Curriculum and Syllabus of Bachelor of Technology in Computer Science

1. **Programme Title:**

   Bachelor of Technology four year degree programme in Computer Science.

2. **Duration and Mode:**

   Duration of programme for a student shall be four (4) years with eight consecutive semesters after admission. The mode of the programme is Regular (semester system).

3. **Objective:**

   To produce, theoretically and practically well-equipped, skilled professionals to cater to the requirements of Software, Hardware and Network Engineer, and state-of-the-art software development practices in the fast changing IT-enabled systems.

4. **Eligibility Criteria:**

   The eligibility of the candidate is Intermediate (10+2) with Mathematics, Physics and Chemistry (M.P.C) as a group or Mathematics, Physics, Chemistry and Biology (M.Bi.P.C) as another Group with 45% marks in aggregate. Polytechnic diploma engineers of all branches are also eligible. The knowledge of Urdu for the candidate is essential.

5. **Intake:**

   The number of seats for the program is fifty (50) for the first year and ten (10) more seats would be allocated for lateral entry into second year.

6. **Admission:**

   The admission to the B.Tech.(CS) programme is based on the rank secured by the candidate in a written test conducted by the University. Minimum qualifying marks shall be 30% in Entrance Test. The written test will be of 100 marks. Ten seats will be admitted in second year through Lateral entry on merit basis in his/her qualifying examination.

7. **Lateral Entry:**

   This is an option to a candidate with the Polytechnic Diploma engineers with CSE/IT/Electrical and Electronics with minimum 50% marks in aggregate from any recognized university or institution. The admission will be based on the merit in the qualifying diploma for all the students.

8. **Syllabus:** Each theory or lab courses shall have prescribed syllabus approved by BOS from time to time, as per following prescriptions:

   a. **Theory Courses:** Five (5) units largely based on ONE standard textbook and two Reference Books prescribed by the concerned teacher.

   b. **Lab Courses:** At least TEN (10) individual generic assignments and ONE Mini-Project, to be prescribed by the concerned teacher and approved by Head of Department.

9. **Evaluation of Project/Dissertation:**

   a. **Project at Bachelor Level:**

   Every candidate shall be required to submit project report as per the following details:-

   i. **A Project Review Committee** (PRC) shall be constituted with Head of the Department as chair person and at-least two other faculty members from the department.

   ii. **Registration of Project Work:** A candidate is permitted to register for the project work after satisfying the attendance requirement of all the subjects (theory and practical subjects).

iii. After satisfying clause 11.a (ii), a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the Project Review Committee for its approval. Only after obtaining the approval of Project Review Committee the student can initiate the Project work.

iv. Three copies of the Project Report certified by the supervisor shall be submitted to the Department.

v. The project report shall be examined by one examiner selected by the University. For this, Head of the Department shall submit a panel of 3 examiners, who are eminent in that field with the help of the concerned guide.

vi. If the report of the examiner is not favorable, the candidate shall revise and resubmit the report, in the time frame as described by PRC. If the report of the examiner is unfavorable again, the report shall be rejected.

vii. If the report of the examiner is favorable, viva-voce examination shall be conducted by a board consisting of the supervisor, Head of the Department and the examiner. The Board shall jointly report candidates work as:

1. Excellent
2. Good
3. Satisfactory
4. Unsatisfactory

Head of the Department shall coordinate and make arrangements for the conduct of viva-voce examination.

viii. If the report of the viva-voce is unsatisfactory, the candidate will retake the viva-voce examination within three months.

Curriculum and Syllabus of Bachelor of Technology in Computer Science

Semester I

S. No	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	BT 111	English Communication	3	1	0	4	30	70	100
2	BT 112	Engineering Mathematics-1	3	1	0	4	30	70	100
3	BT 113	Engineering Physics	2	1	0	3	30	70	100
4	BT 114	Engineering Chemistry	2	1	0	3	30	70	100
5	BT 115	Basic Electrical Engineering	3	1	0	4	30	70	100
6	BT116	Computer Fundamentals and Programming	3	1	0	4	30	70	100
7	BTL 11	Engineering Physics Lab.	0	0	3	2	50	50	100
8	BTL 12	Engineering Chemistry Lab.	0	0	3	2	50	50	100
9	BTL 13	Basic Electrical Engineering Lab	0	0	3	2	50	50	100
10	BTL 14	Basic Programming Lab	0	0	3	2	50	50	100
11		Tarseel-e-Urdu.	2	0	0	-	30	70	100
		Total				30	410	690	1100

Semester II

S. No	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	BT 121	Mathematics – II	3	1	0	4	30	70	100
2	BT 122	Basic Engineering Mechanics	3	0	0	3	30	70	100
3	BT 123	Engineering Graphics	2	0	3	4	30	70	100
4	BT 124	Basic Electronics	3	1	0	4	30	70	100
5	BT 125	Environmental Studies	3	0	0	3	30	70	100
6	BT 126	Computer Programming using C++	3	1	0	4	30	70	100
7	BTL 21	English Language Communication Skills Lab	0	0	3	2	50	50	100
8	BTL 22	Engineering workshop & IT work shop	0	0	3	2	50	50	100
9	BTL 23	Computer Programming using C++ Lab	0	0	3	2	50	50	100
		Total				28	330	570	900

Semester III

S. No	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	BT 231	Probability & Statistics	3	1	0	4	30	70	100
2	BT 232	Mathematical Foundations of Computer Science	3	1	0	4	30	70	100
3	BT 233	Data Structures	3	1	0	4	30	70	100
4	BT 234	Computer Organization	3	1	0	4	30	70	100
5	BT 235	Digital Logic Design	3	1	0	4	30	70	100
6	BTL 31	Data Structures Using C/C++ Lab.	0	0	3	2	50	50	100
7	BTL 32	Computer Organisation and Digital Logic Design Lab.	0	0	3	2	50	50	100
		Total				24	250	450	700

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S. No	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	BT 241	Java Programming	3	1	0	4	30	70	100
2	BT 242	Data Base Management System	3	1	0	4	30	70	100
3	BT 243	Operating System	3	1	0	4	30	70	100
4	BT 244	Formal Languages and Automata Theory	3	1	0	4	30	70	100
5	BT 245	Managerial Economics And Financial Analysis	3	1	0	4	30	70	100
6	BTL 41	Java Programming Lab	0	0	3	2	50	50	100
7	BTL 42	Data Base Management Systems Lab	0	0	3	2	50	50	100
		Total				24	250	450	700

Semester IV

Semester V

S. No	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	BT 351	Data Communication & Computer Networks	3	1	0	4	30	70	100
2	BT 352	Design Analysis and Algorithms	3	1	0	4	30	70	100
3	BT 353	Compiler Design	3	1	0	4	30	70	100
4	BT 354	Principles of programming Languages	3	1	0	4	30	70	100
5	BT 355	Microprocessors & Assembly Language	3	1	0	4	30	70	100
6	BTL 51	Compiler Design & Computer Networks Lab	0	0	3	2	50	50	100
7	BTL 52	Microprocessors & Assembly language Lab	0	0	3	2	50	50	100
		Total				24	250	450	700

Semester VI

S. No	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	BT 361	Object Oriented Analysis and Design	3	1	0	4	30	70	100
2	BT 362	Computer Graphics	3	1	0	4	30	70	100
3	BT 363	Software Engineering	3	1	0	4	30	70	100
4	BT 364	Data Ware Housing and Data Mining	3	1	0	4	30	70	100
5	BT 365	E-Commerce / Operation Research	3	1	0	4	30	70	100
6	BTL 61	Unified Modeling Language Lab	0	0	3	2	50	50	100
7	BTL 62	Computer Graphics Lab	0	0	3	2	50	50	100
		Total				24	250	450	700

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Semester VII

S. No	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	BT471	Linux Programming	3	1	0	4	30	70	100
2	BT472	Software Testing Methodologies	3	1	0	4	30	70	100
3	BT473	Web Technologies	3	1	0	4	30	70	100
4	BTL71	Linux Programming Lab	0	0	3	2	50	50	100
5	BTL72	Web Technologies Lab	0	0	3	2	50	50	100
6	BTD71	Minor Project	0	0	8	4	50	50	100
		ELECTIVE – I	3	1	0	4	30	70	100
		Total				24	270	430	700

S.No.	ELECTIVE – I
1	BTE71- Cloud Computing
2	BTE72- Distributed Computing
3	BTE73- Mobile Computing
4	BTE74- Software Project Management
5	BTE75 – Soft Computing

Semester VIII

S. No	Course Code	Course Name Subject	L	T	P	Credits	Internal Marks	External Marks	Total Marks
1	BT481	Network Security	3	1	0	4	30	70	100
2	BTD81	Major Project	0	0	24	12	200	200	400
3		ELECTIVE – III	3	1	0	4	30	70	100
4		ELECTIVE – IV	3	1	0	4	30	70	100
		Total				24	290	410	700

S.No.	ELECTIVE – III	ELECTIVE – IV
1	BTE81- Web Services	BTE86-Adhoc and Sensor Networks
2	BTE82-Semantic Web and Social networks	BTE87-Storage area Networks
3	BTE83-Scripting Languages	BTE88-Database Security
4	BTE84-Multimedia and Rich Internet applications	BTE89-Embedded System
5	BTE85 – Artificial Intelligence	

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Semester I

S. No	Course Code	Course Name Subject	L	T	P	Credits
1.	BT 111	English Communication	3	1	0	4
2.	BT 112	Engineering Mathematics-1	3	1	0	4
3.	BT 113	Engineering Physics	2	1	0	3
4.	BT 114	Engineering Chemistry	2	1	0	3
5.	BT 115	Basic Electrical Engineering	3	1	0	4
6.	BT116	Computer Fundamentals and Programming	3	1	0	4
7.	BTL 11	Engineering Physics Lab.	0	0	3	2
8.	BTL 12	Engineering Chemistry Lab.	0	0	3	2
9.	BTL 13	Basic Electrical Engineering Lab	0	0	3	2
10.	BTL 14	Basic Programming Lab	0	0	3	2
11.		Tarseel-e-Urdu.	2	0	0	-
		Total				30

BT111-ENGLISH COMMUNICATION

L T P: 4-0-0

UNIT 1
1. Writing paragraphs
2. Reading for subject
3. Types of nouns and pronouns
4. Homonyms, homophones, synonyms and antonyms

UNIT 2
1. Reading for theme and gist
2. Describing people, places objects, events
3. Verb forms
4. Noun, verb, adjective and adverb

UNIT 3
1. Note-taking
2. Reading for details
3. Note-making, information transfer
4. Present tense

UNIT 4
1. Reading for specific details and information
2. Writing formal letters and CVs
3. Past and future tenses
4. Vocabulary – Idioms and phrases

UNIT 5
1. Technical reports, project reports
2. Adjectives, prepositions and concord
3. Collocations

Text Book:
1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi.2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.

Reference Books:-
1. English Grammar Practice, Raj N Bakshi, Orient Longman.
2. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
3. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
4. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw – Hill.
5. Enjoying Every day English published by sangam books, Hyderabad

BT112-ENGINEERING MATHEMATICS – I

L T P: 3-1-0

UNIT II:

Differential Calculus Rolle's theorem-Lagrange's and Cauchy's mean value theorems – Generalized mean value theorem – Curvature, radius of Curvature, Centre of curvature –Evolutes and Involutes – Envelopes in Cartesian and parametric coordinates – Jacobians and their properties.

UNIT II:

Improper Integration: Beta and Gamma functions,Beta function,various forms of beta function,properties of gamma function,Relation between beta and gamma function,complete function of gamma function

UNIT III:

Multiple Integration and applicatications- Double integrals in Cartesian coordinates,double integral in polar coordinates,change of variables, – Change of order of integration.Triple integration .Application of multiple integration.

UNIT IV:

Differential Equations I-Differential equations an overview –Exact and equations reducible to exact form using Integrating factors - Linear, Bernoulli 's equations – Applications to Newton's Law of Cooling – Law of natural growth and decay – Orthogonal Trajectories in Cartesian and polar form

UNIT V:

Differential equations II-Linear differential equations of higher order with constant coefficients – complementary function and Particular Integrals - General form of Particular Integrals and special types such as e^{ax} ,cosax, sinax, x^m, $e^{ax}V$, xV, method of variation of parametersfor a second order differential equation – Applications to bending of beams, electrical circuits and simple harmonic motion.

Text Books:
1. Advanced Engineering Mathematics by B.S Grewal.
2. Advanced Engineering Mathematics by Kreyzsig

Reference Books:
1. Differential Calculus by shantinarayana
2. Engineering Mathematics by B.V Ramana

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BT113-ENGINEERING PHYSICS

L T P: 2-1-0

UNIT-I

1. **Physics of Motion:** Conservative & non conservative forces, Potential energy function in one, two and three dimensions, equation of motion for a conservative system (in one dimension), effect of friction on simple harmonic motion.

2. **Special theory of relativity:** Non relativistic view point, inertial and non-inertial frames, Galilean transformations, principle of relativity, Lorentz transformations and their consequences, mass, momentum and energy in relativity.

UNIT-II

3. **Optics:** Interference of light, Double slit and triple slit interference, Newton's rings, interference in thin films, single slit diffraction, N slit diffraction.

4. **Introduction to lasers:** qualitative introduction to lasers, uses of lasers. Principle of laser action, population inversion, Einstein coefficients, elementary laser types, applications of lasers.

UNIT-III

5. **Electromagnetism:** Maxwell's equations, wave equation, plane electromagnetic wave, Poynting vector, electromagnetic spectrum.

6. **Quantum theory:** Wave function, probability density, Schordinger equation, free article, particle in a box, system of two dissimilar particles, system of two identical particles.

UNIT-IV

7. **Quantum Ideas:** Photoelectric effect, Compton effect, Planck hypothesis, Bohr theory, de Broglie hypothesis, wave particle duality, uncertainty principle and its implications.

8. **Physics of Solids:** Classification of solids, Bragg diffraction technique, Electrical properties of solids, thermal properties, classical free electron model for metals, critical assessment of the model. Classical and quantum statistics, quantum free electron model of metals, critical assessment of the model, Fermi energy, intrinsic and extrinsic semiconductors, electron and hole densities, properties of semiconductors.

UNIT-V

9. **Frontiers of Physics:** Big bang model of the universe, critical assessment of the model, elementary particles and conservation laws, Last Nobel Prize in Physics.

10. **Nanotechnology:** Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Precipitation, Combustion Methods; Top-down Fabrication: Chemical Vapour Deposition, Physical Vapour Deposition, Pulsed Laser Vapour Deposition Methods, Characterization(XRD&TEM) and Applications.

Text Books:
1. Beiser : Modern Physics
2. Mani and Damask : Modern Physics
3. Garcia and Damask : Physics for computer science
4. Thyagrajan : Laser

Reference Books:
1. Resnick and Halliday : Physics
2. M. Ratner & D. Ratner (Pearson Ed.): Nanotechnology
3. A.J. Decker (Macmillan): Solid State Physics
4. C. Kittel (Wiley Eastern): Introduction to Solid State Physics

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BT114-ENGINEERING CHEMISTRY

UNIT I: L T P: **2- 1-0**

Water Treatment: Hardness of water, types of hardness, unites of hardness of water, determination of hardness of water by EDTA method. Boiler troubles - scale and sludge formation in boilers, caustic embrittlement, priming and foaming, Softening of water- Lime soda, permutit and ion exchange process. Problems

UNIT II:

Reactivity of Organic Molecules & Types of Reaction and Mechanism : Inductive effect, Resonance or Mesomeric effect, Electromeric effect, Hyper conjugation,Carbocation, Carbanion & Free radical. Substitution, Addition and Elimination reaction. Mechanism of the following reactions Aldol condensation, Cannizzaro reaction, Hoffmann reaction & Diels-Alder reaction

UNIT III

Fuels and Combustion: Classification of fuel and Characteristic of a good fuel- conventional fuels (solid, liquid, gaseous). Solid fuels- Coal – analysis- (proximate and ultimate) and their significance. Liquid fuels – petroleum and its refining – Cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane number. Synthetic petrol – Bergius and Fischer Tropsech's process, Gaseous fuels: Constituents, characteristics and applications of natural gas, LPG and CNG. Calorific value of fuel – HCV, LCV, determination of calorific value by Bomb Calorimeter, theoretical calculation of calorific value by Dulong's formula – Numerical problems on combustion.

UNIT IV

Corrosion and its control: Causes, Theories of corrosion – Chemical and electrochemical corrosion, Water line and pitting corrosion; Factors affecting rate of corrosion – Nature of metal and Nature of environment. Corrosion control Methods: using pure metal and alloys, modifying the environment, cathodic protection (sacrificial anodic and impressed current cathodic). Surface coatings: Metallic coatings & methods of application of metallic coatings – hot dipping (galvanization & tinning), electroplating.

UNIT V

Lubricants: Classification – solid, semi-solid and liquid lubricants, characteristics of a good lubricant. Mechanism of lubrication – (Hydrodynamic, boundary and extreme pressure) - Properties of lubricants: viscosity, flash and fire points, cloud and pour point.
Refractories: Classification – acidic, basic and neutral refractories, characteristics Of good refractory, properties of Refractories: refractoriness, refractoriness under load (RUL), porosity, thermal spalling and thermal conductivity, applications of refractories

Text Books:-

1. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008)
2. Engineering Chemistry by R.P Mani and K.N.Mishra, B. Rama Devi /CENGAGE learning

Reference Books

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi(2006)
2. Enginering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills co., New Delhi (2004).
3. Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.
4. Text of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co,New Delhi(2006)
5. Applied Chemistry – A text for Engineering & Technology – Springar (2005).
6. Text Book of Engineering Chemistry – Shasi Chawla, Dhantpat Rai publishing Company, NewDelhi (2008).
7. Engineering Chemistry – R. Gopalan, D. Venkatappayya, D.V. Sulochana Nagarajan Vikas Publishers (2008).

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BT115-BASIC ELECTRICAL ENGINEERING

L T P: 3-1-0

UNIT – I
Introduction to Electrical Circuits: Essence of electricity, conductors, semiconductors and insulators, electric current, electromotive force, electric power, potential difference, ohm's law,active and passive circuits,branch and loop in a circuit,types of sources, Kirchhoff's laws ,network reduction techniques – series, parallel and series parallel combination– Source transformation – star-to-delta ,delta-to-star transformation,Thevenin's theorem,Norton theorem and with simple related problems.

UNIT – II
Single Phase A.C Circuits: Principle of a.c ,sinusoidal emf equation, relationship between poles ,speed and frequency ,average value, RMS, form factor ,peak factor, phasor representation of alternating quantities ,the J -operator and phasor algebra difference , J-notation for alternative quantity, analysis ac circuits with single basic network element, single phase series circuits,single phase parallel circuits,single phase series parallel circuits, power in ac circuits and with simple related problems.

UNIT – III
Transformers: Principle of operations, construction details ,emf equation of transformer, types of transformer, ideal transformer and practical transformer, losses in a transformer, transformer test-open circuit ,short circuit, voltage regulation,effieiency and with simple related problems.

UNIT – IV
D.C Generators: Working principle of generator and constructional of dc generator, types of dc armature windings- lap and wave windings ,types of dc generators: methods of excitation, separately excited and self excited dc generators ,emf equation of a dc generator ,constant and variable losses,efficiency and condition for maximum efficiency and with simple related problems.

UNIT – V
D.C Motors: Working principle of dc motor ,significance of back emf equation, types of dc motors-shunt ,series and compound wound motor, production of torque in a dc motor, Characteristics of series, shunt and compound motor,losses in a dc motor, efficiency and maximum efficiency, application of dc motor and with simple related problems.
Induction Motor: Working principle, constructions of three phase Induction Motor, synchronous speed, torque, slip, rotor frequency, torque-slip characteristic, application, and with simple related problems.

TEXT BOOKS:
1. Network Analysis by Vanvalkenburg, PHI.
2. Network Theory: - N.C. Jagan & C.Lakshminarayana, B.S Publications.
3. Principle of Electrical Engineering- V.K.Metha-S.Chand Publisher.

REFERENCE BOOKS:
1. Electrical machines: P.S.bimbra, khanna publishers.
2. Electrical Circuits: S.Sudhakar, P.S.M.Satyanarayana, TMH Publication.
3. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata McGraw – Hill Publishers, 3rd edition, 2004.

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BT116-COMPUTER FUNDAMENTALS AND PROGRAMMING

L T P: 3-1-0

UNIT – I
Introduction to Computers – Role of computers, Definition, Characteristics and Applications, Generations of Computer, Basic block diagram. CPU, Primary and Secondary storage devices and I/O Devices. **Information Concepts:** Data and its representation, Information and its characteristics, categories of information, Introduction System software and Application Software. Generation of computer languages, types of languages, language translators – Assembler, Interpreter, Compiler, Link and Loader. Introduction to Computer Networks, History and usage of Internet, Browser and its types, Domain Name System (DNS), WWW, Electronic Mail (e-mail), Search Engines and Intranets.

UNIT-II
Introduction to programming – definitions and developing Algorithms and flowcharts for simple programs. Introduction to C Programming: Origin and history of c programming character set, Identifiers and keywords data types, constants, variables operators, symbolic constants, Expressions, compound statements, structure of C program, Input and output function.

UNIT – III
C Statements – selection statements – if nested if's, the if-else –if ladder the conditional expressions, switch statement nested switch statements, iteration statements – the for loop, for loop variations, the while loop, the do-while loop, declaring variable with in selection and iteration statements, jump statement, the return statement, the go to submit, break statement, exit ( ) function, the continue statement, expression statement. Block statements

UNIT – IV
Arrays – Array what is an array? – Array Declaration, Array Initialization – Accessing individual elements of an array – Two Dimensional Arrays – Passing an array element to a function – Rules of using an array. What are strings? String I/O, string Manipulation Functions – The General Form of a Function, elements of function, function categories, types of functions, Function Arguments Call by value, Call by Reference, return statement. Uses of functions. C pre – processor, storage classes – Automatic – Register, Static and external.

UNIT – V
Pointers – definition, pointer variables, pointer expressions, arithmetic pointers, pointers and arrays, initializing pointers and functions and problems with pointers. **Structures** – definition, accessing structure members, structure assignments, array of structures, passing structures, structure pointers, uses of structures **Unions** – definitions, difference between structure and union, type def. **Files** – introduction to streams and files, basics of files – file pointer, opening and closing files, writing and reading character, file functions.

Text Books:
1. Let Us C by Yashwanth Kanethar.
2. "Programming in ANSI C" by E. Balaguruswamy.
3. Programming in C, 2nd Edition, Oxford by Pradip Dey, Mannas Ghosh.

Reference Books:
1. Introduction to Computers by Peter Norton.
2. Introduction to Information Technology – Breaking Wave.

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BTL11-ENGINEERING PHYSICS LAB

L T P: 0-0-3

List of Experiments

1. Dispersive power of the material of a prism – Spectrometer

2. Determination of wavelength of a source – Diffraction Grating.

3. Newton's Rings - Radius of curvature of plano convex lens.

4. Melde's experiment – Transverse and longitudinal modes.

5. Time constant of an R-C circuit.

6. L-C-R circuit.

7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.

8. Study the characteristics of LED and LASER sources.

9. Study the characteristics of p-i-n and avalanche photodiode detectors.

10. Bending losses of fibres.

11. Evaluation of numerical aperture of given fibre.

12. Energy gap of a material of p-n junction.

13. Thermo electric effect – Seebeck effect and Peltier effect.

14. Torsional pendulum.

15. Single slit diffraction using laser.

L T P: **0-0-3**

List of Experiments

1. Determination of carbonate and bicarbonate in a given mixture
2. Determination of temporary and permanent hardness in water sample using EDTA as standard solution
3. Determination of copper using standard sodium thiosulphate
4. Determination of chloride content in bleaching powder
5. Determination of iron content in the given water sample by Mohr's methods
6. pH- metric titration of acid and base
7. Conductometric titration of acid and base
8. Titration of acid and base by Potentiommetry
9. Recording of Cu^{+2} Spectrum, absorptivity (demo only) determination of λ_{max} and molar concentration by Spectrophotometer
10. Preparation of organic compound benzoic acid

Text Books:
1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

Reference Books:
1. Text Book of engineering chemistry by R. N. Goyal and Harrmendra Goel.
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

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BTL13-BASIC ELECTRICAL ENGINEERING Lab

L T P: 0-0-3

List of Experiments

1. Verification of Thevenin's and Norton Theorems
2. Study of Single –Phase R,L & C Series & Parallel Circuits
3. To Determine the Performance Characteristics of a Series Motor
4. To Determine the Performance Characteristics of a Shunt Motor
5. To Determine the Performance Characteristics of a Compound Motor
6. Speed Control of DC Shunt Motor
7. To Determine the Load Characteristics of a Shunt Generator
8. To Determine the Load Characteristics of a Single Phase Induction Motor
9. Measurement of Three Phase Power by Two Wattmeter Method
10. To Determine the Performance Characteristics of a Three Phase Induction Motor

Text Books:-

1. Basic Electrical Engineering, S.N. Singh, PHI, Learning Private Limited.
2. Electrical Machines M. N. Bandyopadhya, PHI, Learning Private Limited.

Reference Books:-

1. Electrical Machines, Ashfaq Husain, Dhanpatrai Company, 4th edition.
2. Basic Electrical Engineering, D.C. Kulshreshtha, revised 1st edition, Tata Mc-Graw Hill education pvt. Ltd.
3. Testing Commissioning Operation & Maintenance Of Electrical Equipment – S. Rao Khanna Publication.

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BTL14-PROGRAMMING LAB in C

L T P: 0-0-3

List of Experiments

1. Write C program to input and output the text message.
2. Write C Program to perform all arithmetic operations.
3. Write C Program to utilize the math function.
4. Write C Program to perform the mathematical expressions.
5. Write C Program for Local and Global Variables.
6. Write C Program for internal static and external static variables.
7. Write C Program to find the roots of a Quadratic equation.
8. Write C Programs for all the Operators. (Arithmetical, Logical, Relational, Bitwise).
9. Write C Programs for Increment and Decrement Operators.
10. Write C Programs to implement the Ternary Operator.
11. Write C Programs for special Operators.
12. Write C Programs for all the Control Structures. (Sequential Control Structures, Conditional Control Structures, Iterative Control Structures).
13. Write C Programs to display the different types of patterns using nested for loop.
14. Write C Program for Statements. (switch, break, goto, continue etc.,).
15. Write C Program to print biggest number from n numbers.
16. Write a C Program to find the given integer number is even or odd number.
17. Write a C Program to calculate the factorial of a given number.
18. Write a C Program to swap the two numbers using temp variable and without using temp variable.
19. Reading and Printing a single dimensional array of elements.
20. Ascending and descending of an array.
21. Sum of all odd numbers and sum of all even numbers in a single dimensional array.
22. Mathematical operations on single dimensional arrays.
23. Reading and Printing a multi-dimensional array of elements.
24. Mathematical operations on multi-dimensional array of elements.
25. Passing an array element to a function.
26. Reading and Printing a string.
27. C Programs on String functions.
28. Write a C program to calculate string length by writing the user-define function.
29. Function declaration and initialization.
30. C Program to differentiate the parameters and arguments in functions.
31. Programs for different types of inbuilt functions.
32. Call by value and Call by reference programs in functions.
33. Write a program to swap the given 2 number using passing by reference.
34. Write C Programs to perform all valid arithmetic operations using pointers.
35. C programs on Structures and accessing of members of the structures.
36. Write a C program to print a book information (Book name, Book no, author name) by writing a structure.
37. Write a C program by passing structure elements to a function and display employee Information (emp no, emp name, emp salary, and emp address).
38. C Programs on Reading a file from the secondary storage device.
39. C Program on writing and appending a file on the secondary storage device.
40. C Program on Opening and closing a file

Text Books:

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications.
2. Let Us C by Yashwanth Kanethar.

Reference Books:
1. Programming in ANSI C by E. Balaguruswamy.
2. Programming in C, 2nd Edition, Oxford by Pradip Dey, Mannas Ghosh.

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Semester II

S. No	Course Code	Course Name Subject	L	T	P	Credits
1.	BT 121	Mathematics – II	3	1	0	4
2.	BT 122	Basic Engineering Mechanics	3	0	0	3
3.	BT 123	Engineering Graphics	2	0	3	4
4.	BT 124	Basic Electronics	3	1	0	4
5.	BT 125	Environmental Studies	3	0	0	3
6.	BT 126	Computer Programming using C++	3	1	0	4
7.	BTL 21	English Language Communication Skills Lab	0	0	3	2
8.	BTL 22	Engineering workshop & IT work shop	0	0	3	2
9.	BTL 23	Computer Programming using C++ Lab	0	0	3	2
		Total				28

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BT121- MATHEMATICS – II

L T P: **3-1-0**

Unit I:
(Matrices I)- Rank of a Matrix and methods of finding the rank, Inverse of a matrix by elementary row transformations (Gauss_Jordan) method, Linear system of homogeneous and non-homogeneous equations – consistency, Linear transformations, Eigenvalues and Eigen vectors, Cayley – Hamilton Theorem and its application to find the inverse of a square matrix.

Unit II:
(Matrices II)-Linear Transformations, Diagonalization of matrices, symmetric, Skew symmetric, Hermitian and Skew Hermitian matrices, Orthogonal matrices and their properties, Quadratic and canonical forms and their nature, - rank, signature and index of quadratic forms, Complete matrices.

Unit III:
Partial differential equations -Formation of Partial differential equations by eliminating the arbitrary constants and arbitrary functions, Solution of partial differential equations (Lagranges method), Non-linear differential equations of order one (Special forms), Method of Separation of variables for solving one dimensional wave equation and heat equation and problems.

Unit IV:
Laplace Transforms-Laplace transform of standard functions-inverse transform-first shifting theorem, transform of derivatives and integrals-unit step function-second shifting theorem-diracs delta function-convolution theorem-periodic function-differentiation and integration of transforms- application of Laplace transform to ordinary differential equations.

Unit V:
Numerical Analysis-Numerical Differentiation, Numerical Integration-Trapezoidal rule, Simpson's One-Third rule, Simpson's Three-Eighth rule and Weddle's rule, fitting of curves like straight line, parabola and exponential by the method of least squares, numerical solution of ordinary differential equations by Euler's method, modified Euler's method and Runge -kutta methods.

Text Books:-

1. Matrices by A. R Vasistha
2. Partial Differential Equation by Sneddon
3. Laplace Transform by Schwaum series

Reference Books:-

1. Numerical Analysis by Shastry
2. Engineering Mathematics by B.V Ramana

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BT122-BASIC ENGINEERING MECHANICS

L-T-P: 3-1-0

UNIT-I

System of forces: Introduction-statics, concept of force, component of forces in a plane, Resultant coplanar concurrent forces, Moment of force and its coplanar applications, Principle of Transmissibility, Varignon's theorem, Couples-Resultant of coplanar non concurrent forces.

Equilibrium of systems of forces: Equations of equilibrium of coplanar systems and conditions for equilibrium, Application in solving the problems on static equilibrium of bodies.

UNIT- II

Centroid and Moment of Inertia: Significance of centroid and moment of area. Centroid of elementary areas and lines , composite areas, centroid of volume, centre of gravity of bodies, Moment of inertia of elementary areas and composite areas , Polar moment of inertia, Radius of gyration, Parallel axis theorem, Mass Moment of Inertia elementary bodies.

UNIT-III

Friction: Theory of friction, Types of friction, Limiting friction, Static & Dynamic friction, Laws of friction, Angle of friction, Friction of motion of bodies, Application of fiction- Ladder, Wedge, Screw jack.

UNIT- IV

Kinematics: Introduction to Dynamics, Rectilinear motion of particles-Equations of motion for constant acceleration- motion under gravity-Variable acceleration, Curvilinear motion of particles- Equation of motion in rectangular-cartesian coordinate, tangential-normal coordinate and radial-transverse coordinate, Kinematics of rigid bodies: Translation- Rotation and General plane motion.

UNIT- V

Kinetics: Newton's second law of motion, Motion of lift, D'Alembert's principle, Work energy principle, Principle of conservation of energy, Linear Impulse & Momentum, Conservation of momentum, Impulse - momentum principle, Kinetics of rigid bodies in translation and rotation, Equation of circular motion-Fixed axis of rotation.

TEXT BOOKS:

1. Engineering Mechanics by R.K. Bansal **,** Laxmi Publications.
2. Engineering Mechanics by Chandramouli P. N,PHI Learning Pvt. Ltd
3. Engineering Mechanics by R.S.Khurmi ,S.Chand Publications.

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L T P: 2- 0- 3

UNIT-I
Instruments and their use: Lettering and various types of lines, scaled reduced and enlarged scales, representive fraction, types of scales Plain, Diagonal, Vernier scale.
Geometrical construction: Construction of regular polygons inscribed in a circle given side of polygon.
Curves Used in Engineering Practice & their Constructions:
a) Cycloid, Epicycloid and Hypocycloid b) Involutes.

UNIT–II
Projections of Points and Straight Line: Point placed in different quadrants. Projections of straight lines - Parallel, perpendicular, inclined to one plan and inclined to planes. True lengths and true angle of a line. Traces of a line
Projections of Planes: Projections of regular planes parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference plane.

UNIT–III
Projections of Solids: Projections of regular solids, cube, prism, pyramids, tetrahedran, cylinder and cone, axis inclined to one and both the references plane.

UNIT – IV
Sections and Sectional Views: True shape of section, Right Regular Solids- Prism, Cylinder, Pyramid, Cone.

UNIT – V
Isometric Projections: Principles of Isometric Projection, Isometric scale, Isometric views-Conventions-Plane Figures, Simple and Compound Solids.
Transformation of Projections: Conversion of Isometric Views to Orthographic views in first angle projection-simple objects.

TEXT BOOK :
1. Engineering Drawing - Basant Agrawal. TMH.
2. Engineering Drawing, N.D. Bhat / Charotar.
3. Engineering Drawing and Graphics, Venugopal / New age International.

REFERENCES :
1. Engineering drawing- P.J. Shah. / S. Chand.
2. Engineering Drawing- Narayana and Kannaiah / Scitech Publishers.
3. Engineering Drawing- Johle / Tata Mcgraw Hill.
4. computer Aided Engineering Drawing- Trymbaka Murthy / I.K. International.
5. Engineering Drawing- Grower.

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BT124-BASIC ELECTRONICS

L T P: 3- 1- 0

Unit-I: Diode ; Characteristics & Applications
Terminal characteristics of diodes, Diode models; Ideal, constant voltage and piecewise linear, load line concept, Diode applications; Rectifiers, logic gates, Zener diode, operation, characteristics, voltage regulation.

Unit-I: BJT; Characteristics & Applications
Bipolar Junction Transistor; construction, operation, configurations, characteristics of common emitter configuration, DC load line analysis.

Unit-III: MOSFET and OpAmp; Characteristics & Applications
Introduction to MOSFET; Depletion MOSFET construction & operation, Enhancement MOSFET construction & operation.
Operational Amplifier; Equivalent circuit, ideal behavior, open loop and closed loop concept, concept of virtual short, simple OpAmp applications; Unity gain amplifier, inverting, non- inverting, integrator, differentiator, subtractor, summer.

Unit-IV: Feedback Concepts: Properties of Negative Feedback Amplifiers, Classification, Parameters Applications. Oscillators – LC Type and RC Type Oscillators and Crystal Oscillators.

Unit-V: Data Acquisition Systems: Study of transducer (LVDT, Strain gauge, Temperature, Force), Photo Electric Devices. Photo diode, Photo Transistor, LED, LCD. **Display Systems:** constructional details of C.R.O and Applications.

TEXT BOOKS
1. R. Boylestad & L. Nashelsky, "Electronics Devices and circuits", Prentice Hall, 1995.
2. A.S. Sedra and K.C. Smith, *Microelectronic Circuits*, Oxford University Press, Vth Edition, 2004.

REFERENCE BOOKS
1. A.K. Sawhney, "A Course in electrical & Electronics Meas. & Inst.",Dhanpat Rai & Sons.
2. Mathur, Chadda and Kulshrestha, "Electronics Devices, Applications and Integrated circuits", Umesh Publications.

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BT125-ENVIRONMENTAL STUDIES

L T P: 3-0-0

UNIT-1:
Evironmental Studies: Definition, scope and importance, need for public awareness. Natural resources: Water resources; use and over utilization of surface and ground water, floods, drought, conflicts over water, dams - benefits and problems, water logging, salinity. Energy resources, growing energy needs, renewable and non – renewable energy sources.

UNIT – II
Ecosytems: Concepts of an ecosystem, structure and functions of an ecosystem, producers,consumers and decomposers, energy flow in ecosystem, food chains, aquatic ecosystem (ponds, lakes, streams, rivers, oceans, estuaries).

UNIT – III
Biodiversity: Genetic, species and ecosystem diversity, bio-geographical classification of India.Value of biodiversity, threats to biodiversity, endangered and endemic species of India, conservation of biodiversity.

UNIT – IV
Enivornmental Pollution: Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution and solid waste management. **Environment Protection Act**: Air, water, forest and wild life acts, issues involved in enforcement of environmental legislation.

UNIT – V
Social Aspects and the Environment: Water conservation and environmental ethics: Climate change, global warming, acid rain, ozone layer depletion.
Disaster Management: Types of disasters, impact of disasters on environment, infrastructure and development. Basic principles of disaster mitigation. disaster management cycle, and disaster management in India.

Text Books:-

1. A.K. De, Environmental Chemistry, New Age Publications, 2002.
2. E.P. Odum, Fundamentals of Ecology, W.B. Sunders Co., U.S.A.

Reference Books:-

1. G.L. Karia and R.A. Christain, Waste Water Treatment, Concepts and Design Approach, Prentice Hall of India, 2005.
2. Benny Joseph, Environmental Studies, Tata McGraw – Hill, 2005.
3. V.K. Sharna, Disaster Management, National Centre for Disaster Management, IIPE, Delhi, 1999.

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BT126-COMPUTER PROGRAMMING USING C++

L T P: 3 -1-0

UNIT – I
Principles of OOP: Programming paradigms, basic concepts, benefits of OOP, applications of OOP Introduction to C++: History of C++, structure of C++, basic data types, type casting, type modifiers, operators and control structures, input and output statements in C++. Classes and objects: class specification, member function specification, scope resolution operator, access qualifiers, instance creation.

UNIT-II
Functions: Function prototyping, function components, passing parameters, call by reference, return by reference, inline functions, default arguments, overloaded function. Pointers: Array of objects, pointers to objects, this pointer, dynamic allocation operators, dynamic objects.

UNIT – III
Constructors: Constructors, parameterized constructors, overloaded constructors, constructors with default arguments, copy constructors, static class members and static objects. Operator overloading: Overloading unary and binary operator, overloading the operator using friend function, stream operator overloading and data conversion.

UNIT – IV
Inheritance: Defining derived classes, single inheritance, protected data with private inheritance, multiple inheritance, multi-level inheritance, hierarchical inheritance, hybrid inheritance, multi -path inheritance, constructors in derived and base class, abstract classes, virtual function and dynamic polymorphism, virtual destructor.

UNIT –V
Exception Handling: Principle of Exception handling, exception handling mechanism, multiple catch, nested try, rethrowing the exception. Streams in C++: Stream classes, formatted and unformatted data, manipulators, user defined manipulators, file streams, file pointer manipulation, file open and close. Templates: Template functions and Template classes.

Text Books:
1. Complete Reference of C++ by Herbert Schilde
2. Object Oriented Programming with C++ By E.Balaguruswamy

Reference Books:
1. Object Oriented Turbo C Plus Plus by Robert Lafore
2. Programming with C Plus Plus by D.RaviChandra
3. Object Oriented Turbo C Plus Plus by Balaguruswamy
4. C Plus Plus Premier Plus by Stephen Prata

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BTL21-ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

L T P: 0-0-3

The following course content is prescribed for **the English Language Laboratory** sessions**:**

UNIT 1   Introduction to Phonetics – Speech Sounds – Vowels & Consonants
UNIT 2   Structure of Syllables – weak forms & strong forms
UNIT 3   Minimal pairs – word accent and stress shifts
UNIT 4   Intonation and common errors in pronunciation
UNIT 5   Conversation practice – oral presentation skills
   a.   Greeting and leave taking, introducing oneself and others
   b.   Apologizing, interrupting, requesting and making polite conversation
   c.   Giving instructions and directions: speaking of hypothetical situations
   d.   Narrating, expressing opinions and telephone interactions

Text Books:-

1. "Enjoying Every day English", Published by Sangam Books, Hyderabad
2. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi.2010.
3. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.

Reference Books:-

1. English Grammar Practice, Raj N Bakshi, Orient Longman.
2. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
3. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
4. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
5. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
6. Technical Communication, Meenakshi Raman, Oxford University Press
7. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education

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BTL22-IT WORKSHOP & ENGINEERING WORKSHOP

L T P: 0-0-3

PC Hardware

Lab 1:

Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Lab 2:

Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC.

Lab 3:

Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Hardware Troubleshooting:

Lab 4:

Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Internet & World Wide Web

Lab 5:

Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email.

Lab 6:

Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Productivity tools

Word
Lab 7:
Word Orientation
The mentor needs to give an overview of Microsoft (MS) office 2007: Importance of MS office 2007 Word as word Processors, Details of the tasks that would be covered in each, MS word:
Formatting, Character Spacing, Borders and Colors, Inserting Header and Footer, Inserting table, Bullets and Numbering, Spell Check, Images from files and clip art, Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel
Lab 8:   **Excel Orientation**
The mentor needs to give an overview of Microsoft (MS) office 2007. Details of the tasks that would be covered using MS Excel:

Gridlines, Format Cells, Summation, Formatting Text, Formulae in excel – average, Rank, Result, Division, Charts, Renaming and Inserting worksheets, Conditional formatting.

Power Point
Lab 9:   **Power Point Orientation**

Students will be working on basic power point utilities and tools which help them to create basic power point presentation. Details of the tasks that would be covered using MS Power Point:

Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Inserting – Images, Clip Art, Audio, Video, Objects, Tables and Charts, Background, textures, Design Templates, Hidden slides.

Text Books:-

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.

Reference Books:-

1. Upgrading and Repairing, PC's 18   edition, Scott Muller QUE, Pearson Education
2. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
3. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
4. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

ENGINEERING WORKSHOP

L T P: 0-0-3
List of Experiments

1. **Carpentry:** Study of hand tools like hacksaws, jack planes, chisels and gauges for construction of various joints. Practice in planning, chiselling, marking and sawing. Joints –Cross joint, T joint, Dove tail joint.

2. **Fitting**: Study of different fitting tools. Use and setting of fitting tools for marking, center punching, chipping, cutting, filing, drilling, their use, different measuring tools, Files – Material and Classification. Practice in filing, cutting, drilling and tapping. Male and female joints, Stepped joints.

3. **Plumbing:** Study of different plumbing tools. Details of plumbing work in domestic and industrial applications. Study of pipe joints, cutting, threading and laying of pipes different fittings using PVC pipes. Use of special tools in plumbing work. Practice of a domestic line involving fixing of a water tap and use of coupling, elbow, tee, and union etc.

TRADES FOR DEMONSTRATION & EXPOSURE:

1. **House Wiring:** Study of wiring tools, industrial wiring, accessories, earthing, and safety precaution. Practice to make parallel and series connection of three bulbs, stair case wiring, florescent lamp fitting.
2. **Machine Tools**: Study and demonstration on working of machine tools. Lathe and Drilling machine.

Text Books:-

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

Reference Books:-

1. Elements of Workshop Technology (Volume - 1): Hajra Choudhury

BTL23-COMPUTER PROGRAMMING USING C++ Lab

L T P: 0 -0-4

List of Experiments

1. Program on Pointers and structure
2. Program on type def.
3. Handling array elements using pointers.
4. Swapping of two numbers using pointers and a function
5. Sorting of any array using pointers and functions.
6. Pointer Arithmetic.
7. Sorting and array of structures.
8. Passing of individual elements of a structure to a function.
9. Passing of entire structure to function.
10. Structures – Arrays – Pointers.
11. Inline Function.
12. Function Overloading.
13. Programs on Classes.
14. Constructors, Destructors
15. Static Members.
16. Friend Function, Friend Class
17. Dynamic Memory Allocation using new and delete.
18. Pointer to object.
19. Overloading unary operator, Overloading binary Operators
20. Overloading binary operators using Friend function.
21. Single and Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance.
22. Constructors and Destructors in derived classes.
23. Virtual Function.
24. Programs on file handling using classes.

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Semester III

S. No	Course Code	Course Name Subject	L	T	P	Credits
1.	BT 231	Probability & Statistics	3	1	0	4
2.	BT 232	Mathematical Foundations of Computer Science	3	1	0	4
3.	BT 233	Data Structures	3	1	0	4
4.	BT 234	Computer Organization	3	1	0	4
5.	BT 235	Digital Logic Design	3	1	0	4
6.	BTL 31	Data Structures Using C/C++ Lab.	0	0	3	2
7.	BTL 32	Computer Organisation and Digital Logic Design Lab.	0	0	3	2
		Total				24

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BTL231-PROBABILITY & STATISTICS

L T P: 3-1-0

Unit I: Probability
Axioms of Probability, some elementary theorems, Addition theorem on probability, conditional Probability & problems, Baye's Theorem ,Random variables, types of random variables and their distribution functions.

Unit II: Distributions
Binomial Distribution, Poisson's distribution, Normal Distribution and its properties moment generating functions, coefficient of skewness, kurtosis. Sampling distribution, Distribution of mean (variance is known and unknown).

Unit III: Estimation and Testing of Hypothesis
Definitions, properties of good estimator, types of estimations, Large and small samples, Null Hypothesis and alternative hypothesis, types of errors, critical region. Z-test and t-tests for means and differences of means, chi-square test of goodness to fit and test of independence.

Unit IV: Correlation and Regression
Bivariate distribution, correlation, coefficient of correlation, regression coefficients, lines of regression, relation between regression coefficient and the two correlation coefficient, Karl Pearson's and Spearman's methods of finding correlation coefficients.

Unit V: Queuing Theory
Definition and types of queues, arrival pattern, Pure Birth and death processes, M/M/1 models.

Text Books:-
1. Probability & Statistics, T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. A text book of Probability & Statistics, Shahnaz Bathul, V. G. S. Book Links.
3. Fundamentals of statistical methods S.S. Gupta and V.C. Kapoor, S. Chand & Company.

Reference Books:-

1. Probability & Statistics, Arnold O. Allen, Academic Press.
2. Probability & Statistics for Engineers, Miller and John E. Freund, Prentice Hall of India.
3. Probability & Statistics, Mendan Hall, Beaver Thomson Publishers.
4. Probability & Statistics, D. K. Murugeson & P. Guru Swamy, Anuradha Publishers.

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BTL232-MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

L T P: 3-1-0

UNIT I
Mathematical Logic: Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers. Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

UNIT II
Relations: Properties of binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. Functions: Inverse Function, Composition of functions, recursive Functions, Lattice and its Properties, Pigeon hole principles and its application.

UNIT III
Elementary Combinatorics: Basics of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial and Multinomial theorem, the principles of Inclusion – Exclusion.

UNIT IV
Recurrence Relations: Generating Functions, Function of Sequences, Calculating Coefficients of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, the method of Characteristic roots, solution of Inhomogeneous Recurrence Relations.

UNIT V
Graph Theory: Representation of Graphs, DFS, BFS, Spanning Trees, Planar Graphs. Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

Text books:-

1. Mathematical Foundation of Computer Science – Shahnaz Bathul, PHI.
2. Elements of Discrete Mathematics- A Computer Oriented Approach,C.L.Liu, D.P. Mohapatra,3edition,TMH.
3. Discrete Mathematics for Computer Scientists & Mathematicians, second edition, J.L.Mott, A. Kandel, T.P. Baker, PHI
4. Discrete and Combinatorial Mathematics- An Applied Introduction-5th Edition– Ralph. P.Grimaldi, Pearson Education.

Reference books:-

1. Discrete Mathematics and its applications, 6th edition, K.H.Rosen, TMH.
2. Discrete Mathematical Structures, Mallik and Sen, CengageLearning.
3. Discrete Mathematical Structures, BernandKolman, Robert C. Busby, Sharon Cutler Ross, PHI/ Pearson Education.
5. Discrete Mathematics with Applications,ThomasKoshy,Elsevier.
6. Logic and Discrete Mathematics, Grass Man and Tremblay,Pearson Education.

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BT233-DATA STRUCTURES

L T P: 3-1-0

UNIT I:
Introduction to data structures and objectives, basic concepts Arrays: one dimensional, multi-dimensional, Elementary Operations.
Analysis of Algorithm: Time Complexity and Space Complexity, Big-O Notation, Omega Notation, Theta Notation.

UNIT II:
Stacks: Representation, elementary operations and applications such as infix to postfix, postfix evaluation, parenthesis matching **Queues:** Simple queue, circular queue, dequeue, elementary operations and applications. Recursion Technique, Tower of Honoi Problem.

UNIT III:
Linked lists: Linear, circular and doubly linked lists, elementary operations and applications such as polynomial manipulation.

UNIT IV:
Trees: Binary tree representation, tree traversal, complete binary tree, heap, binary search tree, height balanced trees like AVL tree, Huffman Tree, B Tree, B+ Tree and other operations and applications of trees.

UNIT V:
Graph: Undirected Graph, Directed Graph, Representation of Graph, Operation on Graph, Traversal in Graph, BFS (Breadth First Search), DFS (Depth First Search), Spanning Tree. **Algorithm:** Warshall's Algorithm, Shortest Path Algorithm (Dijkstra), Prim's Algorithm, Kruskal's Algorithm.
Sorting: what is sorting, Bubble Sort, Selection Sort, Insertion Sort, Shell Sort, Merging, Merge Sort, Radix Sort, Quick Sort, Heap Sort, Binary Tree Sort, Address Calculation Sort, Sequential Search, Binary Search.
Text Books:-

1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.
2. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and .Mount, Wiley student edition, John Wiley and Sons.

Reference Books:-

1. Data structures and Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
2. Data structures and algorithms in C++, 3rd Edition, Adam Drozdek, Thomson
3. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.
4. Problem solving with C++, The OOP, Fourth edition, W.Savitch, Pearson education.

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BTL234-COMPUTER ORGANIZATION

L T P: 3-1-0

Unit I:
Introduction: Function and structure of computer Functional components of a computer, Interconnection of components, Performance of a computer. Computer Organization and Architecture Basic structure of General purpose Computer with instruction set, Basic Computer and registers, Hardware Organization.

Unit II:
Registers Microoperations and Arithmetic Logic Structure: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Adder-Subtractor, Arithmetic Logic Shift Unit.

Unit III:
CPU Organization: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control Organization of a control unit-Operations of a control unit, Hardwired control unit, Microprogrammed control unit.

Unit IV:
Input Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA controlled I/O, Direct Memory Access, Input-Output Processor

Unit V:
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware

Text Books:-

1. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI

Reference Books:-

1. Computer Organization and Architecture–William Stallings Sixth Edition, Pearson/PHI
2. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
4. Fundamentals o r Computer Organization and Design, -Sivaraama Dandamudi Springer Int. Edition.
5. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier
6. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

BT235-DIGITAL LOGIC DESIGN

L T P: 3-1-0

UNIT I
Digital Computers and digital systems. Binary Numbers. Number based conversion. Octal and Hexadecimal Numbers. Signed Binary Numbers. Complements. Arithmetic Operations (Add and Subtract).

UNIT II
Logic Gates: NOT, AND, OR, NAND, NOR, Exclusive-OR and Equivalence. Logic Circuits. Binary Codes: BCD, ASCII and EBCDIC. Boolean Algebra. Basic Definition. Basic Theorems. Boolean Functions. Canonical Forms: Minterms & Maxterms. Simplification using SOP and POS. Simplification Using Map Method: Two- and Three- Variables Maps. Four-Variable Map. NAND and NOR Implementation. Don't Care conditions.

UNIT III
Combinational Logic Circuits: Adders and Sub tractors. Multilevel NAND. Multilevel NOR. Combinational Logic Circuit with MSI and LSI Binary Adders, Binary Sub tractor, Decoders, Multiplexers.

UNIT IV
Sequential Circuits: Flip-Flops. Analysis of Clocked Sequential Circuits. Flip-Flops: RS, D, JK and T. Flip-Flop Excitation Tables. Design Procedure.

UNIT V
Registers, Counters, Synchronous Counters, Shift Registers, Ripple Counter, Random Access Memory, Memory Decoding, Error correcting codes, PLA, PAL.

Text Books:-
1. DIGITAL DESIGN – Third Edition, M. Morris Mano, Pearson Education/PHI.
2. FUNDAMENTALS OF LOGIC DESIGN, Roth, 5th Edition, Thomson.

Reference Books:-

1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2. Switching and Logic Design, C.V.S. Rao, Pearson Education
3. Digital Principles and Design – Donald D. Givone, Tata McGraw Hill, Edition.
4. Fundamentals of Digital Logic & Micro Computer Design, 5TH Edition, M. Rafiquzzaman John Wiley.

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BTL31-DATA STRUCTURES USING C/C++ LAB

L T P: 0-0-3

List of Experiments

1. Implementation of array operations, Structures & Unions.
2. Stacks, Queues, Circular Queues, Priority Queues, Multiple stacks and queues.
3. Infix to postfix expression using stack
4. Implementation of linked lists: stacks, queues, single linked lists.
5. Implementation of polynomial operations. Doubly linked lists.
6. Tree traversal: AVL tree implementation, application of trees.
7. Implementation of Hash Table.
8. Searching and sorting
9. Traversal of graph

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BTL32- CO & DIGITAL LOGIC DESIGN LAB.

L T P: 0-0-3

List of Experiments

1. Bread Board Implementation of various logic gates

2. Bread Board Implementation of various logic gates using NAND gate.

3. Bread Board Implementation of various logic gates using NOR gate.

4. Bread Board implementation of Binary Adder (Half and Full) using general gates.

5. Bread Board implementation of Adder/Subtractor.

6. Bread Board Implementation of Flip-Flops.

7. Experiments with clocked Flip-Flop.

8. Design of Counters.

9. Bread Board implementation of counters & shift registers.

10. Implementation of Arithmetic algorithms.

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Semester IV

S.No	Course Code	Course Name	Lectures	Tutorials	Practicals	Credits
1.	BT 241	Java Programming	3	1	0	4
2.	BT 242	Data Base Management System	3	1	0	4
3.	BT 243	Operating System	3	1	0	4
4.	BT 244	Formal Languages and Automata Theory	3	1	0	4
5.	BT 245	Managerial Economics And Financial Analysis	3	1	0	4
6.	BTL 41	Java Programming Lab	0	0	3	2
7.	BTL 42	Data Base Management Systems Lab	0	0	3	2
					TOTAL	24

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UNIT I

Java Basics - Review of OOP concepts, History of Java, Java buzzwords, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow-block scope, conditional statements, loops, break and continue statements, simple java program, arrays, input and output, formatting output, encapsulation, inheritance, polymorphism, classes, objects, constructors, methods, parameter passing, static fields and methods, access control, this keyword, overloading methods and constructors, recursion, garbage collection, String Handling, Enumerations.

UNIT II

Inheritance – Inheritance concept, benefits of inheritance ,Super classes and Sub classes, Member access rules, Inheritance hierarchies, super keyword, preventing inheritance: final classes and methods, casting, polymorphism - dynamic binding, method overriding, abstract classes and methods, the Object class and its methods.

UNIT III

Interfaces – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface. **Inner classes** – Uses of inner classes, local inner classes, anonymous inner classes, static inner classes.
Packages-Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

UNIT IV

Exception handling – Dealing with errors, benefits of exception handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally , re-throwing exceptions, exception specification, built in exceptions, creating own exception sub classes, Guide lines for proper use of exceptions.
Multi-threading - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, thread groups, daemon threads.

UNIT V

APPLETS, JAVA GUI AND DATABASE CONNECTIVITY, Networking - Applets – Applet
life cycle methods – Applets based GUI – AWT Introduction - GUI components – Basics of Swings – Accessing database with JDBC basics- Types of Drivers – Basics of Network Programming, Addresses, Ports, Sockets, Simple Client and Server Program, Multiple Clients and Single Server.

Text Books:-

1. Java; the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson education.

Reference Books:

3. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
4. An Introduction to OOP, second edition, T. Budd, pearson education.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education
7. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.

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BT242-Database Management Systems

L T P: **3 -1-0**

UNIT I:
Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor.History of Data base Systems. Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT II:
Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views. Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT III:
Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases. Schema refinement – Problems Caused by redundancy Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.

UNIT IV:
Transaction Concept- Transaction State- Implementation of Atomicity and Durability Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Base Protocols – Multiple Granularity. Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.

UNIT V:
Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

Text books :
1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.
3. Fundamentals of Database Systems , Elmasri,Navathe, Addison Wesley

Reference Books:
1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education

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BT243-Operating System

L T P: 3 -1-0

UNIT I:

Introduction : Operating system and functions, Clasification of Operating systems- Batch, Interactive, Time sharing, Real Time System, Multiprocesor Systems, Multiuser Systems, Multiproces Systems, Multihreaded Systems, Operating System Structure- Layered structure, System Components, Operating System services, Rentrant Kernels, Monolithic and Microkernel Systems.

Unit – II

Concurent Proceses: Proces Concept, Principle of Concurency, Producer /Consumer Problem, Mutual Exclusion, Critcal Section Problem, Deker's solution, Peterson's solution, Semaphores, Test and Set peration; Clasical Problem in Concurency- Dining Philosopher Problem, Sleping Barber Problem; Inter Proces Communication models and Schemes, Proces generation.

Unit – III

CPU Scheduling: Scheduling Concepts, Performance Criteria, Proces States, Proces Transiton Diagram, Schedulers, Proces Control Block (PCB), Process address space, Proces identification information, Threads and their management, Scheduling Algorithms, Multiprocesor Scheduling. Deadlock: System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery from deadlock.

UNIT IV:

Memory Management: Basic bare machine, Resident monitor, Multiprogramming with fixed partions, Multiprogramming with variable portions, Protection schemes, Paging, Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging, Page replacement algorithms, Thrashing, Cache memory organization, Locality of reference.

Unit – V

I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O bufering, Disk storage and disk scheduling, RAID. File System: File concept, File organization and aces mechanism, File directories, and File sharing, Filesystem implementation isues, File system protection and security.

Text Books:-

1. 1. Silberschatz, Galvin and Gagne, "Operating Systems Concepts", Wiley
2. 2. SibsankarHalder and Alex A Aravind, "Operating Systems", Pearson Education

Reference Books:-

1. Harvey M Dietel, " An Introduction to Operating System", Pearson Education
2. D M Dhamdhere, "Operating Systems :A Concept basedAproach", McGraw Hil. 5. Charles Crowley, "Operating Systems: A Design-Oriented Aproach", Tata McGraw Hil
3. Education". 6. Stuart E. Madnick & John J. Donovan. Operating Systems. McGraw Hil

BT244-Formal Languages and Automata Theory

L T P: 3 -1-0

UNIT I

Models of computation, classification, properties and equivalences, automata: Introduction to formal proof, additional forms of proof, inductive proofs, finite automata (FA), deterministic finite automata (DFA), non-deterministic finite automata (NFA) , Finite Automata with Epsilon transitions.

UNIT II

Regular expression and languages: Introduction to regular expression, building regular expression, converting DFA to a regular expression, converting regular expression to DFA, pumping lemma and its applications to prove languages not to be regular, closure properties of regular languages, minimization of automata.

UNIT III

Context free grammars (CFG) and languages: Definition, derivations, parse trees, ambiguity in grammars and languages, pushdown automata (PDA): Definition, Graphical notation, deterministic and nondeterministic, instantaneous descriptions of PDAs, language acceptance by final states and by empty stack, equivalence of the CFG and PDAs, pumping lemma for CFLs, closure properties of CFLs, decision problems for CFLs.

UNIT IV

Turing machines: Introduction to Turing machines, instantaneous descriptions, language acceptance by Turing machines, Turing machine transition diagrams, Church-Turing hypothesis, Chomsky hierarchy, recursively enumerable sets, existence of non-recursively enumerable notion of undecidable problems, universality of Turing machine, separation of recursive and recursively enumerable classes, notion of reduction, undecidable problems of Turing machines.

UNIT V

Chomsky hierarchy of languages, linear bounded automata and context sensitive language, LR(0) grammar, decidability of, problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility,

Text Books:-

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education
2. Introduction to Theory of Computation –Sipser 2nd edition Thomson
3. Theory of Computer Science: Automata, Languages and Computation, K.L.P.Mishra, N.Chandrasekaran.

Reference Books:-

1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
2. Introduction to languages and the Theory of Computation ,John C Martin, TMH
3. "Elements of Theory of Computation", Lewis H.P. & Papadimition C.H. Pearson /PHI.

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BT245-Managerial Economics and Financial Accountancy

L T P: 3 -1-0

UNIT I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics– Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

Elasticity of demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand or casting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT II

Theory of Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb- Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

UNIT III

Introduction to Markets & Pricing Policies: Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

Objectives and Policies of Pricing- Methods of Pricing: Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

UNIT IV

Business & New Economic Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario

Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

UNIT V

Introduction to Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Financial Analysis through ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

Text books:
1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

Reference Books:
1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Edition.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.

BTL41-Java Programming Lab

L T P: **0-0-3**

List of Experiments

1. Write a program to print the Fibonacci series upto a given number?
2. Write a Java Program to find the maximum of two numbers using command line arguments?
3. Write a Java Program to demonstrate the operation of super keyword in Java?
4. Write a Java Program to demonstrate the concept of method overriding?
5. Write a Java Program to describe about abstract class?
6. Write a Java Program to demonstrate about the final method?
7. Write a Java Program to define and implements an interface?
8. Write a Java Program to describe about try and catch blocks for handling exceptions?
9. Write a Java Program to demonstrate about throw and throws keywords?
10. Write a Java Program to raise and handle custom or user defined exceptions in java?
11. Write a Java Program to demonstrate about switch case?
12. Write a Java Program to find whether the given number is palindrome or not?
13. Write a Java Program on the operation of this keyword?
14. Write a Java Program on concept of method overloading?
15. Write a Java Program to explain single inheritance concept?
16. Write a Java program to demonstrate the operation of scanner class?
17. Write a Java Program to create threads in java by extending Thread Class?
18. Write a Java Program to create threads in java by implementing Runnable Interface?
19. Write a Java Program to define and import the user defined package?
20. Write a Java program to print a message using applet concept?
21. Write a Java Program to pass the parameters using applet concept?
22. Write a program to generate random numbers sequence in Java?
23. Write a program to swap the numbers without using third variable in Java?
24. Write a Java Program to find the sum and product of digits of a given number?
25. Write a Java Program to display multiplication table?

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BTL42-Database Management Systems Lab

L T P: 0-0-3

List of Experiments

1. Write the queries for Data Definition and Data Manipulation Language.
2. Write SQL queries using logical operations (=, <,>,etc.)
3. Write SQL queries using SQL operators
4. Write SQL query using character, number, date and group functions
5. Write SQL queries for relational algebra
6. Write SQL queries for extracting data from more than one table
7. Write SQL queries for sub queries, nested queries
8. Write programme by the use of PL/SQL
9. Concepts for ROLL BACK, COMMIT & CHECK POINTS
10. Create VIEWS, CURSORS and TRIGGERS & write ASSERTIONS.
11. Create FORMS and REPORTS

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Semester V

S.No	Course Code	Course Name	Lectures	Tutorials	Practicals	Credits
1.	BT 351	Data Communication & Computer Networks	3	1	0	4
2.	BT 352	Design Analysis and Algorithms	3	1	0	4
3.	BT 353	Compiler Design	3	1	0	4
4.	BT 354	Principles of programming Languages	3	1	0	4
5.	BT 355	Microprocessor & Assembly Language	3	1	0	4
6.	BTL 51	Compiler Design & Computer Networks Lab	0	0	3	2
7.	BTL 52	Microprocessor & Assembly language Lab	0	0	3	2
					TOTAL	24

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BT351-Data Communication & Computer Networks

L T P: 3 -1-0

UNIT I
Introduction Concepts: Goals and Applications of Networks, Network structure and architecture, The OSI reference model, services, Network Topology Design - Delay Analysis, Back Bone Design, Local Access Network Design. Physical Layer Transmission Media, Switching methods, ISDN, Terminal Handling.

UNIT II
Medium Access sub layer: Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling.

UNIT III
Network Layer: Network Layer - Point - to Pont Networks, routing, Congestion control Internetworking - TCP / IP - IP packet, IP address, IPv6.

UNIT IV
Transport Layer: Transport Layer - Design issues, connection management, session Layer Design issues, remote procedure call. Presentation Layer-Design issues, Data compression techniques, cryptography - TCP - Window Management.

UNIT V
Application Layer: Application Layer: File Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application, Example Networks - Internet and Public Networks.

Text books:-

1. Forouzen, "Data Communication and Networking", TMH
2. A.S. Tanenbaum, "Computer Networks", 3rd Edition, Prentice Hall India, 1997.

Reference Books:-

1. S. Keshav, "An Engineering Approach on Computer Networking", Addison Wesley, 1997
2. W. Stallings, "Data and Computer Communication", Macmillan Press, 1989.

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BT352-Design Analysis and Algorithms

L T P: 3-1-0

UNIT I
Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- O notation, Omega notation, Theta notation **Divide and Conquer:** Structure of divide-and-conquer algorithms; Binary search; Merge Sort; Quick sort.

UNIT- II
Greedy Method: General method- Knapsack problem – job sequencing with deadlines– minimum-cost spanning trees: Prim's and Kruskal's algorithms – Single source shortest paths: Dijkstra's algorithm.

UNIT-III
Dynamic Programming: General method – Multistage Graphs – All pairs shortest paths, Single source shortest paths – optimal binary search trees – 0/1 Knapsack problem traveling sales person problem.

UNIT-IV
Back Tracking: General method – n-queen problem – sum of subsets problem – graph colouring – Hamiltonian cycles – Knapsack problem.

UNIT-V
Branch and Bound: Least Cost (LC) search, bounding – LC branch and bound – FIFO branch and bound – Travelling sales person problem.

Text Books:-

1. Thomas H. Coreman, Charles E. Leiserson and Ronald L. Rivest, "Introduction to Algorithms", Printice Hall of India.
2. Anany Levitin, "Introduction to the Design & Analysis of Algorithms", Pearson Education, 2007.

Reference Books:-

1. RCT Lee, SS Tseng, RC Chang and YT Tsai, "Introduction to the Design and Analysis of Algorithms", Mc Graw Hill, 2005.
2. E. Horowitz & S Sahni, "Fundamentals of Computer Algorithms", Berman, Paul," Algorithms", Cengage Learning.
3. Aho, Hopcraft, Ullman, "The Design and Analysis of Computer Algorithms" Pearson Education, 2008.

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BT353-Compiler Design

L T P: 3 -1-0

Unit I:
Introduction to compiler design, Model of a Compilers, Translators, Interpreters, Assemblers, Languages, Computer Architecture vs Compiler Design, Lexical analyzer, Regular expressions and finite automata.

Unit II:
Introduction to context free grammars, BNF notation, Syntax Analysis,Parsing Techniques: Top-down parsing and Bottom-up parsing, general parsing strategies, brute force approach, recursive descent parser and algorithms, simple LL(1) grammar.

Unit III:
Bottom-up parsing-handle a right sentential form, shift reduce parsers, operator precedence parsers, LR, SLR, Canonical LR, LALR grammar and parsers, error recover strategies for different parsing techniques.

Unit IV:
Symbol table, syntax-directed translation schemes, intermediate code generation, translation schemes for programming language constructs, runtime storage allocation.

Unit V:
Code generation and instruction selection: Issues, basic blocks and flow graphs, register allocation, DAG representation of programs, code generation from DAG, peep hole optimization, code generator generators, specifications of machine. Code optimization, source of optimizations, optimization of basic blocks, loops, global dataflow analysis, solution to iterative dataflow equations.

Books Recommended:

TEXT BOOKS :
1. Principles of compiler design -A.V. Aho .J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

REFERENCES :
1. lex&yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech.
3. Engineering a Compiler-Cooper & Linda, Elsevier.
4. Compiler Construction, Louden, Thomson.

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UNIT I

BT354-Principles of programming Languages

L T P: **3-1-0**

Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming , Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments.

Syntax and Semantics: general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotational semantics and axiomatic semantics for common programming language features.

UNIT II:

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. **Expressions and Statements:** Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands

UNIT III:

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static anddynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub- program names, design issues for functions user defined overloaded operators, co routines.

UNIT IV:

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada 95
Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.
Exception handling : Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

UNIT V:

Logic Programming Language : Introduction and overview of logic programming, basic elements of prolog, application of logic programming.
Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

Text Books :
1. Concepts of Programming Languages Robert .W. Sebesta 6/e, Pearson Education.
2. Programming Languages –Louden, Second Edition, Thomson.

Reference Books :
1. Programming languages –Ghezzi, 3/e, John Wiley
2. Programming Languages Design and Implementation – Pratt and Zelkowitz, Fourth Edition PHI/Pearson Education
3. Programming languages –Watt, Wiley Dreamtech
4. LISP Patric Henry Winston and Paul Horn Pearson Education.

BT355-Microprocessor & Assembly Language

L T P: 3-1-0

UNIT I 8085 Microprocessor
8085 Architecture – Instruction set – Addressing modes – Timing diagrams – Assembly language programming – Counters – Time Delays – Interrupts – Memory interfacing – Interfacing, I/O devices.

UNIT II PERIPHERALS INTERFACING
Interfacing Serial I/O (8251)- parallel I/O (8255) –Keyboard and Display controller (8279) – ADC/DAC interfacing – Inter Integrated Circuits interfacing (I2C Standard)- Bus: RS232C-RS485-GPIB

UNIT III 8086 Microprocessor
Intel 8086 Internal Architecture – 8086 Addressing modes- Instruction set- 8086 Assembly language Programming–Interrupts.

UNIT IV 8051 MICROCONTROLLER
8051 Micro controller hardware- I/O pins, ports and circuits- External memory –Counters and Timers-Serial Data I/O- Interrupts-Interfacing to external memory and 8255.

UNIT V 8051 PROGRAMMING AND APPLICATIONS
8051 instruction set – Addressing modes – Assembly language programming – I/O port programming - Timer and counter programming – Serial Communication – Interrupt programming –8051 Interfacing: LCD, ADC, Sensors, Stepper Motors, Keyboard and DAC.

TEXT BOOKS
1. Ramesh S Gaonkar, Microprocessor Architecture, Programming and application with 8085, 4th Edition, Penram International Publishing, New Delhi, 2000.
2. John Uffenbeck, The 80x86 Family, Design, Programming and Interfacing, Third Edition. Pearson Education, 2002.
3. Mohammed Ali Mazidi and Janice Gillispie Mazidi, The 8051 Microcontroller and Embedded Systems, Pearson Education Asia, New Delhi, 2003.

REFERENCES
1. A.K. Ray and K.M.Burchandi, Intel Microprocessors Architecture Programming and Interfacing, McGraw Hill International Edition, 2000
2. Kenneth J Ayala, The 8051 Microcontroller Architecture Programming and Application, 2nd Edition, Penram International Publishers (India), New Delhi, 1996.
3. M. Rafi Quazzaman, Microprocessors Theory and Applications: Intel and Motorola prentice Hall of India, Pvt. Ltd., New Delhi, 2003.

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BTL51-Compiler Design & Computer Networks Lab

L T P: 0-0-3

List of Experiments

1. Simulation of a Finite state Automata to recognize the tokens of various control statements.
2. Simulation of a Finite state machine to distinguish among Integers, Real Numbers & Numbers with Exponents.
3. Program in LEX tool to recognize the tokens and to return the token found for a C like Language
4. Parsing of arithmetic and algebraic expressions and equations.
5. Use of YACC tool to parse the statements of C like Language.
6. Implementation of the Data Link Layer framing method such as character stuffing and bit stuffing in C.
7. Implementation of CRC algorithm in C.
8. Implementation of a Hamming (7, 4) code to limit the noise. We have to code the 4 bit data in to 7 bit data by adding 3 parity bits. Implementation will be in C.
9. Implementation of LZW compression algorithm in C.
10. Write a socket program in C to implement a listener and a talker.
11. Simulation of a network of 3 nodes and measure the performance on the same network.
12. Write a program in C to encrypt 64-bit text using DES algorithm.

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BTL52-Microprocessors & Assembly language lab

List of Experiments   **L T P: 0-0-3**

1. To study 8085 microprocessor System
2. To study 8086 microprocessor System
3. To develop and run a programme to find out largest and smallest number
4. To develop and run a programme for converting temperature from F to C degree
5. To develop and run a programme to compute square root of a given number
6. To develop and run a programme for computing ascending/descending order of a number.
7. To perform interfacing of RAM chip to 8085/8086
8. To perform interfacing of keyboard controller
9. To perform interfacing of DMA controller
10. To perform interfacing of UART/USART

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Semester VI

S.No	Course Code	Course Name	Lectures	Tutorials	Practicals	Credits
1.	BT 361	Object oriented Analysis and Design	3	1	0	4
2.	BT 362	Computer Graphics	3	1	0	4
3.	BT 363	Software Engineering	3	1	0	4
4.	BT 364	Data Ware Housing and Data Mining	3	1	0	4
5.	BT 365	E-Commerce / Operation Research	3	1	0	4
6.	BTL 61	Unified Modeling Language Lab	0	0	3	2
7.	BTL 62	Computer Graphics Lab	0	0	3	2
					TOTAL	24

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BT361-Object Oriented Analysis and Design

L T P: 3-1-0

UNIT-I
UML Introduction: Why we Model, Introducing the UML, Hello World. Basic Structural Modeling: Classes, Relationships, Common Mechanisms, Diagrams, Class Diagrams.
Advanced Structural Modeling: Advanced Classes, Advanced Relationships, interfaces, Types and Roles, Packages, Instances, Object Diagrams, Components.

UNIT-II
Basic behavioral Modeling: Interactions, Use Cases, Use Case Diagrams, Interaction Diagrams, Activity Diagrams.
Advanced Behavioral Modelling: Events and Signals, State Machines, Processes and Threads, Time and Space, State Chart Diagrams.

UNIT-III
Architecture Modeling: Artifacts, Deployment Collaborations, Patterns and Frame Works, Artifact Diagrams, Deployment Diagrams, Systems and Models.

UNIT-IV
Unified Software Development Process: The Unified Process, The Four P's, A Use Case Driven Process, An Architecture, An Architecture-Centric Process, An Iterative and Incremental Process.

UNIT-V
Core Workflows: Requirements Capture, Capturing Requirements as Use Cases, Analysis, Design, Implementation, and Test.

Text Books:-

1. Grady Booch, James Rumbaugh, Ivor Jacobson, "The Unified Modeling Language-user
2. Guide", (Covering UML 2.0), 2nd Edition, Pearson Education, India, 2007.
3. Ivor Jacobson, Grady Booch, James Rumbaugh, "The Unified Software Development
4. Process", Pearson Education, India, 2008.

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L T P: 3 -1-0

UNIT I
Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices
Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms

UNIT II
2-D geometrical transforms: Translation, scaling, rotation, other transformations, matrix representations and homogeneous coordinates, transformations between coordinate systems.
2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm

UNIT III
3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods

UNIT IV
3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.
3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping

UNIT V
Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods
Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.

Text Books:-

1. "Computer Graphics *C version*", Donald Hearn and M.Pauline Baker, Pearson Education.
2. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

Reference Books:
1. "Computer Graphics", second Edition, Donald Hearn and M.Pauline Baker, PHI/Pearson Education.
2. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc- Graw hill edition.
3. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
4. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
5. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
6. Computer Graphics, Steven Harrington, TMH

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BT363 SOFTWARE Engineering

L T P: 3-1-0

UNIT I
Software Engineering Fundamentals: Definition of software product and process, Software Characteristics, Components, Applications, Layered Technologies, Processes and Product, Methods and Tools, Generic View of Software Engineering, Software Crisis, Software development paradigms, Techniques of Process Modelling, Software Process and lifecycle models: Build & Fix Model, Waterfall Model, Prototyping Model, Iterative Enhancement Model, Evolutionary Development Model and Spiral Model, Incremental, and Concurrent Development Model.

UNIT II
Software Requirements Analysis & Specification: System specification, Software requirements specification (SRS) standards, Formal specification methods, Specification tools, Requirements validation and management. Problem Recognition, Evaluation and Synthesis, Modelling, Specifications and Review Techniques. Analysis Modelling: Difference between Data and Information, ER Diagram, Dataflow Model, Control Flow Model, Control and Process Specification, Data Dictionary.

UNIT III
Software Design: Software architecture, Modular Design-cohesion and coupling, Process-oriented design, Process and Optimization, Data-oriented design, User-interface design, Real-time software design, Architectural Designing, Interface Design, Procedural Design, Object Oriented Design.
CASE Tools: Computer-aided software engineering, Introduction to CASE, Building Blocks of CASE, Relevance of CASE tools, High-end and low-end CASE tools, automated support for data dictionaries, DFD, ER diagrams, Integrated Case Environment, CASE workbenches.

UNIT IV
Coding and Testing: Choice of Programming languages, Coding standards, Introduction to Testing Process, Functional & Structural Testing, Testing Activities like Unit, Integration & System Testing, Testing tools and workbenches.
User Interface Design: Concepts of Ui, Interface Design Model, Internal and External Design, Evaluation, Interaction and Information Display.

UNIT V
Configuration Management: Concepts in Configuration Management, The Configuration Management Process: Planning and Setting up Configuration Management, Perform Configuration Control, Status Monitoring and Audits.
Software Maintenance: What is software maintenance, Maintenance Process & Models, Reverse Engineering, Software re- engineering, Configuration Management issues and concept, Configuration planning & techniques, Software versions and change control process, Documentation.

Text Books:
1. R. Pressman, "Software Engineering", 7th Edition, 2002, McGraw-Hill.
2. W.S. Jawadekar, Software Engineering – A Primer, TMH-2008

Reference Books:
1. Shari Pfleeger, "Software Engineering", 2001, Pearson Education.
2. Stephen Schach, Software Engineering, TMH, 2007
3. Sommerville I., Software Engineering, Addision-Wesley.

BT364-Data Ware Housing and Data Mining

L T P: 3-1-0

UNIT-I

Introduction: What is Data Mining, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining. Data Preprocessing: Needs Preprocessing, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

UNIT-II

Data Warehouse and OLAP Technology: What is Data Warehouse, A Multidimensional Data Model, Data Warehouse Architecture and Implementation, from Data Warehousing to Data Mining.Mining Frequent Patterns, Associations Rules: Basic Concepts, Efficient and Scalable Frequent Item Set Mining Methods, Mining Various kinds of Association Rules.

UNIT-III

Classification and Prediction: Introduction, Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule based Classification, Classification by Back Propagation, Support Vector Machines, Prediction, Accuracy and Error Measures

UNIT-IV

Cluster Analysis: Introduction, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid Based Methods, Model Based Clustering Methods, Outlier Analysis.

UNIT—V

Mining Object, Spatial, Multimedia, Text, and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

Text Books:-
1. Han J &Kamber M, "Data Mining: Concepts and Techniques", Harcourt India, Elsevier India, Second Edition.
2. Pang-NingTan. MichaelSteinback,VipinKumar, "Introduction to Data Mining", Pearson Education, 2008.

References:

1. Margaret H Dunham,S.Sridhar, "Data mining: Introductory and Advanced Topics", Pearson Education, 2008.
2. Humphires,hawkins,Dy, "Data Warehousing: Architecture and Implementation", Pearson Education, 2009.
3. Anahory, Murray, "Data Warehousing in the Real World", PearsonEçiucation, 2008.
4. Kargupta,Joshi,etc., "Data Mining: Next Generation Challenges and Future Directions" Prentice Hall of IndiaPvtLtd, 2007

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BT365-E-Commerce

L T P: 3-1-0

UNIT – I

Introduction to Electronic Commerce – E-Commerce Framework- Anatomy of E-Commerce Applications – E-Commerce Consumer & Organization Applications- E- Commerce and World Wide Web – Internet Service Providers – Architectural Framework for Electronic Commerce – WWW as the Architecture- Hypertext publishing.

UNIT – II

Electronic Payment Systems – Types of Electronic Payment Systems – Digital Token Based Electronic Payment System – Smart Cards – Credit Cards – Risk in Electronic Payment Systems – Designing Electronic Payment Systems

UNIT – III

Corporate Digital Library – Document Library, Digital Document Types, Corporate Data Warehouse, Advertising and Marketing – Information based Marketing, Advertising on Internet, On-Line Marketing Process, Market Research.

UNIT –IV

Consumer Search and Resource Discovery – Information Search and Retrieval, Commerce Catalogues, Information Filtering   Multimedia – Key Multimedia Concepts, Digital Video and Electronic Commerce, Desktop Video Processing, Desktop Video Conferencing .

UNIT - V

Electronic Payments: Overview, The SET protocol, Payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking. EDI Application in business, E- Commerce Law, Forms of Agreement, Govt. policies and Agenda

Text Books

1. Ravi Kalakota & A. B. Whinston - "Frontiers of Electronic Commerce", Pearson Education, India, 1999.
2. Daniel Minoli, Emma Minoli: "Web Commerce Technology Handbook", Tata McGraw Hill
3. Bajaj and Nag. "E-Commerce the cutting edge of Business". TMH.
4. E-Business & Commerce: Brahm Cazner, Wiley dreamtech.

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BTL61-Unified Modeling Language Lab

List of Experiments   **L T P: 0-0-3**

Students have to perform the following OOAD steps on a given Case Study:

- Use Case Modeling
- Structural Modeling
- Behavioural Modeling
- Architecture Modeling

The output should consist of:

- Use Case Diagrams
- Class Diagrams
- Sequence Diagrams
- Collaboration Diagrams
- State Chart Diagrams
- Activity Diagrams
- Deployment Diagrams
- Component Diagrams

Students should form into groups. They should carry out the Case Study as a group activity. The lab should be carried out using a CASE Tool. Finally they should submit a report.

BTL62-Computer Graphics Lab

L T P: 0-0-3

List of Experiments

1) Write a C Program to draw a line using Bresenhams Line Drawing Algorithm.
2) Write a C Program to draw a line using Digital Differential Analyzer Line Drawing Algorithm.
3) Write a C Program to draw a Circle using Mid-Point Circle Algorithm.
4) Write a C Program to draw an Ellipse using Mid-Point Ellipse Algorithm.
5) Write a C Program to draw user defined Polygon at run time.
6) Write a C Program for Scan Line Polygon Filling Algorithm.
7) Write a C Program for Boundary Fill Algorithm.
8) Write a C Program for Flood Fill Algorithm.
9) Write a C Program for Basic Transformations.
10) Computer Graphics Functions:
   - i) Line Function.
   - ii) Circle and arc Functions. iii) Ellipse Function.
   - iv) floodfill and setfillstyle Functions. v) setcolor Function.
   - vi) Rectangle Function.
   - vii) putpixel Function.
   - viii) outtext and outtextxy Functions.
11) Write a C Program to draw a Square, Rectangle and Triangle using Graphics Functions.
12) Write a C Program to draw an Ellipse, Circle and Arc using Graphics Functions.
13) Write a C Program to draw a Fish with different color using Graphics Functions.
14) Write a C Program to draw a Flag with orange, white and green colors using Graphic Functions.
15) Write a C Program to draw a Flag with user defined colors at run time.
16) Write a C Program to draw a Star using line function.
17) Write a C Program to draw a Cylinder using ellipse and line functions.
18) Write a C Program to construct a clock.
19) Write a C Program to draw Umbrella using line and ellipse functions.
20) Write a C Program to Construct an Animated Car/Truck.

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Semester VII

S. No	Code	Course Name	Lectures	Tutorials	Practical's	Credits
1	BT471	Linux Programming	3	1	0	4
2	BT472	Software Testing Methodologies	3	1	0	4
3	BT473	Web Technologies	3	1	0	4
4	BTL71	Linux Programming Lab	0	0	3	2
5	BTL72	Web Technologies Lab	0	0	3	2
6.	BTD71	**Mini Project**	0	0	8	4
7.		**ELECTIVE – I**	3	1	0	4
						24

	ELECTIVE – I
1	BTE71: Cloud Computing
2	BTE72: Distributed Computing
3	BTE73: Mobile Computing
4	BTE74: Software Project Management
5	BTE75: Soft Computing

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BT471 - Linux Programming

L T P: 3-1-0

UNIT I
Introduction – Short History - Why is Linux So Successful?- UNIX Flavors - BSD, SysV, Linux - Standards - System Architecture - The Kernel - The Shell - Utilities - Tools and Applications – **Linux Programming Security** – Users and Groups - PUID & PGID - Real and Effective IDs - Authenticating Users - File System Permissions.

UNIT II
Programming under Linux- Privileged Execution Mode - Kernel Mode Vs. User Mode System calls. **Files** - Using Files - Using Links - Working With Directories - Obtaining File Information – File Permissions - Special Permissions – **Signals** - The Way the Kernel Handles Signals- Types of Signals- Results of a Process - Receiving a Signal - Handling Signals - Signals List - Sending Signals - Handling Signals - Response to Signals - Activation of pause, signal - System Call for Signal Handling - Error Handler.

UNIT III
Process - Programs and Processes - The Process IDs - The Process Table - The Process State PS Report - Process Status - Context Switch - The Process Environment - Process Group - Job and Processes - Process Termination - Creating a New Process - The wait Function Family - Executing a Program - The system C Library Function - Redirection of Input and Output - The vfork System Call.

UNIT IV
Threads - Thread Creation - Thread Cancellation - Thread-Specific Data Synchronization and Critical Sections - GNU/Linux Thread Implementation - Processes Vs. Threads - **Inter-Process communication (IPC)** - Pipes - Named Pipes - Shared Memory - Message Queue - csh Level commands - **Synchronization Mechanisms** - File locking - Semaphore.

UNIT V
Sockets - What Is A Socket? - A Brief History Of Sockets - Communication Protocols - communication Capabilities - Endpoint Addresses - The Internet Protocol (IP) - Internet Addresses - Address Classes - Connection Oriented Communications And TCP - Connectionless communications And UDP - Stream Sockets - The Basic Model - Sending Data(send) - Receiving Data(recv.) - Shutting Down A Socket - Related files - The select( ) System Call -Broadcast and Datagram Sockets

TEXT BOOKS:-

1. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.
2. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education, 2003.

REFERENCE BOOKS:-

1. Unix Network Programming, W.R.Stevens, PHI.
2. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education.

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BT472-Software Testing Methodologies

L T P: 3 -1-0

UNIT I:
Introduction: Software program and its objective, Software development techniques, top-down Vs. bottom-up approach, modular and structures programming. A brief introduction about object oriented approach.
Importance of Software Testing: Software testing and its importance, software development life cycle verses software testing life cycle, Deliverables, version and error control.

UNIT II
Testing Techniques and Strategy: Unit testing, Integration testing, System testing, Acceptance testing White-Box testing: Flow Graph notation, Cyclomatic Complexity, Graph matrices, control structure and loop testing. Black-Box testing: Equivalence partitioning, Boundary Value Analysis, Orthogonal Array Testing

UNIT III
Verification and Validation: Requirement verification, Coding standards, Walk through, Formal Inspection, Design validation and verification, Function test, Design metrics, correctness proof and its requirement.

UNIT IV
Building Test Cases and Plans: Format of test cases, Du, dc and other data paths, Test data selection, branch coverage, statement coverage, pre-condition and post-condition, Test schedule and check pointing, suitable exercises for creating test cases for each type of techniques.

UNIT V
Quality Assurance and Standards: Basic software quality parameters and its metrics, Software Configuration Change and types of errors, Quality management models: ISO, SPICE, IEEE, CMM
Debugging Technique and Tools: Integrated development environment, debugging, tracing, data inspection, exception errors, code and data redundancy, unreachable code.
External Source of Errors: Main memory, conflicting dll and unknown interface as source of error and their rectification.
Note: Any open-source Software Tools may be utilized, such as "winrunner".

Text Books:-

1. Desikan S, Ramesh G, "Software Testing", Pearson Education, 2008.
2. Tamres L, "Introducing Software Testing", Pearson Education, 2007.
3. Dustin E, "Effective Software Testing", Pearson Education, 2007.
4. Mathur A.P, "Fundamentals of Software Testing", Pearson Education, 2008.

Reference Books:-

1. Brian Marick, "The Craft of Software Testing", Pearson Education, 2008.
2. Rajani & Oak, "Software Testing Methodology, Tools and Processes" Tata McGraw-Hill, 2007.
3. R. Pressman, "Software Engineering", 6th Edition, Tata McGraw-Hill.

BT473-Web Technologies

L T P: 3-1-0

UNIT 1
Collections : Collection Interfaces, Concrete Collections, The Collections Framework **Multithreading :** Creating thread and running it, Multiple Thread acting on single object, Synchronization, Thread communication, Thread group, Thread priorities, Daemon Thread, Life Cycle of Thread

UNIT 2
Enterprise Java Bean: Preparing a Class to be a JavaBean, Creating a JavaBean, JavaBean Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean
Java Database Connectivity (JDBC): Merging Data from Multiple Tables: Joining, Manipulating Databases with JDBC, Prepared Statements, Transaction Processing, Stored Procedures C

UNIT 3
Servlets: Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling HTTP get Requests, Handling HTTP post Requests, Redirecting Requests to Other Resources, Session Tracking, Cookies, Session Tracking with HttpSession
Java Server Pages (JSP): Introduction, JavaServer Pages Overview, A First JavaServer Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries

UNIT 4
Remote Method Invocation: Defining the Remote Interface, Implementing the Remote Interface, Compiling and Executing the Server and the Client
Common Object Request Broker Architecture (CORBA): Technical/Architectural Overview, CORBA Basics, CORBA services

UNIT 5
Introduction Smart Phone Application Development: Introduction to android platform, Creating application template, adding activity, intent, services to application, using Google map API.

Text Book:-

1. "Advanced Java 2 Platform HOW TO PROGRAM" by H. M.Deitel, P. J. Deitel, S. E. Santry – Prentice Hall
2. "Beginning Java™ EE 6 Platform with GlassFish 3 From Novice to Professional" by Antonio Goncalves – Apress publication

Reference Book:-

1. The complete Reference Java 7th Edition , Herbert Schildt., TMH.
2. Java Server Pages,Hans Bergsten, SPD, O'Reilly.
3. Professional Jakarta Struts - James Goodwill, Richard Hightower, Wrox Publishers.
4. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp –2008.

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BTL71- Linux Programming Lab

L T P: 0-0-3

List of Experiments

1. Write a shell script that accepts a file name, starting and ending numbers as arguments and displays all the lines between the given line numbers.
2. Write a shell script that deletes all lines containing the specified word in one or more files supplied as arguments to it.
3. Write a shell script that displays a list of all files in the current directory to which the user has read, write and execute permissions.
4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
6. Write a shell script to list all of the directory files in a directory.
7. Write a shell script to find factorial of a given number.
8. Implement in C the following Unix commands and System calls.
   a. Implement in C the cat Unix command using system calls
   b. Implement in C the following ls Unix command using system calls
   c. Implement in C the Unix command mv using system calls
9. Write a C program that takes one or more file or directory names as command line input and reports the following information on the file.
   a) file type
   b) number of links
   c) read, write and execute permissions
   d) time of last access
10. Write a C program to emulate the Unix ls – l command.
11. Write a C program that redirects a standard output to a file. Ex: ls >f1.
12. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.
13. Write a C program to create a zombie process.
14. Write a C program that illustrates how an orphan is created.
15. Write a C program that illustrates the following.
    1. Creating a message queue.
    2. Writing to a message queue.
    3. Reading from a message queue.
16. Write a C program that implements a producer-consumer system with two processes.(using semaphores)
17. Write a C program that illustrates inter process communication using shared memory.
18. Write a C program that illustrates file locking using semaphores.
19. Write a C program that counts the number of blanks in a text file using standard I/O.
20. Write a C program that illustrates communication between two unrelated processes using named pipe.

BTL72- Web technologies Lab

L T P: 0-0-3

List of Experiments

1. Develop static pages (using only HTML) of an online Book store. The pages should resemble: www.amazon.com The website should consist the following pages.Home page, Registration and user Login, User profile page, Books catalog, Shopping cart, Payment By credit card, order confirmation.
2. Validate the registration, user login, user profile and payment by credit card pages using JavaScript.
3. Write an XML file which will display the Book information which includes the following:
   a. Title of the book
   b. Author Name
   c. ISBN number
   d. Publisher name
   e. Edition
   f. Price
4. Write a Document Type Definition (DTD) to validate the above XML
   file.Display the XML file as follows. The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns. Use XML schemas XSL and CSS for the above purpose.
5. Create a simple visual bean with a area filled with a color. The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false. The color of the area should be changed dynamically for every mouse click.
6. Install TOMCAT web server. While installation assign port number 8080. Make sure that these ports are available i.e., no other process is using this port.
7. Access the above developed static web pages for books web site, using these servers by using the urls :http://localhost:8080/rama/books.html
8. Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 And, pwd4 respectively. Write a servelet for doing the following.
   a. Create a Cookie and add these four user id's and passwords to this Cookie.
   Read the user id and passwords entered in the Login form (Program 1) 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 ".
9. 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). Practice 'JDBC' connectivity. Write a java program/servlet/JSP 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 (Program 1).
10. Write a JSP which does the following job:
    Insert the details of the 3 or 4 users who register with the web site (Program 7) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database.

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BTE71-Cloud Computing

L T P: 3-1-0

UNIT I
Cloud Computing Fundamentals: Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing , Applications cloud computing, Business models around Cloud – Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus - Open Nebula, CloudSim.

UNIT II
Cloud Services and File System
Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service- Monitoring as a Service – Communication as services. Service providers- Google App Engine, Amazon EC2, Microsoft Azure, Sales force. Introduction to MapReduce, GFS, HDFS, Hadoop Framework.

UNIT III
Collaborating With Cloud
Collaborating on Calendars, Schedules and Task Management – Collaborating on Event Management, Contact Management, Project Management – Collaborating on Word Processing ,Databases Storing and Sharing Files- Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Collaborating via Social Networks – Collaborating via Blogs and Wikis.

UNIT IV
Virtualization
Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.
Hardware and Infrastructure
Clients, Security, Network, Services. Accessing the Cloud – Platforms, Web Applications, Web APIs, Web Browsers. Cloud Storage – Overview, Cloud Storage Providers, Standards – Application, Client, Infrastructure, Service.

UNIT V
Security in the Cloud
Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

Text Books:
1. Cloud Computing "A Practical Approach" Anthony T. Velte, Toby J. Velte, Robert Elsenpeter. McGraw-Hill.
2. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
3. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.

Reference Books:
1. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009. Kumar Saurabh, "Cloud Computing – insights into New -Era Infrastructure", Wiley India,2011.
2. Ronald L. Krutz, Russell Dean Vines, "Cloud Security – A comprehensive Guide to Secure Cloud Computing", Wiley – India, 2010.

BTE-72 Distributed Computing

L-T-P: 3-1-0

UNIT 1
Basic Concepts
Characterization of Distributed Systems – Examples – Resource Sharing and the Web Challenges – System Models – Architectural and Fundamental Models – Networking and Internetworking Types of Networks – Network Principles – Internet Protocols – Case Studies

UNIT II
PROCESSES AND DISTRIBUTED OBJECTS
Inter–process Communication – The API for the Internet Protocols – External Data Representation and Marshalling – Client –Server Communication – Group Communication – Case Study – Distributed Objects and Remote Invocation – Communication Between Distributed Objects – Remote Procedure Call – Events and Notifications – Java RMI – Case Study

UNIT III
OPERATING SYSTEM ISSUES
The OS Layer – Protection – Processes and Threads – Communication and Invocation – OS Architecture – Security – Overview – Cryptographic Algorithms – Digital Signatures – Cryptography Pragmatics – Case Studies – Distributed File Systems – File Service Architecture – Sun Network File System – The Andrew File System

UNIT IV
OPERATING SYSTEM ISSUES
Name Services – Domain Name System – Directory and Discovery Services – Global Name Service – X.500 Directory Service – Clocks – Events and Process States – Synchronizing Physical Clocks – Logical Time And Logical Clocks – Global States – Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems

UNIT V
DISTRIBUTED TRANSACTION PROCESSING
Transactions – Nested Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison – Flat and Nested Distributed Transactions – Atomic Commit Protocols – Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery – Overview of Replication And Distributed Multimedia Systems

Text Books
1. 1.George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and
2. Design", 3rd Edition, Pearson Education, 2002.
3. 2.Andrew S. Tanenbaum, Maartenvan Steen, Distibuted Systems, "Principles and Pardigms",
4. Pearson Education, 2002.

Reference Books
1. Sape Mullender, "Distributed Systems", 2nd Edition, Addison Wesley, 1993.
2. Albert Fleishman, Distributes Systems, "Software Design and Implementation", Springer, Verlag, 1994.
3. M. L. Liu, "Distributed Computing Principles and Applications", Pearson Education, 2004.
4. Mugesh Singhal, Niranjan G Shivaratri, "Advanced Concepts in Operating Systems", Tata McGraw Hill Edition, 2001.

BTE73-Mobile Computing

L T P: 3-1-0

UNIT 1
Introduction to Mobile Communications and Computing : Mobile Computing (MC) : Introduction to MC, novel applications, limitations, and architecture. GSM : Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT 2
(Wireless) Medium Access Control : Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA. Mobile Network Layer : Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

UNIT 3
Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP. Database Issues : Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.

UNIT 4
Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, pushbased mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques. Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs

UNIT 5
Protocols and Tools : Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

Textbooks:-

1. Jochen Schiller,"Mobile Communications",Addison-Wesley. (Chapters 4,7,9,10,11),second edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028. (Chapters 11, 15, 17, 26 and 27)

Reference books:-

1. Yi-Bing Lin & Imrich Chlamtac, "Wireless and Mobile Networks Architectures", John
b. Wiley & Sons, 2001.
2. Raj Pandya, "Mobile and Personal Communication systems and services", Prentice Hall of India, 2001.
3. Hansmann, "Principles of Mobile Computing", Wiley Dreamtech, 2004.

BTE74-Software Project Management

L T P: 3 -1-0

UNIT I
Principles of software engineering, features of good software, Quality Requirement in different Application Areas Software Process and Models, Tools and techniques of Process Modelling, Product and Process.

UNIT II
Introduction to Project Management: Definition of the project, Project specification and parameters, Principles of Project management,
Project management life cycle
Software Project Planning. Project activities and Work-Breakdown-Structure(WBS),Criteria for completeness in the WBS, Activity Resource Requirements and Cost, Joint Project Planning Session, Project Management Plan

UNIT III
Project Economics Project Costing, Empirical Project Estimation Techniques, Decomposition Techniques, Algorithmic methods, Automated Estimation Tools
Project Scheduling and Tracking Techniques Why are projects delayed? Effort Estimation Techniques, Task Network and Scheduling Methods, Monitoring and Control Progress, Graphical Reporting Tools
UNIT IV
Risk Analysis and Management Risk Concepts and Identification, Risk Assessment and Control, Risk Components and Drivers, Risk Tracking and Monitoring, Risk Mitigation and Management **Software Metrics and Project Management** Measures, Metrics and Indicators, Process and project metrics, Statistical Metrics and Process Monitoring, Function-point and project management

UNIT V
Project Control and Closure Defect Collection and Audit, Causal and Pareto Analysis, Project Closure Analysis
Project Management Issues with regard to New Technologies Object-oriented Methodology, Web-based Projects, Embedded Systems

Text books:-

1. John J. Rakos, "Software Project Management for Small to Medium Sized Projects", 1998, Prentice Hall, ISBN: 0138261733.
2. Walker Royce, "Software Project Management: A Unified Framework", 2001, AddisonWesley Professional, ISBN-10: 0201309580, ISBN-13: 9780201309584.
3. Pankaj Jalote, "Software Project Management in Practice", 2001, Addison-Wesley Professional, ISBN-10:0-201-73721-3, ISBN-13: 9780201737219.

Reference Books:-

1. Roger S. Pressman, "Software Engineering: A Practitioner's Approach", 7th Edition, McGraw Hill, ISBN: 0073375977.
2. Ian Sommerville, "Software Engineering", 8th Edition, Pearson Education, 2006.
3. A Guide to the Project Management Body of Knowledge (4th Edition), 2008, Project Management Institute, ISBN-13: 97819306994580.

Curriculum and Syllabus of Bachelor of Technology in Computer Science

BTE75- Soft Computing

L-T-P: 3-1-0

Unit- 1
Neural Networks-1(Introduction & Architecture)
Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; perception and convergence rule, Auto-associative and hetro-associative memory.

Unit 2
Neural Networks-II (Back propogation networks)
Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model; back propogation learning methods, effect of learning rule co-efficient ;back propagation algorithm, factors affecting backpropagation training, applications.

Unit 3
Fuzzy Logic-I (Introduction)
Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion.

Unit 4
Fuzzy Logic –II (Fuzzy Membership, Rules)
Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial applications.

Unit 5
Genetic Algorithm (GA)
Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, applications.

Text Books:

1. S. Rajsekaran & G.A. Vijayalakshmi Pai, "Neural Networks,Fuzzy Logic and Genetic Algorithm:Synthesis and Applications" Prentice Hall of India.
2. N.P.Padhy,"Artificial Intelligence and Intelligent Systems" Oxford University Press.

Reference Books:

1. Siman Haykin,"Neural Netowrks"Prentice Hall of India
2. Timothy J. Ross, "Fuzzy Logic with Engineering Applications" Wiley India.
3. Kumar Satish, "Neural Networks" Tata Mc Graw Hill
4. J.S.R.Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI, 2004, Pearson Education 2004.

S. No	Course Code	Course Name Subject	L	T	P	Credits
1.	BT481	Network Security	3	1	0	4
2.	BTD81	Major Project	0	0	24	12
3.		ELECTIVE – III	3	1	0	4
4.		ELECTIVE – IV	3	1	0	4
		Total				24

S.No.	ELECTIVE – III	ELECTIVE – IV
1.	BTE81- Web Services	BTE86-Adhoc and Sensor Networks
2.	BTE82-Semantic Web and Social networks	BTE87-Storage area Networks
3.	BTE83-Scripting Languages	BTE88-Database Security
4.	BTE84-Multimedia and Rich Internet applications	BTE89-Embedded System
5.	BTE85 – Artificial Intelligence	

L T P: 3-1-0

UNIT 1
CONVENTIONAL AND MODERN ENCRYPTION
Services-Attacks-Steganography-Classical Encryption Techniques-SDES-DES-Differential and Linear Cryptanalysis-Modes of Operation-Encryption Algorithms-Triples DES-Blowfish AST128- RC5-Traffic Confidentiality.

UNIT 2
PUBLIC KEY ENCRYPTION
Uniqueness-Number Theory concepts-Primality-Modular Arithmetic-Fermet & Euler theorem-Euclid Algorithm-RSA-Elliptic Curve Cryptography-Diffie Hellman Key Exchange.

UNIT 3
AUTHENTICATION
Digest-Requirements-MAC-Hash Function-Security of Hash and MAC-Birthday Attack-MD5-SHA-RIPEMD-Digital Signature Standard-Proof of DSS.

UNIT 4
SECURITY PRACTICE
Authentication applications-Kerberos-Kerberos Encryption Techniques-PGP-Radix64-IP Security Architecture-Payload-Key Management-Web Security requirement-SSL-TLS-SET.

UNIT 5
SYSTEM SECURITY
Resources-Intruders and Intrusion-Viruses and Worms-OS Security-Firewalls-Design Principles Packet Filtering-Application Gateways-Trusted Systems-Counter Measures.

Text Book:-

1. William Stallings: "**Cryptography and Network Security"**-Pearson Education, New Delhi, 5th Edition, 2011.
2. Behrouz A. Forouzan, Debdeep Mukhopadhyay: "**Cryptography and Network Security"**- Tata McGraw-Hill Education Pvt Ltd, 2nd Edition, 2011.

Reference books:-

1. Charles Pfleeger-**Security in Computing**-PHI, 4th Edition, 2006.
2. Charlie Kaufman, Radia Perlman, Mike Speciner, **"Network Security, Private Communication in a Public World"**, PHI, 2nd Edition.
3. Douglas R. Stinson, **"Cryptography-Theory and Practice"**, CRC Press.
4. Bruce Schneier, Niels Ferguson, **"Practical Cryptography",** Wiley Dreamtech India Pvt Ltd.

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BTE81-Web Services

L T P: 3-1-0

UNIT I
Evolution and Emergence of Web Services -Evolution of distributed computing, Core distributed computing technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

UNIT II
Web Services
Introduction to Web Services, UDDI, SOAP, WSDL, Web Service Architecture, Developing and deploying web services. Ajax – Improving web page performance using Ajax, Programming in Ajax. CORBA

UNIT III
WEB SERVICES AND SOA:
The Web services framework; Services (as Web Services); Service Registry; Service descriptions (with WSDL); Messaging (with SOAP), Transactions, Coordination, Business Activity, Orchestration, Choreography; Addressing, Reliable Messaging, Policies, Metadata, Security, Notification and Events; Semantic Web Services; REST full Services;

UNIT IV
Web 2.0
Interactive and social web: Blogs, wikis, and social networking sites – The technology behind these applications- AJAX, RSS and syndication, Ruby on Rails, Open APIs,

UNIT V
Web 3.0: Semantic Web, Widgets, drag & drop mashups (iGoogle) - The technology behind these applications- RDF Web based Information Systems, Search engines, Recommender Systems, Web Mining

References:
1. Understanding SOA with Web Services – Eric Newcomer, Greg Lomow, Pearson Education, 2005.
2. Developing Enterprise Web Services– An Architect's Guide – Sandeep Chatterjee, James Webber Pearson Education, ISBN 81-297-0491-9
3. Chris Bates, "Web Programing Building Internet Applications", 2nd Edition, WILEY, Dreamtech Joel Sklar.

Curriculum and Syllabus of Bachelor of Technology in Computer Science

BTE82-Semantic Web & Social Networks

L T P: 3-1-0

UNIT –I
Web Intelligence
Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

UNIT –II
Knowledge Representation for the Semantic Web
Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web – Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL), UML, XML/XML Schema.

UNIT-III
Ontology Engineering
Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

UNIT-IV
Semantic Web Applications, Services and Technology
Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

UNIT-V
Social Network Analysis and semantic web.
Development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

Text books:-

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley inter science, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

Curriculum and Syllabus of Bachelor of Technology in Computer Science

BTE83-Scrripting Languages

L T P: 3-1-0

UNIT I
Introduction: What is a scripting language? Motivation for and applications of scripting; How scripting languages differ from non-scripting languages; Biased, native, and thoughtful position papers and debates on the merits of scripting languages; Types of scripting languages.
Overview Of Popular Scripting Languages: Important features of and sample code in bash, Ruby, JavaScript, Perl, Python, Tcl. A list of other scripting languages with uninformative but possibly interesting synopses.

UNIT II
CLIENT-SIDE WEB SCRIPTING: The DOM; JavaScript; DHTML Dynamic HTML with Java Script: Data validation, Opening a new window, Messages and Confirmations, The status bar, Writing to a different frame, Rollover buttons, Moving images, Multiple pages in a single download, A text-only menu system, Floating logos.

UNIT III
XML –Introduction –Document Type Definition or DTD – uses of DTD – Tags – Elements – Attributes – PCDATA – CDATA – Basics of entities – XML Elements – Elements Declaration –usage of #REQUIRED – usage of #IMPLIED – usage of #FIXED – Internal Entities – External Entities –
XML Schema – Defining, Accessing XML Document.

UNIT IV
JAVA SCRIPT – Introduction – Usage of variables – operations – control structures – looping structures – predefined keywords – arrays – predefined functions – user defined functions – arrays and functions – mathematical functions – string functions – objects – expressions –pattern matching using RegEXp Class – String Class – Exception Handling – Built–in objects – Bgcolor/Fgcolor – Date Object – Events and Event Handling – Validations – Window – Confirmation, alert messages.

UNIT V
SERVER-SIDE WEB SCRIPTING: PHP The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output. Working with Functions: What is function?, Calling functions, Defining Functions, Returning the values from User-Defined Functions, Variable Scope, Saving state between Function calls with the static statement, more about arguments.
Working with Arrays: What are Arrays? Creating Arrays, Some Array-Related Functions. **Working with Objects:** Creating Objects, Object Instance Working with Strings, Dates and Time: Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP. Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, Working with File Uploads.

Text Books:
1. David Flanagan, JavaScript: The Definitive Guide, 4th edition, O'Reilly,2001.(ISBN 0596000480)
2. Julie C. Meloni, PHP MySQL and Apache, SAMS Teach yourself, Pearson Education (2007).
3. Chris Bates, Web Programming Building Internet Applications, Second Edition, Wiley (2007)

Reference Books:
1. Programming PHP, 3rd edition. Rasmus Lerdorf, Kevin Tatroe, and Peter MacIntyre. ISBN 1449392776, O'Reilly, 2013.
2. JavaScript: The Definitive Guide, 6th edition. David Flanagan. ISBN 0-596-80552-7, O'Reilly, 2011.

Curriculum and Syllabus of Bachelor of Technology in Computer Science

BTE84-Multimedia & Rich Internet Applications

L T P: 3-1-0

UNIT I
Multimedia System Design: An Introduction
Multimedia Elements, Multimedia Applications, Multimedia System Architecture, Evolving Technologies for Multimedia Systems, Multimedia Databases.

UNIT II
Multimedia Input and Output Technologies
Key Technology Issues, Pen Input, Video and Image Display Systems, Print Output technologies, Image Scanners, Digital Voice and Audio, Video Images and Animation, Full Motion Video.

UNIT III
Compression and Decompression Techniques
Types of Compression, Binary Image Compression Schemes, Color, gray scale, still-video image compression, Discrete Cosine Transform, Video Image compression, MPEG Coding tethodology, Audio Compression, Data and File format standards- RTF, TIFF,RIFF, MIDI, JPEG, AVI, JPEG, TWAIN Architecture.

UNIT IV
Multimedia Application Design
Types of Multimedia systems - Virtual Reality Design - Components of Multimedia system - Distributed Application Design Issues – Multimedia Authoring and User Interface -Hypermedia Messaging – Distributed Multimedia Systems

UNIT V
Storage and Retrieval Technologies
Magnetic Media Technology, RAID-Level-0 To 5, Optical Media, WORM optical drives, Hierarchical Storage Management, Cache Management for storage systems.

Text Books:-

1. Andleigh PK and Thakrar K, *"Multimedia Systems"*, Addison Wesley Longman, 1999.
2. Ralf Steinmetz, Klara Nahrstedt, *"Multimedia, computing, communications and applications"*, Prentice Hall, 1995.

Reference Books:-

1. Fred Halsall, *"Multimedia Communications"*, Addison Wesley, 2000.
2. Tay Vaughan, *"Multimedia making It work"*, TMH 5th Edition 2001.
3. Weixel, Fulton, Barksdale.Morse, *"Multimedia Basics"*, Easwar Press 2004.

Curriculum and Syllabus of Bachelor of Technology in Computer Science

BTE85: Artificial Intelligence

L T P: 3-1-0

Unit-I
Introduction : Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents. Computer vision, Natural Language Possessing.

Unit-II
Introduction to Search : Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha - Beta pruning.

Unit-III
Knowledge Representation & Reasoning: Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

Unit-IV
Machine Learning : Supervised and unsupervised learning, Decision trees, Statistical learning models, Learning with complete data - Naive Bayes models, Learning with hidden data – EM algorithm, Reinforcement learning,

Unit-V
Pattern Recognition : Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods - Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA), Classification Techniques – Nearest Neighbor (NN) Rule, Bayes Classifier, Support Vector Machine (SVM), K – means clustering.

Text Books:-

1. 1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", Pearson Education
2. 2. Elaine Rich and Kevin Knight, "Artificial Intelligence", McGraw-Hill

Reference Books:-

1. E Charniak and D McDermott, "Introduction to Artificial Intelligence", Pearson Education
2. Dan W. Patterson, "Artificial Intelligence and Expert Systems", Prentice Hall of India,

BTE86-Adhoc & Sensor Networks

L T P: 3-1-0

UNIT I
Ad Hoc Wireless Networks: Introduction, Issues in Ad hoc wireless networks, Ad hoc wireless Internet
MAC protocols for Ad hoc Wireless Networks Issues in Designing a MAC Protocol for Ad hoc Wireless Networks, Design Goals for a MAC Protocol for Ad hoc Wireless Networks, Classifications of the MAC Protocols, Other MAC Protocols.

UNIT II
Routing Protocols for Ad Hoc Wireless Networks Issues in Designing a Routing Protocol for Ad hoc Wireless Networks, Classifications of Routing Protocols
Transport Layer for Ad Hoc Wireless Networks Issues in Designing a Transport layer protocol for Ad hoc Wireless Networks, Design goal s of a Transport layer protocol for Ad hoc Wireless Networks, Classification of Transport layer solutions, TCP over Ad hoc Wireless Networks.

UNIT III
Security protocols for Ad hoc Wireless Networks Security in Ad hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad hoc Wireless Networks

UNIT IV
Basics of Wireless, Sensors and Applications: The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications **Data Retrieval in Sensor Networks:** Classification of WSNs, MAC layer, Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

UNIT V
Sensor Network Hardware: Components of Sensor Mote, **Operating System in Sensors–** TinyOS, LA-TinyOS, SOS, RETOS
Imperative Language: nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

Text Books:-

1. Carlos de Morais Cordeiro and Dharma Prakash Agrawal, "Ad Hoc and Sensor Networks : Theory and Applications", Second Edition, World Scientific Publishers, 2011
2. Prasant Mohapatra and Sriramamurtyhy, "Ad Hoc Networks: Technologies and Protocols", Springer International Edition, 2009

Reference Books:-

1. Kazem Sohraby, Daniel Minoli, Taieb Znati, "Wireless Sensor Networks', A John Wiley & Sons Inc. Publication, 2007

BTE87-Storage Area Networks

L T P: 3-1-0

UNIT-1
Introduction to Storage Technology
Data proliferation and the varying value of data with time & usage, Sources of data and states of data creation, Data center requirements and evolution to accommodate storage needs, Overview of basic storage management skills and activities, The five pillars of technology, Overview of storage infrastructure components, Evolution of storage, Information Lifecycle Management concept, Data categorization within an enterprise, Storage and Regulations.

UNIT-II
Storage Systems Architecture
Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, Logical partitioning of disks, RAID & parity algorithms, hot sparing, Physical vs. logical disk organization, protection, and back end management, Array caching properties and algorithms, Front end connectivity and queuing properties, Front end to host storage provisioning, mapping, and operation, Interaction of file systems with storage, Storage system connectivity protocols.

UNIT-III
Introduction to Networked Storage
JBOD, DAS, SAN, NAS, & CAS evolution, Direct Attached Storage (DAS) environments: elements, connectivity, & management, Storage Area Networks (SAN): elements & connectivity, Fibre Channel principles, standards, & network management principles, SAN management principles, Network Attached Storage (NAS): elements, connectivity options, connectivity protocols (NFS, CIFS, ftp), & management principles, IP SAN elements, standards (SCSI, FCIP, FCP), connectivity principles, security, and management principles, Content Addressable Storage (CAS): elements, connectivity options, standards, and management principles, Hybrid Storage solutions overview including technologies like virtualization & appliances.

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

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

Text Books:
1. Information Storage and Management Storing, Managing, and Protecting Digital
2. Information , by EMC, Hopkinton and Massachusetts, Wiley, ISBN: 9788126521470

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BTE88-Database Security

L T P: 3-1-0

UNIT I
Introduction
Introduction to Databases Security Problems in Databases Security Controls Conclusions **Security Models -1**
Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

UNIT II
Security Models -2
Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model The Lattice Model for the Flow Control conclusion.
Security Mechanisms
Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria

UNIT III
Security Software Design
Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages Database Security Design

UNIT IV
Statistical Database Protection & **Intrusion Detection Systems**
Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls evaluation Criteria for Control Comparison .Introduction IDES System RETISS System ASES System Discovery.

UNIT V
Models For The Protection Of New Generation Database Systems -1
Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object Oriented Systems SORION Model for the Protection of Object-Oriented Databases
Models For The Protection Of New Generation Database Systems -2
A Model for the Protection of New Generation Database Systems: the Orion Model Jajodia and Kogan's Model A Model for the Protection of Active Databases Conclusions

Text Books
1. Database Security and Auditing, Hassan A. Afyouni, India Edition, CENGAGE Learning, 2009.

Reference Books:
1. Database Security, *Castano,* Second edition, Pearson Education.
2. Database security by alfred basta, melissa zgola, CENGAGE learnin

BTE89- Embedded Systems

L T P – 3 1 0

UNIT I
Embedded System Organization

Embedded computing – characteristics of embedded computing applications – embedded system design challenges; Build process of Real time Embedded system – Selection of processor; Memory; I/O devices-Rs-485, MODEM, Bus Communication system using I^2C, CAN, USB buses, 8 bit –ISA, EISA bus.

UNIT II
Real-Time Operating System

Introduction to RTOS; RTOS- Inter Process communication, Interrupt driven Input and Output Non-maskable interrupt, Software interrupt; Thread – Single, Multithread concept; Multitasking Semaphores.

UNIT III
Interface with Communication Protocol

Design methodologies and tools – design flows – designing hardware and software Interface. system integration; SPI, High speed data acquisition and interface-SPI read/write protocol, RTC interfacing and programming.

UNIT IV
Design of Software for Embedded Control

Software abstraction using Mealy-Moore FSM controller, Layered software development, Basic concepts of developing device driver – SCI – Software - interfacing & porting using standard C & C++ ; Functional and performance Debugging with benchmarking Real-time system software – basics of contemporary RTOS – VXWorks, UC/OS-II

UNIT V
Interfacing with Embedded Controller

Programmable interface with A/D & D/A interface; Digital voltmeter, control- Robot system; - PWM motor speed controller, serial communication interface. Standard single purpose processor's peripherals: timers, counters, watchdog timers, UART, LCD controllers, keypad controllers.
Applications: Digital camera-washing machine-cell phones-home security systems-finger print identifiers-cruise control-printers Automated teller machine.

Text Books:
1. Steven F. Barrett, Daniel J. Pack, "Embedded Systems – Design and Applications with the 68HC 12 and HCS12", Pearson Education, 2008.
2. Raj Kamal, "Embedded Systems- Architecture, Programming and Design" Tata McGraw Hill,2006.

References:
1. Muhammad Ali Mazidi, Rolin D. Mckinlay, Danny Causey, "PIC Microcontroller and Embedded Systems- Using Assembly and C for PIC18", Pearson Education,2008. Steven F.Barrett,Daniel J.Pack, "Embedded Systems-Design & Application with the 68HC12 & HCS12", Pearson Education, 2008.
2. Daniel W. Lewis, "Fundamentals of Embedded Software", Prentice Hall India, 2004.
3. Jack R Smith "Programming the PIC microcontroller with MBasic" Elsevier, 2007.