architecture Styles, Architectural Design, Assessing Alternative Architectural Designs, Architectural Mapping Using Data Flow.

Component-Level Design: Component, Designing Class-Based Components, Conducting Component-level Design, Component Level Design for WebApps, Designing Traditional Components, Component-Based Development.

User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, WebApp Interface Design, Design Evaluation.

UNIT – V

Software Testing - Software testing fundamentals, Text Case designs, and Testing approaches, strategies. Clean Room Software Engineering. Component based software engineering, client/Server Software Engineering, Web engineering, Reengineering.

TEXTBOOK:

1. -Software engineering A practitioner's Approach, Roger S. Pressman, McGraw Hill International Education, Seventh Edition, 2016.

REFERENCE BOOKS:

1. Fundamentals of Software Engineering, Fourth Edition, Rajib Mall, PHI,
2. Software Engineering, Ninth Edition, IAN Sommerville, Pearson, Ninth edition.
3. Software Engineering, A Precise Approach, PankajJalote, Wiley India,2010.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

CSP09: COMPUTER NETWORKS LAB

Credits: 1

Internal Marks: 40
Univ. Examinations Marks: 60

LIST OF EXPERIMENTS

1. Implement the data link layer framing methods such as bit stuffing
2. Implement the data link layer framing methods such as character, character stuffing.
3. Implement RSA Algorithm.
4. Implement on a data set of characters the three CRC.
5. Implement Dijkstra's algorithm to compute the Shortest path.
6. Take an example subnet of hosts. Obtain broadcast tree for it.
7. Write a program to break the above DES coding.
8. Write a program to create a socket.
9. Write a program for Data link layer framing method (Character count).
10. write a program for Sliding window protocol.

ECP17: MICROPROCESSOR AND APPLICATIONS LAB

Credits: 1

Internal Marks: 40
Univ. Examinations Marks: 60

LIST OF EXPERIMENTS

1. 16 – Bit addition.
2. Sorting the n numbers in ascending & descending order.
3. Sum of squares on n numbers, sum of cubes of n numbers.
4. Arithmetic mean of n numbers.
5. Interface of switch and display.
6. Interface of ADC converter.
7. Interfacing of DAC converter.
8. Stepper motor control using microprocessor.
9. Interfacing Keyboard/Display controller.
10. Implementation of Real Time Clock.
11. Microprocessor based temperature controller.
12. Microprocessor based traffic controller.

Note: About 10 experiments have to be conducted. The original list may be Varied by the Director subject to the availability.

BSP04: SOFT SKILLS LAB

Credits :1

Internal Marks: 40
University Exam. Marks : 60

UNIT-I: COMMUNICATION SKILLS

1. Reading Comprehension
2. Listening comprehension
3. Vocabulary Development
4. Common Errors

UNIT-II: WRITING SKILLS

1. Report writing
2. Resume Preparation
3. E-mail Writing

UNIT-III: PRESENTATION SKILLS

1. Oral presentation
2. Power point presentation
3. Poster presentation

UNIT-IV: GETTING READY FOR JOB

1. Debates
2. Group discussions
3. Job Interviews

UNIT-V: INTERPERSONAL SKILLS

1. Time Management
2. Problem Solving & Decision Making
3. Etiquettes

B.Tech

IV Year I Semester

S.No.	Course Number	Name of the Course
1	CST19	Web Technologies
2	CST20	Compiler Design
3	CST21	Data Mining
4	CST22	Distributed Systems
5		Elective III
6		Elective IV
7	CSP10	Compiler Design Lab
8	CSP11	Web Technologies & Data Mining Lab
9	CSP10	Compiler Design Lab

CST19: WEB TECHNOLOGIES

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

INTRODUCTION TO WEB TECHNOLOGIES Introduction to html, fundamentals of HTML elements, document body, text, hyperlink, lists, tables, Color and Images, frames, cascading style Sheets: Introduction, defining your own styles, properties and values in styles, style sheets, formatting blocks, and layers; JavaScript: JavaScript basics, variables, string manipulation, mathematical functions, statements, operators, arrays and functions.

UNIT-II

OBJECTS IN JAVASCRIPT AND XML Objects in JavaScript: Data and objects in JavaScript, regular expressions, exception handling, built-in objects, events; Dynamic HTML with JavaScript: Data validation, opening a new window, Rollover buttons, moving images, multiple pages in a single download, floating logos; XML: Basics XML, document type definition, xml schemas, Document Object Model, presenting XML.

UNIT-III

SERVLETS AND JSP Servlet: Lifecycle of a Servlet, a simple Servlet, the servlet API, the javax.servlet package, reading Servlet parameters, the javax.servlet. HTTP package, Handling HTTP requests and responses, using cookies and sessions. JSP: The anatomy of a JSP page, JSP processing, declarations, directives, expressions, code snippets, implicit objects, using beans in JSP pages, connecting to database in JSP

UNIT-IV

INTRODUCTION TO PHP Introduction to PHP: Basics of PHP, downloading, installing, configuring PHP, programming in a web environment and the anatomy of a PHP page; Overview of PHP data types and concepts: Variables and data types, operators, expressions and statements, strings, arrays and functions.

UNIT-V

PHP AND DATABASE ACCESS PHP and database access: Basic database concepts, connecting to a MySQL database, retrieving and displaying results, modifying, updating and deleting data; MVC architecture: PHP and other web technologies: PHP and XML, PHP and AJAX.

Text Books:

1. Chris Bates, -Web Programming: Building Internet Applications|, Wiley DreamTech, 2nd Edition, 2002.
2. Jeffrey C K Jackson, -Web Technologies|, Duquesne University, Pearson Education, 3rd Edition, 2010.
3. Steven Holzner, -The Complete Reference PHP|, Tata McGraw-Hill, 1st Edition, 2007.

Reference Books:

1. Hans Bergsten, -Java Server Pages|, O Reilly, 3rd Edition, 2003.
2. D. Flanagan, -Java Script|, O'Reilly, 6th Edition, 2011.
3. Jon Duckett, -Beginning Web Programming|, WROX, 2nd Edition, 2008.

4. Herbert Schildt, -Java the Complete Reference, Tata McGraw-Hill - Osborne, 8thEdition, 2011.

Web References:

1. <https://www.vidyarthiplus.com/vp/thread-16509.html#.WFzQvVMrLDc>
2. <http://www.bdu.ac.in/centers/uic/docs/courseware/NME2-Notes/Unit1.pdf>

CST20: COMPILER DESIGN

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

INTRODUCTION TO COMPILING:

Translators- Compilation and Interpretation-Language processors -The Phases of Compiler Errors Encountered in Different Phases-The Grouping of Phases-Compiler Construction Tools – Programming Language basics.

UNIT-II

LEXICAL ANALYSIS:

Need and Role of Lexical Analyzer-Lexical Errors-Expressing Tokens by Regular Expressions-Converting Regular Expression to DFA- Minimization of DFA- Language for Specifying Lexical Analyzers-LEX-Design of Lexical Analyzer for a sample Language.

UNIT-III

SYNTAX ANALYSIS:

Need and Role of the Parser, Context free grammars, writing a grammar, top down parsing, bottom up parsing, operator precedence parsing, LR parsers, using ambiguous grammars parser generators.

UNIT-IV

SYNTAX DIRECTED TRANSLATION:

Syntax directed Definitions-Construction of Syntax Tree-Bottom-up Evaluation of SAttribute Definitions- Design of predictive translator – Type Systems-Specification of a simple type checker- Equivalence of Type Expressions-Type Conversions. **RUN-TIME ENVIRONMENT:** Source Language Issues-Storage Organization-Storage Allocation- Parameter Passing-Symbol Tables-Dynamic Storage Allocation-Storage Allocation in FORTAN.

UNIT-V

CODE OPTIMIZATION AND CODE GENERATION

Principal Sources of Optimization-DAG- Optimization of Basic Blocks-Global Data Flow Analysis- Efficient Data Flow Algorithms-Issues in Design of a Code Generator – A Simple Code Generator Algorithm.

TEXTBOOK:

1. Alfred V Aho, Monica S. Lam, Ravi Sethi and Jeffrey D Ullman, –Compilers – Principles, Techniques and Tools, 2nd Edition, Pearson Education, published in 1 November 2013
2. Principles of compiler design ,by V Raghavan, McGraw Hill publication,published 1 july 2017.

REFERENCES:

1. Randy Allen, Ken Kennedy, “Optimizing Compilers for Modern Architectures: A Dependence-based Approach”, Morgan Kaufmann Publishers
2. Steven S. Muchnick, “Advanced Compiler Design and Implementation”, Morgan Kaufmann Publishers – Elsevier Science, India.
3. Keith D Cooper and Linda Torczon, “Engineering a Compiler”, Morgan Kaufmann Publishers Elsevier Science
4. Charles N. Fischer, Richard. J. LeBlanc, “Crafting a Compiler with C”, Pearson Education

CST21: DATA MINING

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT –I

Data warehousing: Definition, multi dimensional data model, OLAP operations, warehousing schema, Data warehousing Architecture, warehouse server , metadata OLAP engine, Data warehouse backend process.

UNIT –II

Data Mining: Definition, KDD vs Data mining, DBMS vs Data mining, Data mining Techniques, Issues and challenges in data mining.

UNIT –III

Association Rules: Introduction, Methods to discover Association, Apriori algorithm, Partition algorithm, Pincer search algorithm, FP-tree growth algorithm, Incremental algorithm, Border algorithm, Association rules with item constraints.

UNIT –IV

Clustering Techniques: Introduction, clustering paradigms, partitioning algorithm, K-medoid algorithms, CLARA, CLARANS, Hierarchical clustering, DBSCAN, BIRCH, CURE.

UNIT –V

Decision trees: Introduction, tree construction principles, Decision tree construction algorithms, CART, ID3, C4.5, CHAID, Decision tree construction with presorting. Introduction to web mining, web content mining, web structure mining, web usage mining, Text mining.

Text Book:

1. Arun K Pujari, Data Mining Techniques, University press, 2016

Reference:

1. Jiawei Han, Micheline Kamber, Jian Pei, Data Mining: Concepts and Techniques, Morgan Kaufmann publishers, 2011.

CST22: DISTRIBUTED SYSTEMS

Credits: 4

**Internal Marks: 30
Univ. Examinations Marks: 70**

UNIT – I

Introduction to Distributed Systems: What is a Distributed system, Hardware concepts, Software concepts, Client- Server model.

UNIT – II

Communication: Layered protocols, Remote procedure call Remote object invocation, Message-oriented Communication.

UNIT – III

Processes: Threads, Clients, Servers, Code migration, Software agents.
Naming: Naming entities, locating mobile entities, Removing unreferenced entities.

UNIT – IV

Consistency and Replication: Introduction, Data centric consistency model, Client centric consistency models, Distribution protocols, Consistency protocols.

Synchronization: Clock Synchronization, Logical Clocks, Global State, Election Algorithm, Mutual Exclusion, Distributed transactions.

UNIT – V

Distributed Object-based Systems: CORBA, Distributed COM.
Distributed file system: Sun Network file system.
Distributed document based systems: World Wide Web.

Text Books:

1. Andrew S. Tanenbaum, Maarten van steen, -Distributed systems, principle and Paradigms, Third Edition, Createspace Independant Publishing Platform, 2017.
2. George Coulouris, Jean Dollimore, -Distributed Systems: Concepts and Designl, 5E, 2013.

Reference Books:

1. Neelesh Kumar Jain , Sumita Verma , Deepika Khare , -Distributed Systems -, by Kindle Edition.
2. Ajay D. Kshemkalyani , Mukesh Singhal , -Distributed Computing South Asian Edition: Principles, Algorithms, and Systems, Cambridge University Press; South Asian edition, 2010.

CSP10: COMPILER DESIGN LAB

Credits: 1

Internal Marks: 40
Univ. Examinations Marks: 60

LIST OF EXPERIMENTS

1. To write a c program on lexical analysis to generate tokens.
2. To write a c program to do exercise on syntax analysis.
3. To write a c program to implement infix to postfix operation.
4. To write a c program to implement recursive decent parser.
5. To write a c program to implement symbol table.
6. To write a c program to implement backend of the compiler.
7. To write a c program for stack to use dynamic storage allocation strategies.
8. To write a c program to implement data flow and control analysis.

CSP11: WEB TECHNOLOGIES AND DATA MINING LABORATORY

Credits: 1

Internal Marks: 40
Univ. Examinations Marks: 60

1. Design the following static web pages required for online book store. **1. Home page:-** the static home page must contains three pages **2. Top frame:-** logo and college name and links to homepage, login page, registration Page, catalogue page and cart page **3. Left frame:-** at least four links for navigation which will display the catalogue of Respective links **4. Right frame:-** the pages to links in the left frame must be loaded here initially it Contains the description of the website.
2. Design the following static web pages required for online book store. **1. Home page: -** the static home page must contain three pages **2. Top frame: -** logo and college name and links to homepage, login page, registration Page, catalogue page and cart page **3. Left frame: -** at least four links for navigation which will display the catalogue of Respective links **4. Right frame: -** the pages to links in the left frame must be loaded here initially it Contains the description of the website **5. Registration page** and **6. Cart page.**
3. Write a java script to validate the following fields in a registration page 1. Name (should contains alphabets and the length should not be less than 6 characters) 2. Password(should not be less than 6 characters) 3. E-mail(should not contain invalid addresses).
4. Write an XML file which displays the book details that includes the following: 1) Title of book 2) Author name 3) Edition 4) Price Write a DTD to validate the above XML file and display the details in a table (to do this use XSL).
5. Write an XML file which displays the book details that includes the following: 1) Title of book 2) Author name 3) Edition 4) Price Write a DTD to validate the above XML file and display the details in a table (to do this use XSL).
6. **User Authentication** Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a PHP for doing the following.
 1. Create a Cookie and add these four user ID's and passwords to this Cookie.
 2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies. If he is a valid user (i.e., user-name and

password match) you should welcome him by name (user-name) else you should display
-You are not an authenticated user ‘‘.

7. **User Authentication** Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a PHP for doing the following.
1. Create a Cookie and add these four user ID's and passwords to this Cookie. 2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies. If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display -You are not an authenticated user.3
8. Install a database (Mysql or Oracle). Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form). Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page

LIST OF EXPERIMENTS IN DATA MINING

1. Build Data Warehouse and Explore WEKA.
2. Perform data preprocessing tasks and Demonstrate performing association rule mining on datasets.
3. Demonstrate performing classification on data sets.
4. Demonstrate performing clustering on data sets.
5. Credit Risk Assessment. Sample Programs using German CreditData.
6. Sample Programs using Hospital Management System.

B.Tech

IV Year II Semester

S.No.	Course Number	Name of the Course
1	CST23	Cloud Computing
2		Elective-V
3		Elective-VI
4	CSP12	Project Work

CST23: CLOUD COMPUTING

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Cloud Infrastructure Cloud Computing at Amazon and Google, Microsoft Windows Azure and Online Services, Open-Source Software Platforms for Private Clouds, Cloud Storage Diversity and Vendor Lock-in, Cloud Computing Interoperability, Energy Use and Ecological Impact of Large-Scale Data, Service- and Compliance-Level Agreements, Responsibility Sharing Between User and Cloud Service Provider User Experience.

UNIT-II

Cloud Resource Virtualization Virtualization, Layering and Virtualization, Virtual Machine Monitors, Virtual Machines, Performance and Security Isolation, Full Virtualization and Paravirtualization, Hardware Support for Virtualization, *Xen*, VMM Based on Paravirtualization, Optimization of Network Virtualization in Xen2.0, vBlades, A Performance Comparison of Virtual Machines, The Darker Side of Virtualization, Software Fault Isolation.

UNIT-III

Cloud Resource Management and Scheduling Policies and Mechanisms for Resource Management, Applications of Control Theory to Task Scheduling on a Cloud, Stability of a Two-Level Resource Allocation Architecture, Feedback Control Based on Dynamic Thresholds, Coordination of Specialized Autonomic Performance Managers, A Utility-Based Model for Cloud-Based Web Services, Resource Bundling: Combinatorial Auctions for Cloud Resources, Scheduling Algorithms for Computing Clouds, Fair Queuing, Start-Time Fair Queuing, Borrowed Virtual Time, Cloud Scheduling Subject to Deadlines, Scheduling Map Reduce Applications Subject to Deadlines, Resource Management and Dynamic Application Scaling.

UNIT-IV

Storage Systems The Evolution of Storage Technology, Storage Models, File Systems, and Databases, Distributed File Systems, General Parallel File System, Google File System, *Apache Hadoop*, Locks and *Chubby*, Transaction Processing and NoSQL Databases, *BigTable*, *Megastore*.

UNIT-V

Cloud Security Cloud Security Risks, Security, Privacy and Privacy Impact Assessment, Trust, Operating System Security
Virtual Machine Security, Security of Virtualization, Security Risks Posed by Shared Images, Security Risks Posed by a Management OS, *Xoar*, A Trusted Virtual Machine Monitor.

TEXT BOOKS:

1. Dan C. Marinescu Cloud Computing: Theory and Practice, Elsevier Publication (MK).
2. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Cloud Computing Principles and Paradigms, Wiley, 2010

3. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, 2009.

REFERNCE BOOK:

1. Ronald Krutz and Russell Dean Vines, Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Wiley Publishing, 2010.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach, McGraw Hill, 2010.
3. Judith Hurwitz, Robin Bloor, Marcia Kaufman, Fern Helper, Cloud Computing For Dummies, Wiley Publishing, 2010. vecctiola, Tammarai selvi, TMH

ELECTIVES

ELECTIVE -I

CST24: PYTHON PROGRAMMING

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Exploring Python: Interactive Execution, Comments, Types, Names (Variables), Operators, Print Statement, Input from the User, Indexing, Modules and Dot Notation, Bitwise Operators.

Creating Python Programs: Commands, A Temperature Conversion Program, Statements, Levels of Abstraction, The Software development process.

UNIT-II

Defining Functions: Functions as Building Blocks, Testing functions, Name Scopes, Writing a function that calls itself, Using Global names Inside of functions, Raising Exceptions, functions are values, A few words about nothing.

Strings-Lists-Tuples-Sets.Dictionaries: Introduction, Combining two dictionaries with Update, Making Copies, Zip List Initialization, loops in Dictionaries, Dynamic programming with Dictionaries, Persistent Variables, Internal Dictionaries.

UNIT-III

Files: Introduction, Rewriting the Word Count Program, Operating System Commands, Files and For, Recovering from Exceptions, Standard I/O, Persistence and Pickle, Example on File sort, Reading from a URL.

Classes: Class Basics, Constructors, Class Boundaries, Calling Methods from Inside Other Methods, Objects as references, Printing, Inheritance, Classes types and tests, Class Variables, Multiple Inheritance, Classes as dynamic records

UNIT-IV

Functional Programming: The functional programming paradigm, Mapping, Filtering and reduction, Lambda functions, List Comprehensions.

Object-Oriented Programming: Community, Using the Stack Class, Discovering Objects, Duck Typing, Encapsulation and Properties

UNIT-V

Scopes-Name Spaces-Modules.

Case Studies on GUI programming with Tkinter, Case Studies on Web-Based Applications, Case Study on A Simple Blog, Case Study on A Wiki Web.

TEXT BOOKS:

Exploring Python by Timothy A. Budd, McGrawHill Education, Edition1,published in 2011

REFERENCE BOOK:

Python Programming: A complete guide for Beginners to Master and become an expert in Python Programming Language,Brain Draper,CreateSpace Independent Publishing,published in 2016

Web Reference:

<https://www.python.org>

CST25: ENTERPRISE RESOURCE PLANNING

Internal Marks: 30

Credits: 3

Univ. Examinations Marks: 70

UNIT-I

RP AND TECHNOLOGY: Introduction , Related Technologies , Business Intelligence ,E-Commerce and E-Business , Business Process Reengineering , Data Warehousing ,Data Mining , OLAP , Product life Cycle management ,SCM , CRM.

UNIT-II

ERP IMPLEMENTATION:Implementation Challenges,Strategies, Life Cycle, Pre-implementation Tasks ,Requirements Definition ,Methodologies , Package selection , Project Teams , Process Definitions ,Vendors and Consultants,Data Migration, Project management,Post Implementation Activities.

UNIT-III

ERP IN ACTION & BUSINESS MODULES: Operation and Maintenance,Performance, Maximizing the ERP System,Business Modules ,Finance ,Manufacturing ,Human Resources ,Plant maintenance ,Materials Management , Quality management ,Marketing , Sales, Distribution and service.

UNIT-IV

ERP MARKET: Marketplace , Dynamics ,SAP AG , Oracle ,PeopleSoft ,JD Edwards ,QAD Inc,SSA Global , Lawson Software ,Epicor,Intutive.

UNIT-V

ENTERPRISE APPLICATION INTEGRATION:ERP and E-Business,ERP II ,Total quality management ,Future Directions ,Trends in ERP.

TEXT BOOKS:

1. Alexis Leon, "ERP DEMYSTIFIED", Tata McGraw Hill, Third Edition, 2012.
2. Mary Sumner, "Enterprise Resource Planning", Pearson Education,Third Edition, 2007.

REFERENCES:

1. Jim Mazzullo,"SAP R/3 for Everyone", Pearson,2007.
2. Jose Antonio Femandz, "The SAP R /3 Handbook", Tata McGraw Hill, 1998.
3. Biao Fu, "SAP BW: A Step-by-Step Guide", First Edition, Pearson Education, 200UNIT III.
4. EllenMonk,BretWagner,||Concepts in Enterprice Resource Planning||,ThirdEdition,2008.

CST26: SOFT COMPUTING

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT I

INTRODUCTION Artificial neural network: Introduction, characteristics, learning methods, taxonomy. Evolution of neural networks- basic models - important technologies - applications. Fuzzy logic: Introduction - crisp sets- fuzzy sets - crisp relations and fuzzy relations: cartesian product of relation - classical relation, fuzzy relations, tolerance and equivalence relations, non-iterative fuzzy sets. Genetic algorithm- Introduction - biological background - traditional optimization and search techniques - Genetic basic concepts.

UNIT II

NEURAL NETWORKS McCulloch-Pitts neuron - linear separability - hebb network - supervised learning network: perceptron networks - adaptive linear neuron, multiple adaptive linear neuron, BPN, RBF, TDNN- associative memory network: auto-associative memory network, hetero-associative memory network, BAM, hopfield networks, iterative autoassociative memory network & iterative associative memory network – unsupervised learning networks: Kohonenself organizing feature maps, LVQ – CP networks, ART network.

UNIT III

FUZZY LOGIC Membership functions: features, fuzzification, methods of membership value assignments Defuzzification: lambda cuts - methods - fuzzy arithmetic and fuzzy measures: fuzzy arithmetic - extension principle - fuzzy measures - measures of fuzziness -fuzzy integrals - fuzzy rule base and approximate reasoning : truth values and tables, fuzzy propositions, formation of rules-decomposition of rules, aggregation of fuzzy rules, fuzzy reasoning-fuzzy inference systems-overview of fuzzy expert system-fuzzy decision making.

UNIT IV

GENETIC ALGORITHM Genetic algorithm and search space - general genetic algorithm – operators - Generational cycle - stopping condition – constraints - classification - genetic programming – multilevel optimization – real life problem- advances in GA.

UNIT V

HYBRID SOFT COMPUTING TECHNIQUES & APPLICATIONS Neuro-fuzzy hybrid systems - genetic neuro hybrid systems - genetic fuzzy hybrid and fuzzy genetic hybrid systems - simplified fuzzy ARTMAP - Applications: A fusion approach of multispectral images with SAR, optimization of traveling salesman problem using genetic algorithm approach, soft computing based hybrid fuzzy controllers.

TEXT BOOKS:

- 1 -Neuro-Fuzzy and Soft Computing| by J.S.R.Jang, C.T. Sun and E.Mizutani, , PHI / Pearson Education 2004.
- 2 "Principles of Soft Computing" by S.N.Sivanandam and S.N.Deepa, , Wiley India Pvt Ltd, 2011.
- 3 -Introduction to Genetic Algorithms| by S.N.Deepa, , Springer, 2008 edition.

REFERENCES:

1. "Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis & Applications" by S.Rajasekaran and G.A.VijayalakshmiPai, Prentice-Hall of India Pvt. Ltd., 2006.
2. -Fuzzy Set Theory: Foundations and Applications| by George J. Klir, Ute St. Clair, Bo Yuan, Prentice Hall, 1997.
3. -Genetic Algorithm in Search Optimization and Machine Learning| by 3. David E. Goldberg, Pearson Education India, 2013.
4. -Neural Networks Algorithms, Applications, and Programming Techniques by James A. Freeman, David M. Skapura, Pearson Education India, 1991.
5. -Neural Networks Comprehensive Foundation| by Simon Haykin, Second Edition, Pearson Education, 2005.

CST27: MOBILE COMPUTING

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT – I

Mobile Communication: An overview, Mobile Computing, Mobile Computing Architecture, Mobile Devices, Mobile System Networks, Data Dissemination, Mobility Management.

Mobile Devices and Systems: Mobile Phones, Digital Music Players, Handheld Pocket Computers, Limitation of Mobile Devices, Automotive Systems.

UNIT – II

GSM and Similar Architectures: GSM-Services and Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, General Packet Radio Service, High-Speed Circuit Switched Data, DECT Wireless Medium Access Control and CDMA-based Communication: Medium Access Control, introduction to CDMA-based Systems, Coding Methods in CDMA.

UNIT – III

Mobile IP Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation Route optimization, Dynamic Host configuration Protocols

Mobile Transport Layer: Conventional TCP/IP Transport Layer Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Methods of TCP-layer Transmission for Mobile Networks, TCP Over 2.5G/3G Mobile Networks

UNIT – IV

Data Dissemination and Broadcasting Systems: Communication Asymmetry, Classification of Data-Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Techniques, Digital Audio Broadcasting, Digital Video Broadcasting.

Data synchronization in Mobile Computing Systems: Synchronization, Synchronization Software for mobile Devices, Synchronization Protocols, ssyncML-Synchronization, Language for Mobile Computing, sync4j (Funambol), Synchronized Multimedia Markup Language (SMIL)

UNIT – V

Mobile Ad-Hoc And Sensor Networks: Introduction to Mobile Ad-hoc Network, MANET, Wireless Sensor Networks

Mobile Operating Systems: Operating Systems, palmOS, windows CE, Symbian OS, Linux for Mobile Devices

Text Books:

Raj kamal, Mobile Computing, Oxford University press 2007

ELECTIVE - II

CST28: CYBER PHYSICAL SYSTEMS

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Cyber Physical Systems (CPSs): Introduction, Background, Introduction to wireless cps's, Research trends, cps in the real world, **CPS Architecture:** Prototype architecture, Open data service architecture, design for cps, Multilayer wireless networking, Heterogeneous cps network architecture, Architecture for heterogeneous mobile computing, Barwan. **Cyber Physical system:** Introduction, Network control for cyber physical systems, Network latency in cyber physical system, Design challenges in cyber physical system.

UNIT-II

Interconnection Issues in CPS: introduction, multicast problems in adhoc networks, Introduction to coverage in wireless sensors, issues in IEEE 802.11

CyberPhysical Internet: Introduction, fundamental limitations and important research challenges protocol stack Architecture, cps interconnection protocol, transport protocol services.

NETWORK QOS IN CPS: Introduction, possibilities and challenges in internet QOS

UNIT-III

CPS Security: Introduction, Security , Challenges,

Security Issues of CPS: Introduction, Securing cps, Attacks and its consequences, Security problems in control systems, Control systems against malicious attacks.

Interoperability and Communication Issues in CPS: Heterogeneity, Synchronization methods, Network, **Heterogeneous Networking Issues:** Introduction, An architectural framework for heterogeneous networking network , Model survivable overlay networks and services, Network reconstitution through heterogeneous replication service model.

UNIT-IV

Heterogeneous Mobile Computing Issues: Introduction, Overlay networking, Reliable data transmission.Scalable Architecture for Heterogeneous Environment, Cluster-Based Proxies, Generalized Proxies. **Network Services:** Introduction, Service discovery, Remote-control Interface, Security issues.

UNIT-V

Cyber Physical ControlSystems: Introduction, Adaptive and predictive methods, control system architectures, RCS methodology Objectives.

Cyber Physical Systems Management Introduction, Background, Reliability, Tools and Techniques.

Text Books:

1.P. Venkata Krishna , V. Saritha and H. P. Sultana - Challenges, Opportunities, and Dimensions of Cyber-Physical Systems , Novemeber 2014.

Reference Books:

1. Danda B. Rawat, Joel J.P.C.,Rodrigues, Ivan Stojmenovic -Cyber-Physical Systems: From Theory to Practice,CRC press,2015.
2. Deitmar P.F.Mollar -Guide to computing fundamentals in cyber-physical systems,Springer,2016.

CST29: DESIGN PATTERNS

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Introduction to Design Patterns:

Pattern Description, Design Patterns in Small Talk MVC, Describing Design Patterns, Catalog of Design Patterns, Organizing the Catalog, Design problems, Solving of Design Problems using Design Patterns, Selection of a Design Pattern, use of Design Patterns.

UNIT-II

Designing a Document Editor:

Document structure, Formatting, Embellishing the User Interface, Supporting Multiple Look and Feel standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation.

UNIT-III

Design Patterns Catalog:

Creational Patterns : Discussion of Creational Patterns, Abstract Factory, Builder, Factory Method, Prototype, Singleton.

Structural Patterns-1: Discuss of Structural Patterns, Adapter, Bridge, Composite and Decorator.

UNIT-IV

Structural Patterns-2 & Behavioral Patterns-1:

Structural patterns: Facade, Flyweight, Proxy.

Behavioral Patterns: Discussion of Behavioral Patterns, Chain of Responsibility Command, Interpreter.

UNIT-V

Behavioral Patterns-2: Iterator, Mediator, Observer, State, Strategy, Template Method, Visitor.

Behavioral Patterns-3: State, Strategy, Template Method, Visitor, Expectations from Design Patterns.

TEXT BOOKS:

Design Patterns [Erich Gamma](#) ,2015

Design Patterns Explained: A New Perspective on Object-Oriented Design (Software Patterns Series) – 12 Oct 2004

1. Design Patterns: Elements of Reusable Object Oriented Software, Gamma, Helm, Johnson, 1995, PEA.
2. Head First Design Patterns By Eric Freeman-Oreilly-SPD.

REFERENCES:

1. Java Design Patterns, Cooper, Pearson.
2. Object Oriented Design and Patterns, Horstmann, Wiley.
3. Object Oriented Systems Development, Ali Bahrami, 1999, MCG.
4. Applying UML Patterns, Larman, and PEA.
5. S.Sahni, -Data Structures, Algorithms and Applications in C+ +| Second Edition, Orient Longman Pvt.ltd,2010
6. J.P. Trembly and P.G. Sorensen, -An Introduction to Data Structures with Applications|. Tata McGraw Hill, 2010

ECT10: DIGITAL SIGNAL PROCESSING

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT – I

DISCRETE FOURIER TRANSFORMS:

Introduction, Computation of DFT, Properties of DFT, introduction to Fourier series, DTFT, The Goertzel Algorithm, Decimation in Time Fast Fourier Transform (FFT) Algorithm, Inverse DFT using FFT algorithm, Decimation in Frequency FFT Algorithms, Circular convolution.

UNIT – II

STRUCTURES FOR DISCRETE TIME SYSTEMS:

Introduction, Block Diagram representation of linear constant coefficient difference equations, Signal flow graph representation of linear constant coefficient difference equations. **BASIC STRUCTURES FOR IIR SYSTEMS:** Direct forms, Cascade forms, Parallel forms, Lattice Structures, Transposed forms. **IIR DIGITAL FILTERS :** Design of Discrete time IIR Filters from Continuous Time Filters, Design by Impulse Invariance, Bilinear Transformation, Examples of Bilinear Transformation design, Butterworth filter, Butter worth approximation, Chebyshev approximation..

UNIT – III

Basic Network systems for FIR Systems: Direct forms, Cascade forms, Structures for Linear Phase FIR Systems **FIR DIGITAL FILTERS: Design** of FIR from Windowing, Properties of Rectangular, Bartlet, Hamming Windows, Keiser Window Filter design methods, Comparison of IIR & FIR Filters. FIR filters design by frequency sampling method.

UNIT IV

MULTIRATE DIGITAL SIGNAL PROCESSING :The basic sample rate, Decimation and Interpolation, Multirate structures for sampling rate conversion, Multistage design of decimator and interpolator, the polyphase decomposition, Arbitrary rate. Sampling rate converter, Nyquist Filters.

UNIT - V

DIGITAL SIGNAL PROCESSORS: Introduction to Programmable DSP's, Multiplier and Multiplier accumulator (MAC), Modified bus structures and Memory Access Schemes in P-DSP's Multiplier Access Memory, Multiported Memory, VLIW Architecture, Pipelining, Special addressing modes in PDSPs, On-chip Peripherals. **FEATURES OF TMS3210C5X PROCESSORS:** Internal Architecture, External Memory accessories, Pipeline operations, Peripherals.

TEXT BOOKS:

1. Digital Signal Processors by Venkataramani & Bhaskar, Tata Mc Graw-Hill, 2002.
2. Digital Signal Processing by Sanjit K Mitra, 2nd Edition, Tata Mc Graw-Hill, 2011.
3. Digital Signal Processing by Oppenheim, Schaefer and Buck, Prentice-Hall, 1989.

REFERENCE BOOKS:

1. Digital Signal Processing, Principles, Algorithms and Applications: John Provakis, Dimitris, G. manolakis, Pearson education/PHI 4th edition 2007.
2. Digital signal processing-A.V.Oppenheim & R W Schaffer, 2nd edition, PHI.
3. Digital Signal Processing, a computer base approach- Sanjit K.Mitra, Tata MC GrawHill 3rd edition 2009.
4. Digital Signal Processing- Andreas Antoniou, Tata MC GrawHill 2006.

ELECTIVE - III

CST30: CYBER SECURITY

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Systems Vulnerability Scanning Overview of vulnerability scanning, Open Port / Service Identification, Banner / Version Check, Traffic Probe, Vulnerability Probe, Vulnerability Examples, OpenVAS, Metasploit. Networks Vulnerability Scanning - Netcat, Socat, understanding Port and Services tools - Datapipe, Fpipe, WinRelay, Network Reconnaissance – Nmap, THC-Amap and System tools. Network Sniffers and Injection tools – Tcpdump and Windump, Wireshark, Ettercap, Hping Kismet.

UNIT- II

Network Defense tools Firewalls and Packet Filters: Firewall Basics, Packet Filter Vs Firewall, How a Firewall Protects a Network, Packet Characteristic to Filter, Stateless Vs Stateful Firewalls, Network Address Translation (NAT) and Port Forwarding, the basic of Virtual Private Networks, Linux Firewall, Windows Firewall, Snort: Introduction Detection System.

UNIT-III

Web Application Tools Scanning for web vulnerabilities tools: Nikto, W3af, HTTP utilities - Curl, OpenSSL and Stunnel, Application Inspection tools – Zed Attack Proxy, Sqlmap. DVWA, Webgoat, Password Cracking and Brute-Force Tools – John the Ripper, L0htcrack, Pwdump, HTC-Hydra.

UNIT-IV

Introduction to Cyber Crime and law Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behavior, Clarification of Terms, Traditional Problems Associated with Computer Crime, Introduction to Incident Response, Digital Forensics, Computer Language, Network Language, Realms of the Cyber world, A Brief History of the Internet, Recognizing and Defining Computer Crime, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Indian IT ACT2000.

UNIT-V

Introduction to Cyber Crime Investigation Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Worms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks.

Text Books:

1. Nina Godbole, Sunit Belapure, — Cyber Security : Understanding Cyber crimes , Computer Forensics and Legal Perspectives, 2011, Wiley Publications.
2. Surya Prakash Tripathi, Ritendra Goel, Praveen Kumar shukla, –Introduction to Information security and Cyber Laws, Kindle Edition
3. Mike Shema , Anti-Hacker Tool Kit (Indian Edition), 2014, Mc Graw Hill Publications

CST31: SOFTWARE PROJECT MANAGEMENT

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics. Pragmatic software cost estimation.

UNIT- II

Improving Software Economics: Reducing Software product size, Improving software processes, improving team effectiveness. Improving automation, Achieving required quality, peer inspections. The old way and the new- The principles of conventional software engineering. Principles of modern software management, transitioning to an iterative process.

UNIT- III

Life cycle phases: Engineering and production stages, inception. Elaboration, construction, transition phases. Artifacts of the process: The artifact sets. Management artifacts, Engineering artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

UNIT- IV

Work Flows of the process: Software process workflow, Inter trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process Planning Work breakdown structures, planning guidelines, cost and scheduled estimating, Interaction, planning process, Pragmatic planning.

- Project Organizations and Responsibilities: Line-of-Business Organizations,
- Project Organizations, evolution of Organizations.
- Process Automation: Automation Budding Blocks. The Project Environment..

UNIT-V

Project Control and Process instrumentation: The server care Metrics, Management indicators, and quality indicators. life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminates, Example. Future Software Project Management: Modern Project Profiles Next generation Software economics modern Process transitions.

Case Study: The Command Center Processing and Display System. Replacement (CCPDS. R).

TEXT BOOKS

1. Software Project Management. Walker Royce, Pearson Education.
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, Tate McGraw Hd.

REFERENCE BOOKS

1. Applied Software Project Management, Andrew Stelbian & Jennifer Greene, O'Reilly. 2006
2. Head First PMP, Jennifer Greene & Andrew Stelman, O'RoiHy.2007
3. Software Enneeing Project Managant. Richard H. Thayer & Edward Yourdon, second edition, Wiley India, 2004.
4. Ale Project Management, Jim Highsniiith. Pearson education, 2004
5. The art of Project management. Scott Berkun. O'Reilly, 2005.
6. Software Project Management in Practice. Pankaj Jalote. Pearson Educabon,2002.

MET33: INDUSTRIAL ROBOTICS

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Fundamentals of Robot

Robot - Definition - Robot Anatomy – Co- ordinate Systems, Work Envelope Types and Classification Specifications-Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Payload- Robot Parts and their Functions-Need for Robots-Different Applications.

UNIT II

Robot Drive Systems and End Effectors

Pneumatic Drives-Hydraulic Drives-Mechanical Drives-Electrical Drives-D.C. Servo Motors, Stepper Motors, A.C. Servo Motors-Salient Features, Applications and Comparison of all these Drives, End Effectors-Grippers-Mechanical Grippers, Pneumatic and Hydraulic- Grippers, Magnetic Grippers, Vacuum Grippers; Two Fingere and Three Fingere Grippers; Internal Grippers and External Grippers; Selection and Design Considerations.

UNIT III

Sensors and Machine Vision

Requirements of a sensor, Principles and Applications of the following types of sensors- Position sensors - Piezo Electric Sensor, LVDT, Resolvers, Optical Encoders, pneumatic Position Sensors, Range Sensors Triangulations Principles, Structured, Lighting Approach, Time of Flight, Range Finders, Laser Range Meters, Touch Sensors ,binary Sensors., Analog Sensors, Wrist Sensors, Compliance Sensors, Slip Sensors, Camera, Frame Grabber, Sensing and Digitizing Image Data Signal Conversion,

Image Storage, Lighting Techniques, Image Processing and Analysis-Data Reduction, Segmentation, Feature Extraction, Object Recognition, Other Algorithms, Applications Inspection, Identification, Visual Serving and Navigation

UNIT IV

Robot Kinematics and Robot Programming

Forward Kinematics, Inverse Kinematics and Difference; Forward Kinematics and Reverse Kinematics of manipulators with Two, Three Degrees of Freedom (in 2 Dimension), Four Degrees of freedom (in 3 Dimension) Jacobians, Velocity and Forces-Manipulator Dynamics, Trajectory Generator, Manipulator Mechanism Design-Derivations and problems. Lead through Programming, Robot programming Languages-VAL Programming-Motion Commands, Sensor Commands, End Effector commands and simple Programs.

UNIT V

Implementation and Robot Economics

RGV, AGV; Implementation of Robots in Industries-Various Steps; Safety Considerations for Robot Operations - Economic Analysis of Robots.

TEXT BOOKS:

1. Klafter R.D., Chmielewski T.A and Negin M., -Robotic Engineering - An Integrated Approach, Prentice Hall, 2003.
2. Groover M.P., -Industrial Robotics -Technology Programming and Applications, McGraw Hill, 2001.

REFERENCES:

1. Craig J.J., -Introduction to Robotics Mechanics and Control, Pearson Education, 2008.
2. Deb S.R., -Robotics Technology and Flexible Automation, Tata McGraw Hill Book Co., 1994.
3. Koren Y., -Robotics for Engineers", Mc Graw Hill Book Co., 1992.
4. Fu.K.S.,Gonzalez R.C. and Lee C.S.G., -Robotics Control, Sensing, Vision and Intelligence, McGraw Hill Book Co., 1987.
5. Janakiraman P.A., -Robotics and Image Processing, Tata McGraw Hill, 1995.
6. Rajput R.K., -Robotics and Industrial Automation, S.Chand and Company, 2008.
7. Surender Kumar, -Industrial Robots and Computer Integrated Manufacturing, Oxford and IBH Publishing Co. Pvt. Ltd., 1991.

CST32: BIG DATA ANALYTICS

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Big Data Analytics: What is big data, History of Data Management ; Structure Big Data ; Elements of Big Data ; Big Data Analytics ; Distributed and Parallel Computing for Big Data; What Big Data Analytics Isn't, Why this sudden Hype Around Big Data Analytics , Classification of Analytics, Greatest Challenges that prevent Business from Capitalizing Big Data; **Top Challenges facing Big Data analysis**, Why Big Data Analytics Important; Data Science; Terminologies used in Big Data Environments; Basically Available Soft State Eventual Consistency (BASE); Open Source Analytics Tools.

UNIT-II

Big Data Implementation for Industry: Big Data Analytics for Telecom, Big Data Analytics for Banking, **Emerging Database Landscape:** Database evolution, Scale-out architecture, Database workloads, Database technologies for managing the workloads, Columnar Databases, Requirements for next generation data warehouses, Polyglot persistence-The next generation database architecture.

UNIT-III

Data modeling-NoSQL data modeling techniques: Types of NoSQL stores, Choice of database system, JSON, Column Family Databases, Operations on column family, Understanding Cassandra data model, Designing **Cassandra data structures**, Schema migration approach using ETL. **Big Data Analytics Methodology:** Big Data Analytics methodology analysis and evolution of business usecases ,Development of business hypothesis.

UNIT-IV

Big Data Technology Landscape and Hadoop ;NoSQL,Hadoop; RDBMS versus Hadoop; Distributed computing challenges; **History of Hadoop;** Hadoop overview; Use case of Hadoop; Hadoop distributors; Hadoop Distributed File System(HDFS).

UNIT-V

Extracting value from Big Data: In- memory computing technology, Real-time analytics, CAP Theorem, Use of In-memory data grid, Map-Reduce and real time processing, Real-time analysis of machine generated data, Building a recommendation system .

Data scientist: Definition, Big Data flow, Design principles for contextualizing Big Data, Nature of work of a data scientist.

TEXT BOOK:

1. Mohanty S, Jagadeesh M, Srivatsa H, Big data Imperatives : Enterprise big data warehouse, BI Implementation and analytics, Apress/Springer(India), 2013.
2. Seema Acharya, SubhasininChellapan,Big Data and Analytics, Wiley Publications,2015.

Reference book:

1. Benman JJ, Principles of big data: Preparing, Sharing and analyzing complex information, Morgan Kaufmann, 2013.

CSP13: ADVANCED PROGRAMMING LAB

Credits: 3

Internal Marks: 40
Univ. Examinations Marks: 60

UNIT- I

Introduction to Problem Solving: Introduction to Computer Systems, Computer Environments, Computer Languages, Problem Solving Aspects, Top-Down Design, Bottom-Up Design, Development of Algorithms, Representation of Algorithm, Flow Chart, Pseudo Code, Coding, Testing and Debugging.

UNIT- II

Programming in C: Elements of C Tokens, Identifiers, Preprocessor Directives. Data types in C. Control Structures in C. Sequence, Selection and Iterations. Arrays, Strings, Pointers, Functions, Structures, Unions. Files I/O.

UNIT- III

OO Programming Concepts & C++: Classes, Object, Instantiation. Encapsulation, Abstraction, Inheritance, Polymorphism. C++ Programming: Elements of C++- Tokens, Identifiers. Variables and Constants, Data types, Operators, Control Statements. Functions Constructors and Destructors. Templates, Exception Handling.

UNIT- IV

Java Programming: An overview of Java, Data types, Arrays and Variables, Operators, Control Statements, Introduction of Classes, Inheritance, Packages and Interfaces, Exception Handling, Multithreaded Programming, I/O Basics, Applets.

UNIT- V

Data Structures and Algorithms: Data, Information, Definition of Data Structures. Arrays, Stacks, Queues, Linked Lists, Trees, Graphs. Searching and Sorting Techniques. Introduction to Algorithms. Analysis of Algorithms, Binary Search, Asymptotic Notations-Big O, Omega and Theta. Average Case Analysis of Simple Programs like Finding Maximum of N elements.

Text Books:

1. Balagurusamy E, Programming in ANSI C, 6th Edition, Tata McGraw-Hill, 2012
2. R.G.Dromey, How to Solve it by Computer, PHI.
3. Balagurusamy E , Object Oriented Programming with C++ 6th Edition, McGraw Hill Education, 2013
4. Herbert Schildt Java : The Complete Reference, 10th Edition, Mc Graw Hill India, 2017
5. -Fundamental of Algorithms, E. HOROWITZ and S. SAHNI, GALGOTIA.

ELECTIVE - IV

B.TECH IV YEAR I SEMESTER

ELECTIVE-IV

CST33: R-PROGRAMMING

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

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.

UNIT-II

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 Example: A Binary Search Tree.

UNIT-III

Doing Math and Simulation in R, Math Function, Extended Example Calculating Probability-Cumulative Sums and Products-Minima and Maxima- Calculus, Functions for 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 /out put, Accessing the Keyboard and Monitor, Reading and writer Files,

UNIT-IV

Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot() Function – Customizing Graphs, Saving Graphs to Files.

UNIT-V

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 BOOKS:

- 1) Norman Matloff –The Art of R Programming! No Starch Press,2011
- 2) Lander, Pearson –R for Everyone! Pearson Wesley Professional edition 2014.
- 3) Ä.K Verma Cengage –The Art of R Programming!, Cengage Learning

REFERENCE BOOKS:

Paul Teetor –R Cookbookl , Oreilly publication 2011.

ECT36: DIGITAL IMAGE PROCESSING

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT – I

Digital Image Fundamentals: Digital Image representation, Digital image processing systems, Visual perception, sampling and quantization, Basic relationships between pixels and imaging geometry.

UNIT – II

Image Transforms: Discrete Fourier Transform, Properties of 2 – D Fourier transform, Fast Fourier transform, Walsh, Hadamard, and Discrete cosine transform.

UNIT – III

Image Enhancement: Background enhancement by point processing Histogram processing, Spatial filtering, Enhancement in frequency domain, Image smoothing, Image sharpening, Colour image.

UNIT – IV

Image Restoration: Degradation model, Algebraic approach to restoration, Inverse filtering, Least mean, Square filters, constrained least square restoration.

UNIT – V

Image Coding: Fidelity criteria, Encoding process, Error free coding, Image coding relative to fidelity criterion, Image compression and decompression techniques.

Text Books :

1. Digital Image Processing by R.G. Gonzales and R.E. Woods, Addison Wesley 1985.
2. Fundamental of Digital Image Process, A.K. Jain, Prentice Hall, India, New Delhi 1983.

REFERENCE BOOKS:

1. Digital Image Processing using Matlab-Rafael C Gonzalez, R.E Woods & Steven L edition, PEA,2004.
2. Digital Image Processing – William K Pratt, John Wiley 3rd edition 2004.

CST34: NATURAL LANGUAGE PROCESSING

Credits: 3

Internal marks: 30
Univ. Examinations Marks: 70

UNIT-I

INTRODUCTION TO NATURAL LANGUAGE UNDERSTANDING

The study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English syntax.

UNIT-II

SEMANTICS AND LOGICAL FORM

Semantics and logic form, word sense and ambiguity, the basic logical form language, encoding ambiguity in the logical form, verbs and states in logical form, thematic roles, speech acts and embedded sentences and defining semantics structure model theory.

UNIT-III

GRAMMARS AND PARSING

Grammars and sentence Structure, Top-Down and Bottom-Up Parsers, Transition Network Grammars, Top- Down Chart Parsing. Feature Systems and Augmented Grammars: Basic Feature system for English, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks.

UNIT-IV

GRAMMARS FOR NATURAL LANGUAGE

Auxiliary Verbs and Verb Phrases, Movement Phenomenon in Language, Handling questions in Context-Free Grammars. Human preferences in Parsing, Encoding uncertainty, Deterministic Parser.

UNIT-V

AMBIGUITY RESOLUTION

Statistical Methods, Probabilistic Language Processing, Estimating Probabilities, Part-of-Speech tagging, Obtaining Lexical Probabilities, Probabilistic Context-Free Grammars, Best First Parsing. Semantics and Logical Form, Word senses and Ambiguity, Encoding Ambiguity in Logical Form.

Text Books:

1. James Allen, *-Natural Language Understanding*”, Pearson Education 2nd Edition 1994
2. Jurafsky, Daniel and James H. Martin *-Speech and Language Processing| An introduction to Natural Language processing, Speech Recognition and Computational Linguistics* 2nd Edition, 2009

Reference Books:

1. Akshar Bharti, Vineet Chaitanya and Rajeev Sangal, *NLP: A Paninian Perspective*, Prentice Hall, New Delhi.
2. L.M. Iivansca, S. C. Shapiro, *Natural Language Processing and Language Representation*, 2nd Edition 2000
3. D. Jurafsky, J. H. Martin, *Speech and Language Processing*, Pearson Education., 3rd Edition, 2017

CST35: ANDROID APPLICATION DEVELOPMENT

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT –I

Build your first app : Introduction to Android, Create Your First Android App, Layouts, Views and Resources, Text and Scrolling Views

Activities: Understanding Activities and Intents , The Activity Lifecycle and Managing State , Activities and Implicit Intents

Testing, debugging, and using support libraries: The Android Studio Debugger, Testing your App , The Android Support Library

UNIT –II

User interaction : User Input Controls , Menus , Screen Navigation , RecyclerView

Delightful user experience : Drawables, Styles, and Themes, Material Design , Providing Resources for Adaptive Layouts ,

Testing your UI : Testing the User Interface

UNIT-III

Background Tasks: AsyncTask and AsyncTaskLoader, Connect to the Internet , Broadcast Receivers , Services

Triggering, scheduling and optimizing background tasks : Notifications, Scheduling Alarms, Transferring Data Efficiently

UNIT-IV

Preferences and Settings : Storing Data , Shared Preferences , App Settings

Storing data using SQLite : SQLite Primer , SQLite Database

Sharing data with content providers: Share Data Through Content Providers

Loading data using loaders : Loaders

UNIT –V

Permissions, Performance and Security: Permissions, Performance and Security

Firebase and AdMob: Firebase and AdMob

Publish: Publish

Textbook:

Android Developer Fundamentals Course learn to develop Android Applications, Concept Reference Developed by Google Developer Training Team December 2016

Reference Books:

2. Android Developer Fundamentals Course learn to develop Android Applications, Practical Workbook Developed by Google Developer Training Team December 2016

3. Beginning Android 4 Application Development, Wei-Meng Lee, Published by John Wiley & Sons, Inc

Web Reference:

<https://developer.android.com>

ELECTIVE - V

CST36: INTERNET OF THINGS

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT I

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

UNIT II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT, Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling, Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C)

Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs, Webserver – Web server for IoT, Cloud for IoT, Python web application framework, Designing a RESTful web API

TEXT BOOK:

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madiseti, Universities Press, 2015.
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014 .

CST37: WIRELESS NETWORKS

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT - I

Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum - IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security – IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX

UNIT-II

Destination Sequence distance vector, Dynamic source routing Introduction – Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6-Network layer in the internet- Mobile IP session initiation protocol – mobile ad-hoc network: Routing, Destination Sequence distance vector, Dynamic source routing

UNIT-III

TCP enhancements for wireless protocols – Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility – Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP – TCP over 3G wireless networks.

UNIT-IV

Overview of UTMMS Terrestrial Radio access network-UMTS Core network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN, SMS-GMSC/SMS-IW MSC, Firewall, DNS/DHCP-High speed Downlink packet access (HSDPA)- LTE network architecture and protocol.

UNIT-V

Introduction – 4G vision – 4G features and challenges – Applications of 4G – 4G Technologies: Multicarrier Modulation, Smart antenna techniques, OFDM-MIMO systems, Adaptive Modulation and coding with time slot scheduler, Cognitive Radio.

TEXT BOOKS:

1. Jochen Schiller, *Mobile Communications*, Second Edition, Pearson Education 2012.(Unit I,II,III)
2. Vijay Garg , *Wireless Communications and networking*, First Edition, Elsevier 2007.(Unit IV,V)

REFERENCES:

1. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, *3G Evolution HSPA and LTE for Mobile Broadband*, Second Edition, Academic Press, 2008.
2. Anurag Kumar, D.Manjunath, Joy kuri, *Wireless Networking*, First Edition, Elsevier 2011.
3. Simon Haykin , Michael Moher, David Koilpillai, *Modern Wireless Communications*,

CST38: SOFTWARE TESTING

Internal Marks: 30

Credits: 3

Univ. Examinations Marks: 70

UNIT-I

INTRODUCTION TO SOFTWARE TESTING

Evolution of Software Testing, Software Testing—Myths and Facts, Goals of Software Testing, Psychology for Software Testing, Software Testing Definitions, Model for Software Testing, Effective Software Testing vs. Exhaustive Software Testing. Effective Testing is Hard, Software Testing as a Process. Terminology & Methodology: Software Testing Terminology, Software Testing Life Cycle (STLC), Software Testing Methodology.

UNIT-II

WHITE BOX TESTING NIT II: WHITE BOX TESTING Need of White-Box Testing, Logic Coverage Criteria, Basis Path Testing, Graph Matrices, Loop Testing, Data Flow Testing, Mutation Testing.

UNIT-III

BLACK BOX TESTING Boundary Value Analysis (BVA), Equivalence Class Testing, State Table-Based Testing, Decision Table-Based Testing, Cause Effect Graphing Based Testing, Error Guessing.

UNIT-IV

SOFTWARE TEST MANAGEMENT & METRICS Test Management: Test Organization, Structure of Testing Group, Test Planning, Detailed Test Design, Test Specifications. Software Metrics: Definition of Software Metrics, Classification of Software Metrics, Size Metrics.

UNIT-V

REGRESSION AND AUTOMATION Regression Testing: Progressive vs. Regressive Testing, Regression Testing Produces Quality Software, Regression Testability, Objectives of Regression Testing, Regression Testing Types, Defining Regression Test Problem, Regression Testing Techniques. Automation and Testing Tools: Need for Automation, Categorization of Testing Tools, Selection of Testing Tools, Costs Incurred in Testing Tools, Guidelines for Automated Testing, Overview of Some Commercial Testing Tools.

TEXT BOOK:

Naresh Chauhan, Software Testing: Principles and Practices, Oxford University Press, 2nd Edition, 2016.

REFERENCES:

Boris Beizer, Software Testing Techniques, Dream Tech Press, 2nd Edition, 2004. 2. Dr. K. V. K. Prasad, Software Testing Tools, Dreamtech, 2004. 264

CST39: REAL TIME SYSTEMS

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

INTRODUCTION:

Introduction Issues in Real Time Computing, Structure of a Real Time System. Task Classes, Performance Measures for Real Time Systems, Estimating Program Run times. Task Assignment And Scheduling Classical Uniprocessor scheduling algorithms, Uniprocessor scheduling of IRIS Tasks, Task Assignment, Mode Changes, and Fault Tolerant Scheduling.

UNIT-II

PROGRAMMING LANGUAGES AND TOOLS

Programming Language and Tools– Desired Language characteristics, Data Typing, Control structures, Facilitating Hierarchical Decomposition, Packages, Runtime (Exception) Error handling, Overloading and Generics, Multitasking, Low Level programming, Task scheduling, Timing Specifications, Programming Environments, Run-time Support.

UNIT-III

REAL TIME DATABASES

Real time Databases Basic Definition, Real time Vs General Purpose Databases, Main Memory Databases, Transaction priorities, Transaction Aborts, Concurrency Control Issues, Disk Scheduling Algorithms, Twophase Approach to improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real Time systems.

UNIT-IV

COMMUNICATION

Real-Time Communication - Communications Media, Network Topologies Protocols, Fault Tolerant Routing. Fault Tolerance Techniques Fault Types, Fault Detection. Fault Error containment Redundancy, Data Diversity, Reversal Checks, Integrated Failure handling.

UNIT-V

EVALUATION TECHNIQUES

Reliability Evaluation Techniques Obtaining Parameter Values, Reliability Models for Hardware Redundancy, Software Error models. Clock Synchronization - Clock, A Nonfault Tolerant Synchronization Algorithm, Impact of Faults, Fault Tolerant Synchronization in Hardware, Fault Tolerant Synchronization in Software

TEXTBOOK:

1. Hermann and Kopetz, —Real-Time Systems: Design principles for Distributed Embedded Applications, 2011.
2. Rajib Mall, Real Time Systems: Theory and Practice, Pearson Edition, 2006.

REFERENCES:

1. Stuart Bennett, —Real Time Computer Control-An Introduction, Second edition Perntice Hall PTR, 1994.
2. R.J.A Buhur, D.L. Bailey, — An Introduction to Real-Time Systems, Prentice-Hall International, 1999.
3. Philip.A.Laplante —Real Time System Design and Analysis, PHI, III Edition, April 2004.

ELECTIVE - VI

CST40: ETHICAL HACKING

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

INTRODUCTION TO ETHICAL HACKING

Introduction, Ethical hacking terminology, Types of hacking technologies, phases of ethical hacking, Foot printing, Social Engineering, Scanning and enumeration.

UNIT-II

SYSTEM HACKING

Understanding the password hacking techniques, Rootkits, Trojans, Backdoors, Viruses and worms, sniffers.

UNIT-III

DENIAL OF SERVICE & WEB SERVER HACKING

Denial of service, session hijacking, Hacking web servers, Web application vulnerability, web application vulnerabilities, SQL Injection, Buffer overflow.

UNIT-IV

WIRELESS HACKING & PHYSICAL SECURITY

WEP, WPA Authentication mechanism-wireless sniffers-Physical Security-factors affecting physical security-honeypots-Firewall types

UNIT-V

PENETRATION TESTING

Cryptography-overview of MD5, SHA, RC4, Penetration testing methodologies- Defining security assessment, overview, steps, pen test legal framework, penetration testing tools.

TEXT BOOK:

1. Kimberly graves “*CEH Official Certified Ethical Hacker Review Guide*, Wiley publications, 2007

REFERENCE BOOKS:

1. Micheal Gregg, -*Certified ethical hacker (CEH) Cert guidel*, Pearson education, 2014.
2. Patrick Engebretson, -*The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made*

ECT19: EMBEDDED SYSTEMS

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Introduction to Embedded system: An Embedded System, Processor in the system, Other Hardware Units, Software Embedded into a system, Exemplary Embedded System, Embedded System-On-Chip(SOC) and in VLSI circuit.

Processor and Memory Organization: Processor Selection for an Embedded System, Memory Selection for an Embedded System, Allocation of Memory to program segments and Blocks and Memory Map of a System, Direct Memory Access, Interfacing Processor, Memories, and I/O Devices.

UNIT-II

Devices and Buses for Device Networks: I/O Devices, Timer and Counting Devices, Serial Communication Using the I2C, 'CAN' and Advanced I/O buses between the Networked Multiple Devices, Host System or Computer Parallel communication between the Networked I/O Multiple Devices using the ISA, PCI, PCI-X and Advanced buses.

Device Drivers and Interrupts Servicing Mechanism: Device Drivers, Parallel port Device drivers in a system, Serial port Device Drivers in a system, Device drivers for Internal programmable Timing Devices, Interrupt Servicing (Handling) Mechanism, Context and the periods for context switching, Deadline and interrupt Latency.

UNIT-III

Program Modelling Concepts in Single and Multiprocessor systems Software Development Process: Modelling Processed for Software Analysis before software Implementation, Programming Models for Event Controlled of response Time Considered Real Time Programs, Modeling of Multiprocessor Systems.

Inter-Process communication and Synchronization of Processes, Tasks and Threads: Multiple Processes in an Application, Problem of sharing Data by Multiple Tasks and Routines, Inter process Communication.

UNIT-IV

Real Time Operating systems: Operating System Services, I/O Subsystems, network Operating Systems, Real Time and Embedded System Operating systems, **Interrupt Routines In RTOS Environment:** Handling of Interrupt Source Call by RTOS, RTOS Task Scheduling Models, Interrupt latency and Response Times of the Tasks as Performance Metrics Performance metric in Scheduling Models for sporadic and Aperiodic Tasks IEEE standard POSIX 1003, 1B functions for Standardization of RTOS and Inter-task Communication Functions, Embedded Linux Internals: Linux Kernel for the Device Drivers and Embedded Systems.

Real Time Operating System Programming Tools: Micro C/OS-II and Vx works, Need of a Well Tested and Debugged Real-Time Operating System (RTOS), Use of C/OS-II, Use of VxWorks.

Case studies of Programming with RTOS: Case study of Coding for an Automatic Chocolate Vending Machine Using MUCOS RTOS, Case Study of Coding for Sending Application Layer Byte Streams on a TCP/IP Network Using RTOS VxWorks.

UNIT-V

Hardware-Software Co Design in an Embedded system: Embedded System Project Management ,Embedded System Design and Co-design Issues in System Development Process,Design Cycle in the development phase for an Embedded system,Use of Target System or its Emulator and IN-Circuit Emulator(ICE),Use of Software Tools for Development of an Embedded System,Use of Scopes and Logic Analysers for System Hardware Tests,Issues in Embedded System Design.

TEXT BOOKS

1.RajKamal,Embedded Systems Architecture,Programming and Design,Tata MxGraw-Hill Publishing Company Limited.

CST41: MULTIMEDIA SYSTEMS

Credits: 3

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Multimedia an overview Introduction, Multimedia Presentation and Production, Characteristics of a Multimedia Presentation, Hardware and Software Requirements, Uses of Multimedia ,Analog and Digital Representations, Digitization, Nyquist's Sampling Theorem ,Quantization Error , Visual Display Systems

UNIT-II

Text and Image Text: Introduction, Types of Text, Unicode Standard, Font, Insertion of Text, Text compression, File Formats. Image: Image Data Representation , Image Acquisition, Image Processing , Binary Image Processing, Grayscale Image Processing ,Color Image Processing, Image Output on Monitors ,Image Output on Printers, Image File Formats, Image-Processing Software

UNIT-III

Graphics and Audio Graphics: Advantages of Graphics, Uses of Graphics, Components of a Graphics System, 2D Coordinate Systems, 2D Transformation, Line-Drawing Algorithms, Circle-Drawing Algorithms, Filling Algorithms, Clipping Algorithms, 2D Modeling, Curves and Splines, 3D Graphics, 3D Transformations, Projection, 3D Modeling, 3D Surface Characteristics and Lights, Graphics File Formats, Fractals, QuadTree, Graphics Software

Audio: Introduction, Acoustics ,Nature of sound waves, Types and Properties of Sound, Components of Audio Systems, Synthesizers ,,Digital Audio ,Synthesizer, MIDI, Audio Transmission, Audio recording Devices ,File Formats.

UNIT-IV

Video and Animation Video: Motion Video, Analog Video Camera, Analog Video Signal Representation, Television System, Video Color Spaces, Digital Video, Digital Video Processing, Video Recording and Storage Formats, Video File Format, Video Editing Concepts, Video-Processing Software.

Animation: Historical Background, Uses of Animation, Traditional Animation , Principles of Animation, Computer-based, Animation, Animation on the Web, 3D Animation, Rendering Algorithms, Animation File Formats, Animation Software.

UNIT-V

Multimedia Database

What is a Multimedia Database, Content-Based Storage and Retrieval (CBSR), Designing a Basic Multimedia Database, Image Color Features, Image Texture Features, Image-Shape Features, Audio Features, Video Features, Classification of Data, Artificial Neural Networks , Semantics in Multimedia Data, Prototype Implementations.

TEXT BOOKS

1. Ranjan Parekh, "*Principles Of Multimedia 2e*", **Tata McGraw-Hill Education, 2013.**

REFERENCES

1. Ralf Steinmetz, KlaraNahrstedt, "*Multimedia Systems*", Springer, 2009.

CST42: COMPUTER GRAPHICS

Credits: 4

Internal Marks: 30
Univ. Examinations Marks: 70

UNIT-I

Introduction to computer Graphics: Basic Raster Graphics algorithms for drawing 2-D primitives.

UNIT-II

Geometrical transformations: 2-D transformations, homogeneous coordinate and Matrix representation of 2-D transformations, Composition of 2-D transformations, window to viewport transformations.

Matrix representation of 3-D transformations, composition of 3-D transformation.

UNIT- III

Viewing in 3-D: Projections, specifying an arbitrary 3-D view, Mathematics of planar, Geometric projections.

Representing curves and surfaces: polygon meshes, parametric cubic curves, parametric bicubic surfaces.

UNIT-IV

Solid Modeling: Representing solids, Regularized Boolean set operations, Primitive instancing, Representations, Constructive solid Geometry.

UNIT-V

Visible surface determination: Functions of two variables, techniques for efficient visible surface algorithms. Algorithms for visible line determination: Z-buffer algorithm, list-priority algorithm.

Animation: Conventional and computer assist animation, Animation languages, methods of controlling Animation, Basic rules of animation.

Text Books:

Foley, Van Dam, Feiner, Hughes, Computer Graphics, Principles & practice, Third edition, Addison-Wesley Professional, 2013.

Reference Books:

1. D.F. Roger and J.A. Adams, Mathematical elements for computer graphics by Tata McGraw Hill. 1990.
2. Donald Hearn M.Panline Baker, Computer Graphics, Second edition, Prentice-Hall of India Private ltd, 2000.