Faculty of Engineering & Technology

Syllabus

For

Bachelor of Technology (B. Tech.)

in

Computer Science & Engineering

(2018-19)

B.Tech. (CSE) Course Structure (2018-19)

Semester - I

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
BTBSC 101	Engineering Mathematics-I	3	1	-	30	70	100	4
BTBSC 102	Engineering Physics	3	1	-	30	70	100	4
BTHSMC 103	Communication Skills	2	-	-	30	70	100	2
BTESC 104	Programming for Problem Solving	2	-	-	30	70	100	2
BTESC 105A/ BTESC 105B	Basic Electrical Engineering/ Basic Civil Engineering	2	-	-	30	70	100	2
PRACTICALS/ VIVA VOCE		No. of Teaching Hours			Sessional	Practical	Total	Credits
BTBSC 106	Engineering Physics Lab	-	-	2	30	20	50	1
BTHSMC 107	Language Lab	-	-	2	30	20	50	1
BTESC 108	Computer Programming Lab	-	-	2	30	20	50	1
BTESC109A/ BTESC109B	Basic Electrical Engineering Lab/ Basic Civil Engineering Lab	-	-	2	30	20	50	1
BTESC 110	Computer Aided Engineering Graphics	-	-	2	30	20	50	1
BTSODECA111	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	Total	**12**	**2**	**10**	**300**	**450**	**800**	**20**

Semester - II

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
BTBSC 201	Engineering Mathematics-II	3	1	-	30	70	100	4
BTBSC 202	Engineering Chemistry	3	1	-	30	70	100	4
BTHSMC 203	Human Values	2	-	-	30	70	100	2
BTESC 204	Basic Mechanical Engineering	2	-	-	30	70	100	2
BTESC205A/ BTESC205B	Basic Electrical Engineering/ Basic Civil Engineering	2	-	-	30	70	100	2
BTHSMC 206	Advanced English	2	-	-	30	70	100	2
PRACTICALS/ VIVA VOCE		No. of Teaching Hours			Sessional	Practical	Total	Credits
BTBSC 207	Engineering Chemistry Lab	-	-	2	30	20	50	1
BTHSMC 208	Human Values Activities	-	-	2	30	20	50	1
BTESC 209	Manufacturing Practices Workshop	-	-	2	30	20	50	1
BTESC210A/ BTESC 210B	Basic Electrical Engineering Lab/ Basic Civil Engineering Lab	-	-	2	30	20	50	1
BTESC 211	Computer Aided Machine Drawing	-	-	2	30	20	50	1
BTSODECA212	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	Total	**14**	**2**	**12**	**330**	**520**	**900**	**22**

Semester –III

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
BTCSBSC301	Advanced Engineering Mathematics	3	-	-	30	70	100	3
BTCSHSMC302	Managerial Economics and Financial Accounting	2	-	-	30	70	100	2
BTCSESC303	Digital Electronics	3	-	-	30	70	100	3
BTCSPCC 304	Data Structures and Algorithms	3	-	-	30	70	100	3
BTCSPCC 305	Object Oriented Programming	3	-	-	30	70	100	3
BTCSPCC 306	Software Engineering	3	-	-	30	70	100	3
BTCSPCC 307	Data Structures and Algorithms Lab	-	-	2	30	20	50	1
BTCSPCC 308	Object Oriented Programming Lab	-	-	2	30	20	50	1
BTCSPCC 309	Software Engineering Lab	-	-	2	30	20	50	1
BTCSPCC 310	Digital Electronics Lab	-	-	2	30	20	50	1
BTCSPSIT 311	Industrial Training/ Seminar	-	-	-	-	-	50	1
BTCSSODECA 312	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	TOTAL	17	-	8	300	500	900	23

Semester -IV

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	Subject/Paper	L	T	P	IA	EA	Total	Credits

Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
BTCSBSC 401	Discrete Mathematics Structure	3	1	0	30	70	100	4
BTCSHSMC 402	Technical Communication	3	0	0	30	70	100	3
BTCSESC 403	Microprocessor & Interfaces	3	0	0	30	70	100	3
BTCSPCC 404	Database Management System	3	0	0	30	70	100	3
BTCSPCC 405	Theory of Computation	3	1	0	30	70	100	4
BTCSPCC 406	Data Communication and Computer Networks	3	0	0	30	70	100	3
BTCSPCC 407	Microprocessor & Interfaces Lab	0	0	2	30	20	50	1
BTCSPCC 408	Database Management System Lab	0	0	2	30	20	50	1
BTCSPCC 409	Network Programming Lab	0	0	2	30	20	50	1
BTCSPCC 410	Linux Shell Programming Lab	0	0	2	30	20	50	1
BTCSPCC 411	Java Lab	0	0	2	30	20	50	1
BTCSSODECA 412	Social Outreach, Discipline & Extra Curricular Activities						50	1
	TOTAL	**18**	**2**	**10**	**330**	**520**	**900**	**26**

Semester –V

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCSESC 501	Information Theory & Coding	3	-	-	30	70	100	3
BT CSPCC 502	Compiler Design	3	-	-	30	70	100	3
BT CSPCC 503	Operating System	3	-	-	30	70	100	3
BTCSPCC 504	Computer Graphics & Multimedia	3	-	-	30	70	100	3

BTCSPCC 505	Analysis of Algorithms	3	-	-	30	70	100	3
BTCSPEC 506A	Wireless Communication	3	-	-	30	70	100	3
BTCSPEC 506B	Human-Computer Interaction	3	-	-	30	70	100	3
BTCSPEC 506C	Bioinformatics	3	-	-	30	70	100	3
LABS								
BTCSPCC 507	Computer Graphics & Multimedia Lab	-	-	2	30	20	50	1
BTCSPCC 508	Compiler Design Lab	-	-	2	30	20	50	1
BTCSPCC 509	Analysis of Algorithms Lab	-	-	2	30	20	50	1
BTCSPCC 510	Advance Java Lab	-	-	2	30	20	50	1
BTCSPSIT 511	Industrial Training	-	-	2	30	20	50	1
BT CSSODE CA 512	Social Outreach, Discipline & Extra Curricular Activities						50	1
	TOTAL	**24**	**-**	**10**	**330**	**520**	**900**	**24**

Semester –VI

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	**L**	**T**	**P**	**IA**	**EA**	**Total**	**Credits**
BTCSESC 601	Digital Image Processing	3	-	-	30	70	100	3
BTCSPCC 602	Machine Learning	3	0	0	30	70	100	3
BTCSPCC 603	Information Security System	3	0	0	30	70	100	3
BTCSPCC 604	Computer Architecture and Organization	3	0	0	30	70	100	3
BTCSPCC 605	Artificial Intelligence	3	-	0	30	70	100	3
BTCSPCC 606	Cloud Computing	3	0	0	30	70	100	3

ELECTIVE SUBJECT								
BTCSPEC 607A	Distributed System	3	0	0	30	70	100	3
BTCSPEC 607B	Software Defined Network	3	0	0	30	70	100	3
BTCSPEC 607C	Ecommerce & ERP	3	0	0	30	70	100	3
LABS								
BTCSPCC 608	Digital Image Processing Lab	0	0	2	30	20	50	1
BTCSPCC 609	Machine Learning Lab	0	0	2	30	20	50	1
BTCSPCC 610	Python Lab	0	0	2	30	20	50	1
BTCSPCC 611	Mobile Application Development Lab	0	0	2	30	20	50	1
BT CSSODE CA 612	Social Outreach, Discipline & Extra Curricular Activities						50	1
	TOTAL	21	2	8	330	570	950	26

Semester –VII

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
BTCSPCC 701	Internet of Things	3	1	-	30	70	100	4
ELECTIVE SUBJECT								
BTCSOE 702A	Principle of Electronic Communication	3	1	0	30	70	100	4
BTCSOE 702B	Micro and Smart System Technology	3	1	0	30	70	100	4
BTCSOE 702C	Optimization Techniques	3	1	0	30	70	100	4

LABS		L	T	P	IA	EA	Total	Credits
BTCSPCC 703	Internet of Things Lab	0	0	2	30	20	50	1
BTCSPCC 704	Cyber Security Lab	0	0	2	30	20	50	1
BTCSPSIT 705	Industrial Training	0	0	2	30	20	50	1
BTCSPSIT 706	Seminar	0	0	2	30	20	50	1
BTCSSODE CA 707	Social Outreach, Discipline & Extra Curricular Activities						50	1
	TOTAL	**6**	**2**	**8**	**180**	**220**	**450**	**13**

Semester –VIII

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	**Subject/Paper**	L	T	P	IA	EA	Total	Credits
BTCSPCC 801	Big Data Analytics	3	-	-	30	70	100	3
ELECTIVE SUBJECT								
BTCSOE 802A	Soft Computing	3	0	0	30	70	100	3
BTCSOE 802B	Robotics and Control	3	0	0	30	70	100	3
BTCSOE 802C	Simulation Modeling and Analysis	3	0	0	30	70	100	3
LABS								

BTCSPCC 803	Big Data Analytics Lab	0	0	2	30	20	50	1
BTCSPCC 804	Software Testing and Validation Lab	0	0	2	30	20	50	1
BTCSPSIT 805	Project	0	0	0	120	80	200	4
BTCSSODE CA 806	Social Outreach, Discipline &Extra Curricular Activities						50	1
	TOTAL	**6**	**0**	**4**	**240**	**260**	**550**	**13**

Semester I

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
BTBSC 101	Engineering Mathematics-I	3	1	-	30	70	100	4
BTBSC 102	Engineering Physics	3	1	-	30	70	100	4
BTHSMC 103	Communication Skills	2	-	-	30	70	100	2
BTESC 104	Programming for Problem Solving	2	-	-	30	70	100	2
BTESC 105A/ BTESC 105B	Basic Electrical Engineering/ Basic Civil Engineering	2	-	-	30	70	100	2
PRACTICALS/ VIVA VOCE		No. of Teaching Hours			Sessional	Practical	Total	Credits
BTBSC 106	Engineering Physics Lab	-	-	2	30	20	50	1
BTHSMC 107	Language Lab	-	-	2	30	20	50	1
BTESC 108	Computer Programming Lab	-	-	2	30	20	50	1
BTESC109A/ BTESC109B	Basic Electrical Engineering Lab/ Basic Civil Engineering Lab	-	-	2	30	20	50	1
BTESC 110	Computer Aided Engineering Graphics	-	-	2	30	20	50	1
BTSODECA111	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	Total	**12**	**2**	**10**	**300**	**450**	**800**	**20**

BTBSC101: Engineering Mathematics-I

Unit I: *Calculus:*

Improper integrals (Beta and Gamma functions) and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit II: Sequences and Series:

Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.

Unit III: Fourier Series:

Periodic functions, Fourier series, Euler's formula, Change of intervals, Half range sine and cosine series, Parseval's theorem.

Unit IV: Multivariable Calculus (Differentiation):

Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

Unit V: Multivariable Calculus (Integration):

Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to), Applications: areas and volumes, Centre of mass and Gravity constant and variable densities); Triple integrals (Cartesian), Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, surface integrals, Theorems of Green, Gauss and Stokes.

Textbooks/References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edit ion, John Wiley & Sons, 2006. F201
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36 Edition, 2010.

BTBSC102: Engineering Physics

Unit I: Wave Optics

Newton's Rings, Michelson's Interferometer, Fraunhofer Diffraction from a Single Slit. Diffraction grating: Construction, theory and spectrum, Resolving power and Rayleigh criterion for limit of resolution, Resolving power of diffraction grating, X-Ray diffraction and Bragg's Law.

Unit II: Quantum Mechanics

Introduction to quantum Mechanics, Wave-particle duality, Matter waves, Wave function and basic postulates, Time dependent and time independent Schrodinger's Wave Equation, Physical interpretation of wave function and its properties, Applications of the Schrodinger's Equation: Particle in one dimensional and three dimensional boxes.

Unit III: Coherence and Optical Fibers

Spatial and temporal coherence: Coherence length; Coherence time and 'Q' factor for light, Visibility as a measure of Coherence and spectral purity, Optical fiber as optical wave guide, Numerical aperture; Maximum angle of acceptance and applications of optical fiber.

Unit IV: Laser

Einstein's Theory of laser action; Einstein's coefficients; Properties of Laser beam, Amplification of light by population inversion, Components of laser, Construction and working of He-Ne and semiconductor lasers, Applications of Lasers in Science, engineering and medicine.

Unit V: Material Science & Semiconductor Physics

Bonding in solids: covalent and metallic bonding, Energy bands in solids: Classification of solids as Insulators, Semiconductors and Conductors, Intrinsic and extrinsic semiconductors, Fermi dirac distribution function and Fermi energy, Conductivity in semiconductors, Hall Effect: Theory, Hall Coefficient and applications.

References:

1. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
2. B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., (2007).
3. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).
4. A. Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).
5. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
6. Online course: "Semiconductor Optoelectronics" by M R Shenoy on NPTEL
7. Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptaon NPTEL

BTHSMC103: Communication Skills

Detailed contents :

Unit I: Communication

Meaning, Importance and Cycle of Communication. Media and Typesof Communication. Verbal and Non-Verbal Communication.Barriers to communication. Formal and Informal Channels ofCommunication (Corporate Communication). Divisions of HumanCommunication and Methods to improve InterpersonalCommunication. Qualities of good communication.

Unit II: Grammar

Passive Voice. Reported Speech. Conditional Sentences. Modal Verbs. Linking Words (Conjunctions)

Unit III: Composition

Job Application and Curriculum-Vitae Writing. Business LetterWriting. Paragraph Writing. Report Writing.

Unit IV: Short Stories

"Luncheon" by Somerset Maugham."How Much Land Does a ManNeed?" by Count Leo Tolstoy. "The Night Train at Deoli" by RuskinBond.

Unit V: Poems

"No Men are Foreign" by James Kirkup. "If" by Rudyard Kipling."Where the Mind is without Fear" by Rabindranath Tagore.

Text / Reference Books Suggested Readings:
- (i)   Practical English Usage. Michael Swan. OUP. 1995.
- (ii)   Remedial English Grammar. F.T. Wood. Macmillan.2007
- (iii)   On Writing Well. William Zinsser. Harper Resource Book. 2001
- (iv)   Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
- (v)   Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
- (vi)   Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

BTESC104: Programming for Problem Solving

Syllabus

UNIT I:Fundamentals of Computer:

Stored program architecture of computers, Storage device- Primarymemory, and Secondary storage, Random, Direct, Sequential access methods.

UNIT II:

Concepts of High-level, Assembly and Low-level languages,Representing algorithms through flowchart and pseudo code.

UNIT III:Number system:

Data representations, Concepts of radix and representation ofnumbers in radix r with special cases of r=2, 8, 10 and 16 withconversion from radix r1 to r2, r's and (r-1)'s complement, Binaryaddition, Binary subtraction, Representation of alphabets.

UNIT IV:C Programming:

Problem specification, flow chart, data types, assignment statements,input output statements, developing simple C programs, Ifstatement, for loops, while loops, do-while loops, switch statement,break statement, continue statement.

UNIT V:Development of C programs using

Arrays, functions, parameter passing,recursion, Programming in C using these statements, Structures,files, pointers and multi file handling.

Text / Reference Books
1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

BTESC 105A : Basic Electrical Engineering

Detailed contents

UNIT I:DC Circuits:

Electrical circuit elements (R, L and C), voltage and current sources,Kirchhoff current and voltage laws, Series-Parallel circuits, Nodevoltage method, Mesh current method, Superposition, Thevenin's,Norton's and Maximum power transfer theorems.

UNIT II:AC Circuits:

Representation of sinusoidal waveforms, peak and r.m.s values,phasor representation, real power, reactive power, apparent power,power factor. Analysis of single-phase AC circuits consisting of R, L,C, RL, RC and RLC combinations (series and parallel), resonance.Three phase balanced circuits, voltage and current relations in starand delta connections.

UNIT III:Transformers:

Ideal and practical transformer, EMF equation, equivalent circuit,losses in transformers, regulation and efficiency.

UNIT IV:Electrical Machines:

Generation of rotating magnetic fields, Construction and working ofa three-phase induction motor, Significance of torque-slipcharacteristic. Starting and speed control of induction motor, singlephaseinduction motor. Construction, working, torque-speedcharacteristic and speed control of separately excited DC motor.Construction and working of synchronous generators.

UNIT V:Power Converters:

Semiconductor PN junction diode and transistor (BJT).Characteristics of SCR, power transistor and IGBT. Basic circuits ofsingle phase rectifier with R load, Single phase Inverter, DC-DCconverter.

Suggested Text / Reference Books

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill,2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L. S. Bobrow, " Fundamentals of Electrical Engineering", Oxford University Press, 2011.
4. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
5. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

Detailed contents:

Unit I: Introduction to objective, scope and outcome the subject

Unit II: Introduction

Scope and Specialization of Civil Engineering, Role of civil Engineer in Society, Impact of infrastructural development on economy of country.

Unit III: Surveying Object, Principles & Types of Surveying; Site Plans, Plans& Maps; Scales & Unit of different Measurements. Linear Measurements: Instruments used. Linear Measurement by Tape, Ranging out Survey Lines and overcoming Obstructions; Measurements on sloping ground; Tape corrections, conventional symbols. Angular Measurements: Instruments used; Introduction to Compass Surveying, Bearings and Longitude & Latitude of a Line, Introduction to total station. Levelling : Instrument used, Object of leveling, Methods of leveling in brief, and Contour maps.

Unit IV: Buildings

Selection of site for Buildings, Layout of Building Plan, Types of buildings, Plinth area, carpet area, floor space index, Introduction to building byelaws, concept of sun light and ventilation. Components of Buildings & their functions, Basic concept of R.C.C., Introduction to types of foundation.

Unit V: Transportation

Introduction to Transportation Engineering; Traffic and Road Safety: Types and Characteristics of Various Modes of Transportation; Various Road Traffic Signs, Causes of Accidents and Road Safety Measures.

TEXTBOOKS:
1. Gopi, S., Basic Civil Engineering, Pearson Publishers
2. Kandya, A. A., Elements of Civil Engineering, Charotar Publishing house
3. Rangwala, S. C., Essentials of Civil Engineering, Charotar Publishing House
4. Rangwala, S. C. and Dalal, K. B., Engineering Materials, Charotar Publishing house

References Books:
1. Chudley, R., Construction Technology, Vol. I to IV, Longman Group, England
2. Chudley, R. and Greeno, R., Building Construction Handbook, Addison Wesley, Longman Group, England
3. McKay, W. B. and McKay, J. K., Building Construction Volumes 1 to 4, Pearson India Education Services
4. Minu, S., Basic Civil Engineering, Karunya Publications

BTBSC106: Engineering Physics Lab

LIST OF EXPERIMENTS :
1. To determine the wave length of monochromatic light with the help of Michelson's interferometer.
2. To determine the wave length of sodium light by Newton's Ring.
3. To determine the wave length of prominent lines of mercury by plane diffraction grating with the help of spectrometer.
4. Determination of band gap using a P-N junction diode.
5. To determine the height of given object with the help of sextant.
6. To determine the dispersive power of material of a prism with the help of spectrometer.
7. To study the charge and discharge of a condenser and hence determine the same constant both current and voltage graphs are to be plotted.
8. To determine the coherence length and coherence time of laser using He – Ne laser.
9. To measure the numerical aperture of an optical fibre.
10. To study the Hall Effect and determine the Hall Voltage and Hall coefficients.

BTHSMC107: Language Lab

Detailed Syllabus

1. Phonetic Symbols and Transcriptions.
2. Extempore.
3. Group Discussion.
4. Dialogue Writing.
5. Listening comprehension.

BTESC 108: Computer Programming Lab

LIST OF EXPERIMENTS :

1. To learn about the C Library, Preprocessor directive, Input-outputstatement.
2. Programs to learn data type, variables, If-else statement
3. Programs to understand nested if-else statement and switch statement
4. Programs to learn iterative statements like while and do-while loops
5. Programs to understand for loops for iterative statements
6. Programs to learn about array and string operations
7. Programs to understand sorting and searching using array
8. Programs to learn functions and recursive functions
9. Programs to understand Structure and Union operation
10. Programs to learn Pointer operations
11. Programs to understand File handling operations
12. Programs to input data through Command line argument

BTESC 109A: Basic Electrical Engineering Lab

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List of Experiments

1. Basic safety precautions. Introduction and use of measuring instruments –voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.

2. Transformers: Observation of the no-load current waveform on anoscilloscope. Loading of a transformer: measurement of primary andsecondary voltages and currents, and power.

3. Three-phase transformers: Star and Delta connections. Voltage and Currentrelationships (line-line voltage, phase-to-neutral voltage, line and phasecurrents).Phase-shifts between the primary and secondary side.

4. Demonstration of cut-out sections of machines: dc machine (commutate or brush arrangement), induction machine (squirrel cage rotor), synchronous(field winging - slip ring arrangement) and single-phase induction

5. Torque Speed Characteristic of separately excited dc motor.

6. Demonstration of (a) dc-dc converters (b) dc-ac converters – PWM waveform (c) the use of dc-ac converter for speed control of an induction motor and (d)Components of LT switchgear.

LIST OF EXPERIMENTS:

1. Linear Measurement by Tape:

    a) Ranging and Fixing of Survey Station along straight line and across obstacles.

    b) Laying perpendicular offset along the survey line

2. Compass Survey: Measurement of bearing of linesusing Surveyor's and Prismatic compass

3. Levelling: Using Tilting/ Dumpy/ Automatic Level

    a) To determine the reduced levels in closed circuit.

    b) To carry out profile levelling and plot longitudinal and cross sections for road by Height of Instrument and Rise & Fall Method.

4. To study and take measurements using various electronic surveying instruments like EDM, Total Station etc.

5. To determine pH, hardness and turbidity of the given sample of water.

6. To study various water supply Fittings.

7. To determine the pH and total solids of the given sample of sewage.

8. To study various Sanitary Fittings.

BTESC110: Computer Aided Engineering Graphics

Introduction: Principles of drawing, lines, type of lines, usage of Drawinginstruments, lettering, Conic sections including parabola, hyperbola, RectangularHyperbola (General method only); Scales-Plain, Diagonal and Vernier Scales.

Projections of Point & Lines: Position of Point, Notation System, SystematicApproach for projections of points, front view & Top view of point, Position ofstraight lines, line parallel to Both the RPs, Line perpendicular to either of the RPs,Line inclined to one RP and parallel to the other, Line inclined to Both the RPs,Traces of a line (One drawing sheet, one assignment in sketch book).

Projection of Planes: Positions of planes, Terms used in projections of planes,plane parallel to RP, plane inclined to one RP and perpendicular to the other RP,plane perpendicular to Both the RPs, plane Inclined to Both the RPs, True shape ofthe plane, Distance of a point from plane, Angle between two planes.

Projections of Regular Solids: frustum and truncated solids, those inclined toboth the Planes-Auxiliary Views.

Section of Solids: Theory of sectioning, section of prisms and cubes, section ofpyramids and Tetrahedron section of Cylinders, section of cones, section ofspheres (One drawing sheet, one assignment in sketch book)

Overview of Computer Graphics : Covering theory of CAD software [such as: Themenu System, Toolbars (standard, Object Properties, Draw, Modify andDimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialogboxes and windows, Shortcut menus (Button Bars), Command Line (whereapplicable), The Status Bar, Different methods of zoom as

used in CAD, Select anderase objects.: Isometric Views of lines, Planes, Simple and compound Solids.

BTCSSODECA 111: Social Outreach, Discipline & Extra Curricular Activities

SECOND SEMESTER

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
BTBSC 201	Engineering Mathematics-II	3	1	-	30	70	100	4
BTBSC 202	Engineering Chemistry	3	1	-	30	70	100	4
BTHSMC 203	Human Values	2	-	-	30	70	100	2
BTESC 204	Basic Mechanical Engineering	2	-	-	30	70	100	2
BTESC205A/ BTESC205B	Basic Electrical Engineering/ Basic Civil Engineering	2	-	-	30	70	100	2
BTHSMC 206	Advanced English	2	-	-	30	70	100	2
PRACTICALS/ VIVA VOCE		No. of Teaching Hours			Sessional	Practical	Total	Credits
BTBSC 207	Engineering Chemistry Lab	-	-	2	30	20	50	1
BTHSMC 208	Human Values Activities	-	-	2	30	20	50	1
BTESC 209	Manufacturing Practices Workshop	-	-	2	30	20	50	1
BTESC210A/ BTESC 210B	Basic Electrical Engineering Lab/ Basic Civil Engineering Lab	-	-	2	30	20	50	1
BTESC 211	Computer Aided Machine Drawing	-	-	2	30	20	50	1
BTSODECA212	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	Total	**14**	**2**	**12**	**330**	**520**	**900**	**22**

BTBSC201 : Engineering Mathematics-II

Unit I: Matrices:

Rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

Unit II: First order ordinary differential equations:

Linear and Bernoulli's equations, Exact equations, Equations not of first degree: equations solvable for *p*, equations solvable for *y*, equations solvable for *x* and Clairaut's type.

Unit III: Ordinary differential equations of higher orders:

Linear Differential Equations of Higher order with constant coefficients, Simultaneous Linear Differential Equations, Second order linear differential equations with variable coefficients: Homogenous and Exact forms, one part of CF is known, Change of dependent and independent variables, method of variation of parameters, Cauchy- Euler equation; Power series solutions including Legendre differential equation and Bessel differential equations.

Unit IV: Partial Differential Equations – First order: Order and Degree, Formation; Linear Partial differential equations ofFirst order, Lagrange's Form, Non Linear Partial Differential equationsof first order, Charpit's method, Standard forms.

Unit V: Partial Differential Equations– Higher order : Classification of Second order partial differential equations, Separation of variables method to simple problems in Cartesian coordinates including two dimensional Laplace, one dimensional Heat and one dimensional Wave equations.

Textbooks/References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9[th]Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9[th]Edit ion, John Wiley & Sons, 2006.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11[th]Reprint, 2010.
5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36 Edition, 2010.

BTBSC202: Engineering Chemistry

Detailed contents:

Unit I: Water

Common impurities, hardness, determination of hardness by complexometric (EDTA method), Degree of hardness, Units of hardness Municipal water supply: Requisite of drinking water, Purification of water; sedimentation, filtration, disinfection, breakpoint chlorination. Boiler troubles: Scale and Sludge formation, Internal treatment methods, Priming and Foaming, Boiler corrosion and Caustic embrittlement Water softening; Lime-Soda process, Zeolite (Permutit) process, Demineralization process. Numerical problems based on Hardness, EDTA, Lime-Soda and Zeolite process.

Unit II: Organic Fuels

Solid fuels: Coal, Classification of Coal, Proximate and Ultimate analyses of coal and its significance, Gross and Net Calorific value, Determination of Calorific value of coal by Bomb Calorimeter. Metallurgical coke, Carbonization processes; Otto-Hoffmann byproduct oven method. Liquid fuels : Advantages of liquid fuels, Mining, Refining and Composition of petroleum, Cracking, Synthetic petrol, Reforming, Knocking, Octane number, Anti-knocking agents, Cetane number Gaseous fuels; Advantages, manufacturing, composition and Calorific value of coal gas and oil gas, Determination of calorific value of gaseous fuels by Junker's calorimeter Numerical problems based on determination of calorific value (bomb calorimeter/Junkers calorimeter/Dulongs formula, proximate analysis & ultimate and combustion of fuel.

Unit III: Corrosion and its control

Definition and significance of corrosion, Mechanism of chemical (dry) and electrochemical (wet) corrosion, galvanic corrosion, concentration corrosion and pitting corrosion. Protection from corrosion; protective coatings-galvanization and tinning, cathodic protection, sacrificial anode and modifications in design.

Unit IV: Engineering Materials

Portland Cement; Definition, Manufacturing by Rotary kiln. Chemistry of setting and hardening of cement. Role of Gypsum. Glass: Definition, Manufacturing by tank furnace, significance of annealing, Types and properties of soft glass, hard glass, borosilicate glass, glass wool, safety glass Lubricants: Classification, Mechanism, Properties; Viscosity and viscosity index, flash and fire point, cloud and pour point. Emulsification and steam emulsion number.

Unit V: Organic reaction mechanism and introduction of drugs

Organic reaction mechanism: Substitution; SN1, SN2, Elecrophilic aromatic substitution in benzene, free radical halogenations of alkanes, Elimination; elimination in alkyl halides, dehydration of alcohols, Addition: electrophilic and free radical addition in alkenes, nucleophilic addition in aldehyde and ketones, Rearrangement; Carbocation and free radical rearrangements Drugs : Introduction, Synthesis, properties and uses of Aspirin, Paracetamol

Suggested Text / Reference Books

1. Morrison R.T & Boyn R. N ; Organic Chemistry; Prentice Hall of India 1999
2. Lee   J. D. ; Inorganic Chemistry ;Blackwell Science
3. Gopalan R., Venkappayya D., Nagarajan S. "Engineering Chemistry" Vikas Publishing House Pvt Ltd 2000.
4. Jain & Jain " Engineering Chemistry" Dhanpat Rai publishing company
5. Dara S. S. , " A Text Book of Engineering Chemistry" S. Chand and Company Ltd, 2008
6. Keeler J and Wolhess P, Why Chemical Reaction Happen Oxford Press.

BTHSMC203: Human Values

Detailed contents:

Unit I: Course Introduction - Need, Basic Guidelines, Content andProcess for Value Education

Understanding the need, basic guidelines, Self Exploration – itscontent and process; 'Natural Acceptance' and Experiential Validation,Continuous Happiness and Prosperity- Human Aspirations, Rightunderstanding, Relationship and Physical Facilities,UnderstandingHappiness and Prosperity correctly- A critical appraisal of the currentscenario.Method to fulfill the above human aspirations: understanding andliving in harmony at various levels

Unit II: Understanding Harmony in the Human Being - Harmony in Myself

Understanding human being as a co-existence of the sentient 'I' andthe material 'Body'Understanding the needs of Self ('I') and 'Body' - Sukh and SuvidhaUnderstanding the Body as an instrument of 'I',Understanding thecharacteristics and activities of 'I' and harmony in 'I' Understandingthe harmony of I with the Body: Sanyam and Swasthya; correctappraisal of Physical needs, meaning of Prosperity in detail, Programsto ensure Sanyam and Swasthya.

Unit III: Understanding Harmony in the Family and Society- Harmony inHuman-Human Relationship

Understanding harmony in the Family, Understanding values inhuman-human relationship; meaning of Nyaya and program for itsfulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect(Samman) , meaning of Vishwas; Difference between intention and competence, meaning of Samman, Difference between respect and differentiation; the other salient values in relationship, harmony in the society , Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals ,Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha)- from family to world family.

Unit IV: Understanding Harmony in the Nature and Existence – Whole existence as Coexistence

Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in allpervasive Space. Holistic perception of harmony at all levels of existence

Unit V: Implications of the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values

Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management

models. Strategy for transition from the present state to Universal Human Order: At the level of individual: as socially and ecologically responsible engineers, technologists and managers. Case studies related to values in professional life and individual life.

Suggested Text / Reference Books

1. Gaur R.R., Sangal R. and. Bagaria, G.P: "A Foundation Course in Human Values Professional Ethics," Excel Books, 2010.
2. Sadri S & Sadri, J Business Excellence Through Ethics & Governance, 2ndedition, 2015.
3. Mathur, U C CorporateGovernance and business ethics,MacMillan India Ltd, 2009.
4. Baxi, C V: CorporateGovernance, Excel Books, 2009
5. Sadri S, Sinha A K and Bonnerjee, P: Business Ethics: concepts and cases, TMH, 1998.

BTESC 204: Basic Mechanical Engineering

Unit I: Fundamentals:

Introduction to mechanical engineering, concepts of thermalengineering, mechanical machine design, industrial engineering andmanufacturing technology.Steam Boilers classification and types of steam boilers and steamturbines. Introduction and Classification of power plants.

Unit II: Pumps and IC Engines:

Applications and working of Reciprocating and Centrifugal pumps.Introduction, Classification of IC Engines, Main Components of ICEngines, Working of IC Engines and its components.

Unit III: Refrigeration and Air Conditioning:

Introduction, classification and types of refrigeration systems andair-conditioning. Applications of refrigeration and Air-conditioning.

Unit IV: Transmission of Power:

Introduction and types of Belt and Rope Drives, Gears.

Unit V:

Primary Manufacturing Processes:Metal Casting Process: Introduction to Casting Process, Patterns,Molding, Furnaces. Metal Forming Processes: Introduction toForging, Rolling, Extrusion, Drawing. Metal Joining Processes:Introduction to various types of Welding, Gas Cutting, Brazing, andSoldering.

BTESC205A : Basic Electrical Engineering

Detailed contents

UNIT I:DC Circuits:

Electrical circuit elements (R, L and C), voltage and current sources,Kirchhoff current and voltage laws, Series-Parallel circuits, Nodevoltage method, Mesh current method, Superposition, Thevenin's,Norton's and Maximum power transfer theorems.

UNIT II:AC Circuits:

Representation of sinusoidal waveforms, peak and r.m.s values,phasor representation, real power, reactive power, apparent power,power factor. Analysis of single-phase AC circuits consisting of R, L,C, RL, RC and RLC combinations (series and parallel), resonance.Three phase balanced circuits, voltage and current relations in starand delta connections.

UNIT III:Transformers:

Ideal and practical transformer, EMF equation, equivalent circuit,losses in transformers, regulation and efficiency.

UNIT IV:Electrical Machines:

Generation of rotating magnetic fields, Construction and working ofa three-phase induction motor, Significance of torque-slipcharacteristic. Starting and speed control of induction motor, singlephaseinduction motor. Construction, working, torque-speedcharacteristic and speed control of separately excited DC motor.Construction and working of synchronous generators.

UNIT V:Power Converters:

Semiconductor PN junction diode and transistor (BJT).Characteristics of SCR, power transistor and IGBT. Basic circuits ofsingle phase rectifier with R load, Single phase Inverter, DC-DCconverter.

Suggested Text / Reference Books

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill,2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L. S. Bobrow, " Fundamentals of Electrical Engineering", Oxford University Press, 2011.
4. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
5. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

BTESC 205B: Basic Civil Engineering

Detailed contents:
Unit I: Introduction to objective, scope and outcome the subject

Unit II: Introduction
Scope and Specialization of Civil Engineering, Role of civil Engineer in Society, Impact of infrastructural development on economy of country.

Unit III: Surveying Object, Principles & Types of Surveying; Site Plans, Plans& Maps; Scales & Unit of different Measurements. Linear Measurements: Instruments used. Linear Measurement by Tape, Ranging out Survey Lines and overcoming Obstructions; Measurements on sloping ground; Tape corrections, conventional symbols. Angular Measurements: Instruments used; Introduction to Compass Surveying,Bearings and Longitude & Latitude of a Line, Introduction to total station. Levelling: Instrument used, Object of leveling, Methods of leveling in brief, and Contour maps.

Unit IV: Buildings
Selection of site for Buildings, Layout of Building Plan, Types of buildings, Plinth area, carpet area, floor space index, Introduction to building byelaws, concept of sun light and ventilation. Components of Buildings & their functions, Basic concept of R.C.C., Introduction to types of foundation.

Unit V: Transportation
Introduction to Transportation Engineering; Traffic and Road Safety: Types and Characteristics of Various Modes of Transportation; Various Road Traffic Signs, Causes of Accidents and Road Safety Measures.

TEXTBOOKS:
5. Gopi, S., Basic Civil Engineering, Pearson Publishers
6. Kandya, A. A., Elements of Civil Engineering, Charotar Publishing house
7. Rangwala, S. C., Essentials of Civil Engineering, Charotar Publishing House
8. Rangwala, S. C. and Dalal, K. B., Engineering Materials, Charotar Publishing house

References Books:
5. Chudley, R., Construction Technology, Vol. I to IV, Longman Group, England
6. Chudley, R. and Greeno, R., Building Construction Handbook, Addison Wesley, Longman Group, England
7. McKay, W. B. and McKay, J. K., Building Construction Volumes 1 to 4, Pearson India Education Services
8. Minu, S., Basic Civil Engineering, Karunya Publications

BTHSMC206: Advanced English

Detailed contents

Unit-I (Grammar)

1. Modal
2. Preposition
3. Conjunction

Unit-II (Composition)

1. Resume writing
2. Report writing
3. Advertisement

Unit-III (Personality)

1. Define Personality
2. Types of Personality
3. How to develop one's personality

Unit-IV (Elements of Communication)

1. Meaning
2. Barriers to communication
3. Functions / Objectives of Communication

Unit-V (Poems)

1. 'No men are foreign' – by James Kirk up
2. 'Death, Be not Proud' – by John Donne

BTBSC 207: Engineering Chemistry Lab

List of Experiments:
1. Determination the hardness of water by EDTA method
2. Determination of residual chlorine in water
3. Determination of dissolved oxygen in water
4. Determination of the strength of Ferrous Ammonium sulphate solution with the help of $K_2Cr_2O_7$ solution by using diphenyl amine indicator
5. Determination of the strength of $CuSO_4$ solution iodometrically by using hypo solution
6. Determination of the strength of NaOH and Na_2CO_3 in a given alkali mixture
7. Proximate analysis of Coal
8. Determination of the flash & fire point and cloud & pour point of lubricating oil
9. Determination of the kinematic viscosity of lubricating oil by Redwood viscometer no. 1 at different temperature
10. Synthesis of Aspirin/ Paracetamol

BTHSM208 : Human Values Activities

Detailed contents

PS 1:

Introduce yourself in detail. What are the goals in your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your salient achievements and shortcomings in your life? Observe and analyze them.

PS 2:

Now-a-days, there is a lot of talk about many technogenic maladies such as energy and material resource depletion, environmental pollution, global warming, ozone depletion, deforestation, soil degradation, etc. - all these seem to be manmadeproblems, threatening the survival of life Earth - What is the root cause of these maladies & what is the way out in opinion? On the other hand, there is rapidly growing danger because of nuclear proliferation, arms race, terrorism, breakdown of relationships, generation gap, depression & suicidal attempts etc. - what do you think, is the root cause of these threats to human happiness and peace - what could be the way out in your opinion?

PS 3:

1. Observe that each of us has the faculty of 'Natural Acceptance', based on which one can verify what is right or not right for him. (As such we are not properly trained to listen to our 'Natural Acceptance' and may a time it is also clouded by our strong per-conditioning and sensory attractions). Explore the following:

   (i) What is Naturally Acceptable' to you in relationship the feeling of respect or disrespect for yourself and for others?

   (ii) What is 'naturally Acceptable' to you - to nurture or to exploit others? Is your living in accordance with your natural acceptance or different from it?

2. Out of the three basic requirements for fulfillment of your aspirations – right understanding, relationship and physical facilities - observe how the problems in your family are related to each. Also observe how much time & effort you devote for each in your daily routine.

PS 4:

List down all your important desires. Observe whether the desire is related to Self (I) the Body. If it appears to be related to both, visualize which part of it is related to Self (I) and which part is related to Body.

PS 5:

1. a. Observe that any physical facility you use, follows the given sequence with time: Necessary and tasteful - unnecessary but still tasteful - unnecessary and tasteless - intolerable

    b. In contrast, observe that any feeling in you is either naturally acceptable or not acceptable at all. If not acceptable, you want it continuously and if not acceptable, you do not want it any moment!

2. List down all your important activities. Observe whether the activity is of 'I' or of Body or with the participation of both or with the participation of both 'I' and Body.

3. Observe the activities within 'i'. Identify the object of your attention for different moments (over a period of sy 5 to 10 minutes) and draw a line diagram connecting these points. Try observe the link between any two nodes.

PS 6:
1. Chalk out some programs towards ensuring your harmony with the body – in terms of nurturing, protection and right utilization of the body.
2. Find out the plants and shrubs growing in and around your campus, which can be useful in curing common diseases.

PS 7:
Form small groups in the class and make them carry out a dialogue focusing on the following eight questions related to 'TRUST';

    1a. Do I want to make myself happy?

    2a. Do I want to make the other happy?

    3a. Does the other want to make himself/herself happy?

    4a. Does the other want to make me happy?

What is the answer?

Intention (Natural Acceptance)

    1b. Am I able to always make myself happy?

    2b. Am I able to always make the other happy?

    3b. Is the other able to always make himself/herself happy?

What is the answer?

Let each student answer the questions for himself and everyone else. Discuss the difference between intention and competence. Observe whether you evaluate yourself and others on the basis of intention/competence.

PS 8:
1. Observe, on how many occasions, you are able to respect your related ones (by doing the right evaluation) and on how many occasions you are disrespecting by way of under-evaluation, over-evaluation or otherwise evaluation.
2. Also, observe whether your feeling of respect is based on treating the other as you would treat yourself or on differentiations based on body, physical facilities or beliefs.

PS 9:
1. Write a narration in the form of a story, poem, skit or essay to clarify a salient Human Value to the children.
2. Recollect and narrate an incident in your life where you were able to exhibit willful adherence to values in a difficult situation.

PS 10:
List down some common units (things) of Nature which you come across in your daily life and classify them in the four orders of Nature. Analysis and explain the aspect of mutual fulfillment of each unit with other orders.

PS 11:

Make a chart to show the whole existence as co-existence. With the help of this chart try to identify the role and the scope of some of the courses of your study. Also indicate the areas which are being either over-emphasized or ignored in the present context.

PS 12:

Identify any two important problems being faced by the society today and analyze the root cause of these problems. Can these be solved on the basic of natural acceptance of human values. If so, how should one proceed in this direction from the present situation?

PS 13:

1. Suggest ways in which you can use your knowledge of Science/Technology/Management etc. for moving towards a universal human order.
2. Propose a broad outline for humanistic Constitution at the level of Nation.

PS 14:

The course is going to be over now. It is time to evaluate what difference in your thinking it has made. Summarize the core massage of this course grasped by you. How has this affected you in terms of;

    a. Thought

    b. Behavior

    c. Work and

    d. Relization

What practical steps are you able to visualize for the transition of the society from its present state.

Project:

Every student required to take-up a social project e.g. educating children in needy/weaker section, services in hospitals, NGO's and other such work i.e. social work at villages adopted by respective institute/ college.

BTESC 209: Manufacturing Practices Workshop

Carpentry Shop

1. T – Lap joint
2. Bridle joint

Foundry Shop

3. Mould of any pattern
4. Casting of any simple pattern

Welding Shop

5. Lap joint by gas welding
6. Butt joint by arc welding
7. Lap joint by arc welding
8. Demonstration of brazing, soldering & gas cutting

Machine Shop Practice

9. Job on lathe with one step turning and chamfering operations

Fitting and Sheet Metal Shop

10. Finishing of two sides of a square piece by filing
11. Making mechanical joint and soldering of joint on sheet metal
12. To cut a square notch using hacksaw and to drill a hole and tapping

.

List of Experiments

1. Basic safety precautions. Introduction and use of measuring instruments –voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitorsand inductors.

2. Transformers: Observation of the no-load current waveform on anoscilloscope. Loading of a transformer: measurement of primary andsecondary voltages and currents, and power.

3. Three-phase transformers: Star and Delta connections. Voltage and Currentrelationships (line-line voltage, phase-to-neutral voltage, line and phasecurrents).Phase-shifts between the primary and secondary side.

4. Demonstration of cut-out sections of machines: dc machine (commutate orbrusharrangement), induction machine (squirrel cage rotor), synchronous(field winging - slip ring arrangement) and single-phase induction

 5. Torque Speed Characteristic of separately excited dc motor.

6. Demonstration of (a) dc-dc converters (b) dc-ac converters – PWM waveform (c) the use of dc-ac converter for speed control of an induction motor and (d)Components of LT switchgear.

BTESC 210B: Basic Civil Engineering Lab

LIST OF EXPERIMENTS:

1. Linear Measurement by Tape:

   a) Ranging and Fixing of Survey Station along straight line and across obstacles.

   b) Laying perpendicular offset along the survey line

2. Compass Survey: Measurement of bearing of linesusing Surveyor's and Prismatic compass

3. Levelling: Using Tilting/ Dumpy/ Automatic Level

   a) To determine the reduced levels in closed circuit.

   b) To carry out profile levelling and plot longitudinal and cross sections for road by Height of Instrument and Rise & Fall Method.

4. To study and take measurements using various electronic surveying instruments like EDM, Total Station etc.

5. To determine pH, hardness and turbidity of the given sample of water.

6. To study various water supply Fittings.

7. To determine the pH and total solids of the given sample of sewage.

8. To study various Sanitary Fittings.

BTESC 211: Computer Aided Machine Drawing

Syllabus

Introduction: Principles of drawing, conventional representation of machine components and materials, lines, types of lines, dimensioning types, rules ofdimensioning.

Conversion of pictorial views into orthographic views: (1 drawing sheet)Introduction to orthographic prdcojection, concept of first angle and third angleprojection, drawing of simple machine elements in first angle projection, missingview problems covering Principles of Orthographic Projections.

Sectional views of mechanical components: (1 drawing sheet) Introduction,cutting plane line, type of sectional views-full section, half section, partial orbroken section, revolved section, removed section, offset section, sectioningconventions-spokes, web rib, shaft, pipes, different types of holes, conventions ofsection lines for different metals and materials.

Fasteners and other mechanical components: (Free hand sketch) Temporaryand permanent fasteners, thread nomenclature and forms, thread series,designation, representation of threads, bolted joints, locking arrangement of nuts,screws, washers, foundation bolts etc., keys, types of keys, cotter and knucklejoints. Riveted joints, rivets and riveting, type of rivets, types of riveted joints etc.Bearing: Ball, roller, needle, foot step bearing. Coupling: Protected type, flange, andpin type flexible coupling. Other components: Welded joints, belts and pulleys,pipes and pipe joints, valves etc.

Overview of Computer Graphics: (2 drawing sheets) Covering theory of CADsoftware such as: The menu System, Toolbars (Standard, Object Properties, Draw,Modify and Dimension), Drawing Area (Background, Crosshairs, CoordinateSystem), Dialog boxes and windows, Shortcut menus (Button Bars), CommandLine (Where applicable), The Status Bar, Different methods of zoom as used inCAD, Select and erase objects.: Isometric Views of Lines, Planes, Simple and compound Solids.

BTCSSODECA 212: Social Outreach, Discipline & Extra Curricular Activities

Semester –III

Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
BTCSBSC301	Advanced Engineering Mathematics	3	-	-	30	70	100	3
BTCSHSMC302	Managerial Economics and Financial Accounting	2	-	-	30	70	100	2
BTCSESC303	Digital Electronics	3	-	-	30	70	100	3
BTCSPCC 304	Data Structures and Algorithms	3	-	-	30	70	100	3
BTCSPCC 305	Object Oriented Programming	3	-	-	30	70	100	3
BTCSPCC 306	Software Engineering	3	-	-	30	70	100	3
BTCSPCC 307	Data Structures and Algorithms Lab	-	-	2	30	20	50	1
BTCSPCC 308	Object Oriented Programming Lab	-	-	2	30	20	50	1
BTCSPCC 309	Software Engineering Lab	-	-	2	30	20	50	1
BTCSPCC 310	Digital Electronics Lab	-	-	2	30	20	50	1
BTCSPSIT 311	Industrial Training/ Seminar	-	-	-	-	-	50	1
BTCSSODECA 312	Social Outreach, Discipline & Extra Curricular Activities	-	-	-	-	-	50	1
	TOTAL	17	-	8	300	500	900	23

BTCSBSC301: Advanced Engineering Mathematics

Unit-1

Random Variables:

Discrete and Continuous random variables, Joint distribution, Probability distribution function, conditional distribution.

Mathematical Expectations: Moments, Moment Generating Functions, variance and correlation coefficients, Chebyshev's Inequality, Skewness and Kurtosis.

Unit-2

Binomial distribution, Normal Distribution, Poisson Distribution and their relations, Uniform Distribution, Exponential Distribution.: Karl Pearson's coefficient, Rank correlation. Curve fitting. Line of Regression.

Unit-3

Historical development, Engineering Applications of Optimization, Formulation of Design Problems as a Mathematical Programming Problems, Classification of Optimization Problems

Unit-4

Cassical Optimization using Differential Calculus: Single Variable and Multivariable Optimization with & without Constraints, Langrangian theory, Kuhn Tucker conditions

Unit-5 Linear Programming: Simplex method, Two Phase Method and Duality in Linear Programming. Application of Linear Programming: Transportation and Assignment Problems.

References Books:
1. Advanced Engineering Mathematicsby Erwin Kreyszig.
2. Advanced Engineering Mathematicsby Dennis G Zill and Warren S Wright.
3. Advance Engineering Mathematicsby Zill D G
4. Advanced Engineering Mathematics by Jain R K

BTCSHSMC302: Managerial Economics and Financial Accounting

UNIT -1

 Basic economic concepts-Meaning, nature and scope of economics,deductive vs inductive methods, static and dynamics, Economicproblems: scarcity and choice, circular flow of economic activity, nationalincome-concepts and measurement.

UNIT -2

Demand and Supply analysis-Demand-types of demand, determinants of demand, demand function, elasticity of demand, demand forecasting – purpose, determinants and methods, Supply-determinants of supply, supply function, elasticity of supply.

UNIT- 3

Production and Cost analysis-Theory of production- production function, law of variable proportions, laws of returns to scale, production optimization, least cost combination of inputs, isoquants. Cost concepts explicit and implicit cost, fixed and variable cost, opportunity cost, sunk costs, cost function, cost curves, cost and output decisions, cost estimation

UNIT -4

Market structure and pricing theory-Perfect competition, Monopoly, Monopolistic competition, Oligopoly.

UNIT- 5

Financial statement analysis-Balance sheet and related concepts, profit and loss statement and related concepts, financial ratio analysis, cash flow analysis, funds-flow analysis, comparative financial statement, analysis and interpretation of financial statements, capital budgeting techniques.

Text Books

1. Managerial Economics and Financial Accounting, M. KASI REDDY, S. SARASWATHI, PHI Learning Pvt. Ltd

2**.** Managerial Economics and Financial Accounting, Prof. B.K. Garg,Dr. Surabhi Garg, Dr.Kusumlata Bhardwaj , Ashirwad Publication, ISBN- 9788193796207

Reference Books:

1. Managerial Economics, R.L.Varshney & K.L Maheswari",. 5th Edition, S.Chand Publishers,

2. Managerial Economics And Financial Analysis, Kumar, P. Vijaya & Rao

Unit-1

Fundamental concepts: Number systems and codes, Basic logic Gates and Boolean algebra:Sign & magnitude representation, Fixed point representation,complement notation, various codes & arithmetic in different codes &their inter conversion. Features of logic algebra, postulates of Booleanalgebra. Theorems of Boolean algebra.

Unit-2

Minimization Techniques and Logic Gates: Principle of Duality - Boolean expression - Minimization of Booleanexpressions — Minterm – Maxterm - Sum of Products (SOP) – Productof Sums (POS) – Karnaugh map Minimization – Don't care conditions– Quine - McCluskey method of minimization.

Unit-3

Digital Logic Gate Characteristics:

TTL logic gate characteristics. Theory & operation of TTL NAND gatecircuitry. Open collector TTL. Three state output logic. TTLsubfamilies. MOS& CMOS logic families. Realization of logic gates inRTL, DTL, ECL, C-MOS & MOSFET.

Unit-4

Combinational Circuits:

Combinational logic circuit design, adder, subtractor, BCD adder,encoder, decoder, BCD to 7-segment decoder, multiplexer,demultiplexer.

Unit-5

Sequential Circuits:

Latches, Flip-flops - SR, JK, D, T, and Master-Slave Characteristictable and equation, counters and their design, Synchronous counters– Synchronous Up/Down counters – Programmable counters – Statetable and state transition diagram ,sequential circuits designmethodology. Registers –shift registers.

Textbooks/References:
- M. Morris Mano: Digital Logic and Computer Design, PHI, India
- Malvino and Leach: Digital Principles
- Tocci R.J., Digital Systems- Principles & Applications, PHI 1997
- loyd, Digital Fundamentals, PHI, 1997
- Salivahanan A, Digital Circuit and Design, TMH

Unit-1

Stacks: Basic Stack Operations, Representation of a Stack using StaticArray and Dynamic Array, Multiple stack implementation using singlearray, Stack Applications: Reversing list, Factorial Calculation, Infix topostfix Transformation, Evaluating Arithmetic Expressions and Towersof Hanoi.

Unit-2

Queues: Basic Queue Operations, Representation of a Queue usingarray, Implementation of Queue Operations using Stack, Applicationsof Queues- Round Robin Algorithm. Circular Queues, DeQueue PriorityQueues.

Linked Lists: Introduction, single linked list, representation of a linkedlist in memory, Different Operations on a Single linked list, Reversing asingle linked list, Advantages and disadvantages of single linked list,circular linked list, double linked list and Header linked list.

Unit-3

Searching Techniques: Sequential and binary search. SortingTechniques: Basic concepts, Sorting by: bubble sort, Insertion sort,selection sort, quick sort, heap sort; merge sort, radix sort and countingsorting algorithms.

Unit-4

Trees: Definition of tree, Properties of tree, Binary Tree, Representationof Binary trees using arrays and linked lists, Operations on a BinaryTree, Binary Tree Traversals (recursive), Binary search tree, B-tree , B+tree, AVL tree, Threaded binary tree.

Unit-5

Graphs: Basic concepts, Different representations of Graphs, GraphTraversals (BFS & DFS), Minimum Spanning Tree(Prims &Kruskal),Dijkstra's shortest path algorithms. Hashing: Hash function, Addresscalculation techniques, Common hashing functions, Collisionresolution: Linear and Quadratic probing, Double hashing.

Textbooks/References:

•   Schaum Series, "Introduction *to Data Structures*", TMH.

- R.B. Patel, "*Expert Data Structures with C*", Second Edition, Khanna Book publishing Co (P) Ltd.
- Tenenbaum, "*Data Structure using C++*", PHI.
- Chattopadhyay S., Dastidar d G.and Chattopadhyay Matangini., "*Data Structure through C language*", BPB publications.

BTCSPCC305 : Object Oriented Programming

Unit-1

Introduction to different programming paradigm, characteristics ofOOP, Class, Object, data member, member function, structures inC++, different access specifiers, defining member function inside andoutside class, array of objects.

Unit-2

Concept of reference, dynamic memory allocation using new and deleteoperators, inline functions, function overloading, function with defaultarguments, constructors and destructors, friend function and classes,using this pointer.

Unit-3

Inheritance, types of inheritance, multiple inheritance, virtual baseclass, function overriding, abstract class and pure virtual function

Unit-4

Constant data member and member function, static data member andmember function, polymorphism, operator overloading, dynamic bindingand virtual function

Unit-5

Exception handling, Template, Stream class, File handling.

Textbooks/References:

- E. Balagurusamy, Object Oriented programming, Tata McGraw Hill.
- K R Venugopal, Rajkumar, T Ravishankar, Mastering C++, Tata McGraw Hill.
- C. Thomas Wu, An Introduction to OOP with Java, McGraw Hill.
- Timothy Wood, An Introduction to Object Oriented Programming, Addison Wesley.
- John R. Hubbard, Programming with C++, McGraw Hill International.

Unit-1

Introduction, software life-cycle models, software requirements specification, formal requirements specification, verification and validation.

Unit-2

Software Project Management: Objectives, Resources and theirestimation, LOC and FP estimation, effort estimation, COCOMOestimation model, risk analysis, software project scheduling.

Unit-3

Requirement Analysis: Requirement analysis tasks, Analysis principles.Software prototyping and specification data dictionary, Finite StateMachine (FSM) models. Structured Analysis: Data and control flowdiagrams, control and process specification behavioral modeling

Unit-4

Software Design: Design fundamentals, Effective modular design: Dataarchitectural and procedural design, design documentation.

Unit-5

Object Oriented Analysis: Object oriented Analysis Modeling, Datamodeling. Object Oriented Design: OOD concepts, Class and objectrelationships, object modularization, Introduction to Unified ModelingLanguage.

Text/ Reference Books:

• R. S. Pressman, "Software Engineering – A practitioner's approach", McGraw Hill Int. Ed.

• I. Sommerville, "Software Engineering", Addison Wesley, 2004

• Rajib Mall, "Fundamental of Software Engineering", 3rd Edition, PHI Learning Private Limited

• K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers

• K. K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed., New Age International, 2005.

• James Peter, W. Pedrycz, "Software Engineering: An Engineering Approach", John Wiley & Sons.

• Pankaj Jalote, "An Integrated Approach to Software Engineering", Narosa, 3rd Ed., 2005.

BTCSPCC 307 : Data Structures and Algorithms Lab

List of Experiments:

S.No.	List of Exercises
1	Write a program to insert an element at desire position in the array.
2	Write a program to delete an element at desire position from the array.
3	Write a program to replace an element at desire position in the array.
4	Write a program to search (linear search) an element in the array.
5	Write a program to search (binary search) an element in the array.
6	Write a program to addition and multiply of two matrices.
7	Write a program to implementation of stack using array.
8	Write a program to implementation of queue using array.
9	Write a program to implementation link list.
10	Write a program that sorts the array through Bubble sort.
11	Write a program that sorts the array through Quick sort.
12	Write a program that sorts the array through Merge sort.
13	Write a program that sorts the array through Insertion sort.
14	Write a program to BST (binary search tree) addition, deletion and searching.

BTCSPCC 308 : Object Oriented Programming Lab

List of Experiments :

1 Understand the basics of C++ library, variables, data input-output.
2 C++ program using with the concept of structures.
3 Implement class and object concepts and function overloading.
4 Write programs to understand dynamic memory allocation and array of objects.
5 Program to understand different types of constructors and destructor.
6. Implement friend function to access private data of a class and usage of this
Pointer.

7.Write programs to understand the usage of constant data member and memberfunction, static data member and member function in a class.

8.Implement different types of inheritance, function overriding and virtual function

9.Implement Operator overloading concepts.

10 .Write programs to understand function template and class template.

11.Write programs to understand exception handling techniques.

12.Write programs to understand file handling techniques.

BTCSPCC 309 : Software Engineering Lab

Tool Required: Rational Rose Enterprise Edition

List of Experiments:
1. Development of requirements specification, function oriented design usingSA/SD, object-oriented design using UML, test case design, implementationusing Java and testing. Use of appropriate CASE tools and other tools such asconfiguration management tools, program analysis tools in the software lifecycle.
2. Develop Software Requirements Specification (SRS) for a given problem in IEEE template.
3. Develop DFD model (level-0, level-1 DFD and Data dictionary) of the project.
4. Develop structured design for the DFD model developed.
5. Developed all Structure UML diagram of the given project.
6. Develop Behavior UML diagram of the given project.

BTCSPCC 310 : Digital Electronics Lab

List of Experiments:
1. To verify the truth tables of basic logic gates: AND, OR, NOR, NAND, NOR. Alsoto verify truth table of Ex-OR, Ex-NOR (For 2, 3, & 4 inputs using gateswith 2, 3,& 4 inputs).
2. To verify the truth table of OR, AND, NOR, Ex-OR, Ex-NOR realized usingNAND& NOR gates.
3. To realize an SOP and POS expression.
4. To realize Half adder/ Subtractor& Full Adder/ Subtractor using NAND & NORgatesand to verify their truth tables.
5. To realize a 4-bit ripple adder/ Subtractor using basic Half adder/ Subtractor&basic Full Adder/ Subtractor.
6. To verify the truth table of 4-to-1 multiplexer and 1-to-4 demultiplexer. Realizethe multiplexer using basic gates only. Also to construct and 8-to-1 multiplexerand 1-to-8 demultiplexer using blocks of 4-to-1 multiplexer and 1-to-4demultiplexer.
7. Design & Realize a combinational circuit that will accept a 2421 BCD code anddrive a TIL -312 seven-segment display.
8. Using basic logic gates, realize the R-S, J-K and D-flip flops with and withoutclock signal and verify their truth table.
9. Construct a divide by 2,4& 8 asynchronous counter. Construct a 4-bit binarycounter and ring counter for a particular output pattern using D flip flop.
10. Perform input/output operations on parallel in/Parallel out and Serial in/Serialout registers using clock. Also exercise loading only one of multiple values intothe register using multiplexer. Note: As far as possible, the experiments shall beperformed on bread board. However, experiment Nos. 1-4 are to be performed onbread board only.

BTCSPSIT 311: Industrial Training / Seminar

BTCSSODECA 312: Social Outreach, Discipline & Extra Curricular Activities

Semester –IV

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
BTCSBSC 401	Discrete Mathematics Structure	3	1	0	30	70	100	4
BTCSHSMC 402	Technical Communication	3	0	0	30	70	100	3
BTCSESC 403	Microprocessor & Interfaces	3	0	0	30	70	100	3
BTCSPCC 404	Database Management System	3	0	0	30	70	100	3
BTCSPCC 405	Theory of Computation	3	1	0	30	70	100	4
BTCSPCC 406	Data Communication and Computer Networks	3	0	0	30	70	100	3
BTCSPCC 407	Microprocessor & Interfaces Lab	0	0	2	30	20	50	1
BTCSPCC 408	Database Management System Lab	0	0	2	30	20	50	1
BTCSPCC 409	Network Programming Lab	0	0	2	30	20	50	1
BTCSPCC 410	Linux Shell Programming Lab	0	0	2	30	20	50	1
BTCSPCC 411	Java Lab	0	0	2	30	20	50	1
BTCSSODECA 412	Social Outreach, Discipline & Extra Curricular Activities						50	1
	TOTAL	**18**	**2**	**10**	**330**	**520**	**900**	**26**

Syllabus

Unit 1: **Introduction:**

Objective, scope and outcome of the course

Unit 2: **Set Theory:**

Definition of sets, countable and uncountable sets, Set operations, Partition of set, Cardinality (Inclusion- Exclusion & Addition Principles) Venn Diagrams, proofs of some general identities on sets.

Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation, Job - Scheduling problem.

Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions, pigeonhole principle. Theorem proving Techniques: Mathematical induction, Proof by contradiction. Composition of Functions. The Pigeonhole and Generalized Pigeonhole Principles.

Unit 3: **Propositional Logic:**

Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Normal Forms, Universal and existential quantifiers. 2 way predicate logic. Introduction to finite state machine Finite state machines as models of physical system equivalence machines, Finite state machines as language recognizers

Unit 4:

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded and complemented lattices.

Combinatorics: Introduction, Permutation and combination, Binomial Theorem, Multimodal Coefficients Recurrence Relation and Generating Function: Introduction to Recurrence Relation and Recursive algorithms, linear recurrence relations with constant coefficients, Homogen

eous solutions, Particular solutions, Total solutions, Generating functions, Solution by method of generating functions.

Unit 5:

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

Unit 6:

Graph Theory: Introduction and basic terminology of graphs, Planer graphs, Multigraphs and weighted graphs, Isomorphic graphs, Paths, Cycles and connectivity, Shortest path in weighted graph, Introduction to Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs, matching, vertex/edge covering

References:

1. Richard, Johnsonbaugh (2000) *Discrete Mathematics*, Prentice Hall , NJ.
2. Epp, Susanna (1996) *Discrete Mathematics with Applications*, Brooks Cole , Pacific Grove, CA.

BTCSHSMC402 : Technical Communication

Detailed Contents

UNIT1

Introduction to Technical Communication- Definition of technical communication, Aspects of technical communication, forms of technical communication, importance of technical communication, technical communication skills (Listening, speaking, writing, reading writing), linguistic ability, style in technical communication.

UNIT 2

Comprehension of Technical Materials/Texts and Information Design & development- Reading of technical texts, Reading andcomprehending instructions and technical manuals, Interpreting andsummarizing technical texts, Note-making. Introduction of differentkinds of technical documents, Information collection, factors affectinginformation and document design, Strategies for organization,Information design and writing for print and online media.

UNIT 3

Technical Writing, Grammar and Editing- Technical writing process, forms of technical discourse, Writing, drafts and revising, Basics of grammar, common error in writing and speaking, Study of advanced grammar, Editing strategies to achieve appropriate technical style, Introduction to advanced technical communication. Planning, drafting and writing Official Notes, Letters, E-mail, Resume, Job Application, Minutes of Meetings.

UNIT4

Technical Reports, types of technical reports, Characteristics and formats and structure of technical reports. Technical Project Proposals, types of technical proposals,

UNIT 5

 Advanced Technical Writing- Characteristics and formats and structure of technical proposals. Technical Articles, types of technical articles, Writing strategies, structure and formats of technical articles.

Text/Reference Books:

1. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, M004

2. M. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, M003. (ISBN

031M406843)

3. Shiv Khera, You Can Win, Macmillan Books, New York, M003.

4. Raman Sharma, Technical Communications, Oxford Publication, London, M004.

5. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, M004. (ISBN: 078M8357-4)

6. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi M00M.

7. Xebec, Presentation Book, TMH New Delhi, M000. (ISBN 040MM13)

BTCSESC 403: Microprocessor & Interfaces

Unit 1: **Introduction:** Objective, scope and outcome of the course.

Unit 2: Introduction to Microprocessors, microcontroller; 8085 Microprocessor Architecture, pin description, Bus concept and organization; concept of multiplexing and de-multiplexing of uses; concept of static and dynamic RAM, type of ROM, memory map.

Unit 3: Software architecture registers and signals, Classification of instruction, Instruction set, addressing modes, Assembly Language Programming and Debugging, Programming Technique, instruction Format and timing.

Unit 4: Advance Assembly Language Programming, Counter and time delay; types of Interrupt and their uses, RST instructions and their uses, 8259 programmable interrupt controller; Macros, subroutine; Stack -implementation and uses with examples; Memory interfacing.

Unit 5: 8085 Microprocessor interfacing:, 8255 Programmable Peripheral Interface, 8254 programmable interval timer, interfacing of Input/output device, 8279 Key board/Display interface.

Unit 6 : Microprocessor Application: Interfacing scanned multiplexed display and liquid crystal display, Interfacing and Matrix Keyboard, MPU Design; USART 8251,RS232C and RS422A, Parallel interface- Centronics and IEEE 488.

References:

1. Ramesh.S.Gaonkar "Microprocessor architecture, programming & applications with 8085.

2.Kenneth J.Ayala "The 8051 Microcontroller Architecture, Programming & Applications"- Penram International publishing.

3.D.V.Hall "Microprocessor and Digital system"-McGraw Hill Publishing Company.

4 .Ajit Pal "Microprocessor Principles and Applications"-Tata McGraw Hill.

5.Kenneth "Microprocessor and programmed logic" PHI.

BTCSPCC 404 : Database Management System

UNIT I: Introduction: Objective, scope and outcome of the course.

UNIT II:Introduction to database systems: Overview and History of DBMS. File System v/s DBMS.Advantage of DBMS Describing and Storing Data in a DBMS.Queries in DBMS. Structure of a DBMS.

Entity Relationship model: Overview of Data Design Entities, Attributes and Entity Sets, Relationship and Relationship Sets. Features of the ER Model- Key Constraints, Participation Constraints, Weak Entities, Class Hierarchies, Aggregation, Conceptual Data Base, and Design with ER Model- Entity v/s Attribute, Entity vs Relationship Binary vs Ternary Relationship and Aggregation v/s ternary Relationship Conceptual Design for a Large Enterprise.

UNIT III: Relationship Algebra and Calculus: Relationship Algebra Selection and Projection, Set Operations, Renaming, Joints, Division, Relation Calculus, Expressive Power of Algebra and Calculus.

SQL queries programming and Triggers: The Forms of a Basic SQL Query, Union, and Intersection and Except, Nested Queries, Correlated Nested Queries, Set-Comparison Operations, Aggregate Operators, Null Values and Embedded SQL, Dynamic SQL, ODBC and JDBC, Triggers and Active Databases.

UNIT IV: Schema refinement and Normal forms: Introductions to Schema Refinement, Functional Dependencies, Boyce-Codd Normal Forms, Third Normal Form, Normalization-Decomposition into BCNF Decomposition into 3-NF.

UNIT V: Transaction Processing: Introduction-Transaction State, Transaction properties, Concurrent Executions. Need of Serializability, Conflict vs. View Serializability, Testing for Serializability, Recoverable Schedules, Cascadeless Schedules.

UNIT VI: Concurrency Control: Implementation of Concurrency: Lock-based protocols, Timestamp-based protocols, Validation-based protocols, Deadlock handling,

Database Failure and Recovery: Database Failures, Recovery Schemes: Shadow Paging and Log-based Recovery, Recovery with Concurrent transactions.

References:
1 Date C J, "An Introduction to Database System", Addision Wesley.
2 Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
3 Elmasri, Navathe, "Fundamentals of Database Systems", Addision Wesley
4 Leon & Leon, "Database Management System", Vikas Publishing House.
5 Bipin C. Desai, "An introduction to Database Systems", Galgotia Publication
6 Ramakrishnan, Gehrke, "Database Management System", McGraw Hill
7 Kroenke, "Database Processing: Fundamentals, Design and Implementation",
       Pearson.

BTCSPCC 405 : Theory of Computation

UNIT I:Introduction: Objective, scope and outcome of the course.

UNIT II: Finite Automata & Regular Expression: Basic machine, Finite state machine, Transition graph, Transition matrix, Deterministic and nondeterministic finite automation, Equivalence of DFA and NDFA, Decision properties, minimization of finite automata, Mealy & Moore machines.

Alphabet, words, Operations, Regular sets, relationship and conversion between Finite automata and regular expression and vice versa, designing regular expressions, closure properties of regular sets, Pumping lemma and regular sets, Myhill- Nerode theorem , Application of pumping lemma, Power of the languages.

UNIT III: Context Free Grammars (CFG), Derivations and Languages, Relationship between derivation and derivation trees, leftmost and rightmost derivation, sentential forms, parsing and ambiguity, simplification of CFG, normal forms, Greibach and Chomsky Normal form , Problems related to CNF and GNF including membership problem.

UNIT IV: Nondeterministic PDA, Definitions, PDA and CFL, CFG for PDA, Deterministic PDA, and Deterministic PDA and Deterministic CFL , The pumping lemma for CFL's, Closure Properties and Decision properties for CFL, Deciding properties of CFL.

UNIT V: Turing Machines: Introduction, Definition of Turing Machine, TM as language Acceptors and Transducers, Computable Languages and functions, Universal TM & Other modification, multiple tracks Turing Machine.

Hierarchy of Formal languages: Recursive & recursively enumerable languages, Properties of RL and REL, Introduction of Context sensitive grammars and languages, The Chomsky Hierarchy.

UNIT VI: Tractable and Untractable Problems: P, NP, NP complete and NP hard problems, Un-decidability, examples of these problems like vertex cover problem, Hamiltonian path problem, traveling sales man problem.

References:
1. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science, PHI
2. Martin J. C., "Introduction to Languages and Theory of Computations", TMH
3. Hopcroft, Ullman, "Introduction to Automata Theory, Language and Computation", Nerosa Publishing House, 3rd Edition.

UNIT I: Introduction: Objective, scope and outcome of the course.

UNIT II: Introductory Concepts: Network hardware, Network software, topologies, Protocols and standards, OSI model, TCP model, TCP/IP model, Physical Layer: Digital and Analog Signals, Periodic Analog Signals, Signal Transmission, Limitations of Data Rate, Digital Data

Transmission, Performance Measures, Line Coding, Digital Modulation, Media and Digital Transmission System.

UNIT III: Data Link Layer: Error Detection and Correction, Types of Errors, Two dimensional parity check, Detection verses correction, Block Coding, Linear Block Coding, Cyclic Codes, Checksum, Standardized Polynomial Code, Error Correction Methods, Forward Error Correction, Protocols: Stop and wait, Go-back-N ARQ, Selective Repeat ARQ, Sliding window, Piggy backing, Pure ALOHA, Slotted ALOHA, CSMA/CD, CSMA/CA.

UNIT IV: Network Layer: Design issues, Routing algorithms: IPV4, IPV6, Address mapping: ARQ, RARQ, Congestion control, Unicast, Multicast, Broadcast routing protocols, Quality of Service, Internetworking.

UNIT V: Transport Layer: Transport service, Elements of transport protocols,User Datagram Protocol, Transmission Control Protocol, Quality of service, Leaky Bucket and Token Bucket algorithm.

UNIT VI: Application Layer: WWW, DNS, Multimedia, Electronic mail, FTP, HTTP, SMTP, Introduction to network security

References:

1. Computer Networking; J. F. Kurose and K.W.Ross, Pearson education
2. Data Communications and Networking; B.A. Forouzon, Tata-McGraw-Hill
3. Computer Networks; A.S. Tannenbaum
4. Communication Networks; Garcia and Widija, Tata-McGraw-Hill.

List of Experiments:

1. Add the contents of memory locations XX00 &XX01 & place the result in memory location XX02.
2. Add the 16 bit numbers stored in memory location & store the result in another memory location.
3. Transfer a block of data from memory location XX00 to another memory location XX00 in forward & reverse order.
4. Write a program to swap two blocks of data stored in memory.
5. Write a program to find the square of a number.
6. Write a main program and a conversion subroutine to convert Binary to its equivalent BCD.
7. Write a program to find largest & smallest number from a given array.
8. Write a program to Sort an array in ascending & descending order.
9. Write a program to multiply two 8 bit numbers whose result is 16 bit.

10. Write a program of division of two 8 bit numbers.
11. Generate square wave from SOD pin of 8085 & observe on CRO.
12. Write a program to perform traffic light control operation.
13. Write a program to control the speed of a motor

BTCSPCC 408 : Database Management System Lab

List of Experiments:

1. Design a Database and create required tables. For e.g. Bank, College Database
2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
3. Write a SQL statement for implementing ALTER, UPDATE and DELETE.
4. Write the queries to implement the joins.
5. Write the query for implementing the following functions: MAX (), MIN (), AVG () and COUNT ().
6. Write the query to implement the concept of Integrity constrains.
7. Write the query to create the views.
8. Perform the queries for triggers.
9. Perform the following operation for demonstrating the insertion , updation and deletion
10. Using the referential integrity constraints.
11. Write the query for creating the users and their role.

BTCSPCC409 : Network Programming Lab

List of Experiments:

1. Study of Different Type of LAN& Network Equipments.
2. Study and Verification of standard Network topologies i.e. Star, Bus, Ring etc.
3. LAN installations and Configurations.
4. Write a program to implement various types of error correcting techniques.
5. Write a program to implement various types of framing methods.
6. Write two programs in C: hello_client and hello_server
   a. The server listens for, and accepts, a single TCP connection; it reads all the data it can from that connection, and prints it to the screen; then it Closes the connection
   b.The client connects to the server, sends the string "Hello, world!", then closes the connection 7.
7. Write an Echo_Client and Echo_server using TCP to estimate the round trip time from client to the server. The server should be such that it can accept multiple connections at any given time.
8. Repeat Exercises 6 & 7 for UDP.
9. Repeat Exercise 7 with multiplexed I/O operations.
10. Simulate Bellman -Ford Routing algorithm in NS2

List of Experiments:

1. Use of Basic Unix Shell Commands: ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit.
2. Commands related to inode, I/O redirection and piping, process control commands, mails.

3. Shell Programming: Shell script based on control structure -If-then-fi, if-then-else-if, nested if -else, to find:
    3.1 Greatest among three numbers.
    3.2 To find a year is leap year or not.
    3.3 To input angles of a triangle and find out whether it is valid triangle or not.
    3.4 To check whether a character is alphabet, digit or special character.
    3.5 To calculate profit or loss.
4. Shell Programming Looping-while, until, for loops
    4.1 Write a shell script to print all even and odd number from 1 to 10.
    4.2 Write a shell script to print table of a given number
    4.3 Write a shell script to calculate factorial of a given number.
    4.4 Write a shell script to print sum of all even numbers from 1 to 10.
    4.5 Write a shell script to print sum of digit of any number.
5. Shell Programming - case structure, use of break

    5.1 Write a shell script to make a basic calculator which performs addition, subtraction, Multiplication, division
    5.2 Write a shell script to print days of a week.
    5.3 Write a shell script to print starting 4 months having 31 days.
6. Shell Programming -Functions

    6.1 Write a shell script to find a number is Armstrong or not.
    6.2 Write a shell script to find a number is palindrome or not.
    6.3 Write a shell script to print Fibonacci series.
    6.4 Write a shell script to find prime number.
    6.5 Write a shell script to convert binary to decimal and decimal to binary
7. Write a shell script to print different shapes -Diamond, triangle, square, rectangle, hollow square etc.
8. Shell Programming –Arrays
    8.1 Write a C program to read and print elements of array.
    8.2 Write a C program to find sum of all array elements.
    8.3 Write a C program to find reverse of an array.
    8.4 Write a C program to search an element in an array.
    8.5 Write a C program to sort array elements in ascending or descending order.

List of Experiments:

1. Develop an in depth understanding of programming in Java: data types, variables, operators, operator precedence, Decision and control statements, arrays, switch statement, Iteration Statements, Jump Statements, Using break, Using continue, return.

2. Write Object Oriented programs in Java: Objects, Classes constructors, returning and passing objects as parameter, Inheritance, Access Control, Using super, final with inheritance Overloading and overriding methods, Abstract classes, Extended classes.

3. Develop understanding to developing packages & Interfaces in Java: Package, concept of CLASSPATH, access modifiers, importing package, Defining and implementing interfaces.

4. Develop understanding to developing Strings and exception handling: String constructors, special string operations, character extraction, searching and comparing strings, string Buffer class. Exception handling fundamentals, Exception types, uncaught exceptions, try, catch and multiple catch statements. Usage of throw, throws and finally.

5. Develop applications involving file handling: I/O streams, File I/O.

6. Develop applications involving concurrency: Processes and Threads, Thread Objects, Defining and Starting a Thread, Pausing Execution with Sleep, Interrupts, Joins, and Synchronization.

7. Programs to demonstrate basic concepts e.g. operators, classes, constructors, control & iteration statements, recursion etc. such as complex arithmetic, matrix arithmetic, tower of Hanoi problem etc.

8. Development of programs/projects to demonstrate concepts like inheritance, exception handling, packages, interfaces etc. such as application for electricity department, library management, ticket reservation system, payroll system etc.

9. Development of a project to demonstrate various file handling concepts.

10. Develop applications involving Applet: Applet Fundamentals, using paint method and drawing polygons. It is expected that each laboratory assignments to given to the students with an aim to In order to achieve the above objectives.

BTCSSODECA 412: Social Outreach, Discipline & Extra Curricular Activities

Semester –V

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
BTCSESC 501	Information Theory & Coding	3	-	-	30	70	100	3
BT CSPCC 502	Compiler Design	3	-	-	30	70	100	3
BT CSPCC 503	Operating System	3	-	-	30	70	100	3
BTCSPCC 504	Computer Graphics & Multimedia	3	-	-	30	70	100	3
BTCSPCC 505	Analysis of Algorithms	3	-	-	30	70	100	3
BTCSPEC 506A	Wireless Communication	3	-	-	30	70	100	3
BTCSPEC 506B	Human-Computer Interaction	3	-	-	30	70	100	3
BTCSPEC 506C	Bioinformatics	3	-	-	30	70	100	3
LABS								
BTCSPCC 507	Computer Graphics & Multimedia Lab	-	-	2	30	20	50	1
BTCSPCC 508	Compiler Design Lab	-	-	2	30	20	50	1
BTCSPCC 509	Analysis of Algorithms Lab	-	-	2	30	20	50	1
BTCSPCC 510	Advance Java Lab	-	-	2	30	20	50	1
BTCSPSIT 511	Industrial Training	-	-	2	30	20	50	1
BT CSSODE CA 512	Social Outreach, Discipline & Extra Curricular Activities						50	1

	TOTAL	24	-	10	330	520	900	24

BTCSESC 501: Information Theory & Coding

UNIT I: Introduction to information theory: Uncertainty, Information and Entropy, Information measures for continuous random variables, source coding theorem. Discrete Memory less channels, Mutual information, Conditional entropy.

UNIT II: Source coding schemes for data compaction: Prefix code,Huffman code, Shanon-Fane code &Hempel-Ziv coding channel capacity. Channel coding theorem. Shannon limit.

UNIT III : Linear Block Code: Introduction to error connecting codes, coding & decoding of linear block code, minimum distance consideration,conversion of non-systematic form of matrices into systematic form.

UNIT IV : Cyclic Code: Code Algebra, Basic properties of Galois fields (GF) polynomial operations over Galois fields, generating cyclic code by generating polynomial, parity check polynomial. Encoder &decoder for cyclic codes.

UNIT V: Convolutional Code: Convolutional encoders of different rates. Code Tree, Trllis and state diagram. Maximum likelihood decoding of convolutional code: The viterbi Algorithm fee distance of a convolutional code.

Text/Reference Books:

•   K. Sam Shanmugam-"Digital and Analog Communication System", John Wiley Sons.

•   HerborTaub Donald Schilling- "Principal of Communication System". Tata Mc-Graw Hill.

BTCSPCC 502 : Compiler Design

UNIT I: Introduction: Objective, scope and outcome of the course. Compiler, Translator, Interpreter definition, Phase of compiler,Bootstrapping, Review of Finite automata lexical analyzer, Input,Recognition of tokens, Idea about LEX: A lexical analyzer generator, Error handling.

UNIT II : Review of CFG Ambiguity of grammars: Introduction to parsing.Top down parsing, LL grammars & passers error handling of LL parser, Recursive descent parsing predictive parsers, Bottom up parsing, Shift reduce parsing, LR parsers, Construction of SLR, Conical LR & LALR parsing tables, parsing with ambiguous grammar. Operator precedence parsing, Introduction of automatic parser generator: YACC error handling in LR parsers.

UNIT III : Syntax directed definitions; Construction of syntax trees, S Attributed Definition, L-

attributed definitions, Top down translation. Intermediate code forms using postfix notation, DAG,Three address code, TAC for various control structures, Representing TAC using triples and quadruples, Boolean expression and control structures.

UNIT IV : Storage organization; Storage allocation, Strategies, Activation records, Accessing local and non-local names in a block structured language, Parameters passing, Symbol table organization, Data structures used in symbol tables.

UNIT V: Definition of basic block control flow graphs; DAG representation of basic block, Advantages of DAG, Sources of optimization, Loop optimization, Idea about global data flow analysis, Loop invariant computation, Peephole optimization, Issues in design of code generator, A simple code generator, Code generation from DAG.

Text/Reference Books:
- 'Compilers Principles, Techniques and Tools',Aho, Pearson Education.
- 'Modern Compiler Design', Galles, Pearson Education.
- 'The Essence of Compilers', Hunter, Pearson Education

BTCSPCC 503 : Operating System

UNIT I: Introduction and History of Operating systems: Structure and operations; processes and files Processor management: inter process communication, mutual exclusion, semaphores, wait and signal procedures, process scheduling and algorithms, critical sections, threads, multithreading

UNIT II: Memory management: contiguous memory allocation, virtual memory,paging, page table structure, demand paging, page replacement policies,thrashing, segmentation, case study

UNIT III : Deadlock: Shared resources, resource allocation and scheduling,resource graph models, deadlock detection, deadlock avoidance, deadlock prevention algorithms.
Device management: devices and their characteristics, device drivers,device handling, disk scheduling algorithms and policies

UNIT IV : : File management: file concept, types and structures, directory structure, cases studies, access methods and matrices, file security, user authentication

UNIT V: UNIX and Linux operating systems as case studies; Time OS and case studies of Mobile OS

Text/Reference Books:

- Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
- Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.
- Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
- Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
- Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India
- Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

BTCSPCC 504: Computer Graphics & Multimedia

UNIT I: Basic of Computer Graphics: Basic of Computer Graphics, Applications of computer graphics, Display devices, Random and Raster scan systems, Graphics input devices, Graphics software and standards

UNIT II: Graphics Primitives Points, lines, circles and ellipses as primitives, scan conversion algorithms for primitives, Fill area primitives including scanline polygon filling, inside-outside test, boundary and flood-fill, character generation, line attributes, area-fill attributes, character attributers. Aliasing, and introduction to Anti Aliasing (No anti aliasing algorithm).

UNIT III : Two Dimensional Graphics: Transformations (translation, rotation, scaling), matrix representation, homogeneous coordinates, composite transformations, reflection and shearing, viewing pipeline and coordinates system, window-to-viewport transformation, clipping including point clipping, line clipping (cohen-sutherland, liang- bersky, NLN), polygon clipping

UNIT IV : Three Dimensional Graphics:3D display methods, polygon surfaces, tables, equations, meshes, curved lies and surfaces, quadric surfaces, spline representation, cubic spline interpolation methods, Bazier curves and surfaces, B-spline curves and surfaces.3D scaling, rotation and translation, composite transformation, viewing pipeline and coordinates,

parallel and perspective transformation, view volume and general (parallel and perspective) projection transformations.

UNIT V: Illumination and Colour Models: Light sources – basic illumination models – halftone patterns and dithering techniques; Properties of light – Standard primaries and chromaticity diagram; Intuitive colour concepts –RGB colour model – YIQ colour model – CMY colour model – HSV colour model – HLS colour model; Colour selection.

UNIT VI: Animations &Realism: Design of Animation sequences – animation function – raster animation – key frame systems – motion specification – morphing – tweening.

Computer Graphics Realism: Tiling the plane – Recursively defined curves – Koch curves – C curves – Dragons – space filling curves – fractals – Grammar based models – fractals – turtle graphics – ray tracing.

Text/Reference Books:

- Foley et.al, Computer Graphics Principles & Practice, Addision , 1999
- David F.Rogers, Procedural Elements for Computer Graphics, McGraw Hill Book Company
- D.Heam and P.Baker, Computer Graphics, Prentice Hall 1986
- R.Plastock and G.Kalley, Theory and Problems of Computer Graphics, Schaum's Series., McGraw Hill.
- Ralf Steinmetz &KlaraNahrstedt - Multimedia : computing, Communication & Applications, Pearson Education Asia.
- PrabhatK.Andleigh-Multimedia System Design, Prentice Hall,KiranThaukrar.

BTCSPCC 505: Analysis of Algorithms

UNIT I: Background: Review of Algorithm, Complexity Order Notations: definitions and calculating complexity .Divide And Conquer Method: Binary Search, Merge Sort, Quick sort and Strassen's matrix multiplication algorithms.

UNIT II: Greedy Method: Knapsack Problem, Job Sequencing, Optimal Merge Patterns and Minimal Spanning Trees. Dynamic Programming: Matrix Chain Multiplication. Longest CommonSubsequence and 0/1 Knapsack Problem.

UNIT III : Branch And Bound: Traveling Salesman Problem and Lower Bound Theory.

Backtracking Algorithms and queens problem.Pattern Matching Algorithms: Naïve and Rabin Karp string matching algorithms, KMP Matcher and Boyer Moore Algorithms.

UNIT IV : Assignment Problems: Formulation of Assignment and Quadratic Assignment

Problem. Randomized Algorithms- Las Vegas algorithms, Monte Carlo algorithms, randomized algorithm for Min-Cut, randomized algorithm for 2- SAT. Problem definition of Multicommodity flow, Flow shop scheduling and Network capacity assignment problems.

UNIT V: Problem Classes Np, Np-Hard And Np-Complete: Definitions of P, NP-Hard and NP-Complete Problems. Decision Problems.Cook's Theorem.Proving NPComplete Problems -

Satisfiability problem and Vertex Cover Problem.Approximation Algorithms for Vertex Cover and Set Cover Problem.

Text/Reference Books:

* Design and Analysis of Algorithm; Horowitz and Sahani
* Introduction to Algorithm Design ; Corman
* Design and Analysis of Computer Algorithms ; Aho, Pearson

BTCSPEC 506A : Wireless Communication

UNIT I: Wireless Channels: Large scale path loss – Path loss models: Free Space and Two-Ray models -Link Budget design – Small scale fading- Parameters of mobile multipath channels – Time dispersion parameters-Coherence bandwidth – Doppler spread & Coherence time, Fading due to Multipath time delay spread – flat fading – frequency selective fading – Fading due to Doppler spread – fast fading – slow fading.

UNIT II: Cellular Architecture: Multiple Access techniques - FDMA,TDMA, CDMA – Capacity calculations–Cellular concept- Frequency reuse - channel assignment- hand off-interference & system capacity- trunking& grade of service – Coverage and capacity

Improvement.

UNIT III : Digital Signaling For Fading Channels: Structure of a wireless communication link, Principles of Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle – Cyclic prefix, Windowing, PAPR.

UNIT IV : Multipath Mitigation Techniques: Equalisation – Adaptive equalization, Linear and Non-Linear equalization, Zero forcing and LMS Algorithms. Diversity – Micro and Macrodiversity, Diversity combining techniques, Error probability in fading channels with

diversity reception, Rake receiver,

UNIT V: Multiple Antenna Techniques: MIMO systems – spatial multiplexing -System model - Pre-coding - Beam forming - transmitter diversity, receiver diversity- Channel state information capacity in fading and non-fading channels.

Text/Reference Books:

* Rappaport T.S, "Wireless Communications: Principles and Practice", 2nd Edition, Pearson Education, 2007
* Wayne Tomasi, "Advanced Electronic Communication Systems", 6th Edition, Pearson Education, 2009.

- Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons, 2004
- H.Taub, D L Schilling and G Saha, "Principles of Communication", 3rd Edition, Pearson Education, 2007.
- B. P.Lathi, "Modern Analog and Digital Communication Systems", 3rd Edition, Oxford University Press, 2007.

BTCSPEC 506B
Human Computer Interaction

UNIT I: Historical evolution of the field, Interactive system design, Concept of usability - definition and elaboration, HCI and software Engineering, GUI design and Aesthetics, Prototyping techniques.

Model-based Design and evaluation: Basic idea, introduction to different types of models, GOMS family of models (KLM and CMNGOMS), BFitts' law and Hick-Hyman's law, Model-based design case studies,

UNIT II: Guidelines in HCI:Shneiderman's eight, golden rules, Norman's seven principles, Norman's model of interaction, Nielsen's ten heuristics with example of its use Heuristic evaluation, Contextual inquiry, Cognitive walkthrough

UNIT III : Empirical research methods in HCI: Introduction (motivation, issues, research question formulation techniques), Experiment design and data analysis (with explanation of one-way ANOVA)

UNIT IV : Task modelling and analysis: Hierarchical task analysis (HTA), Engineering task models and Concur Task Tree (CTT),I introduction to formalism in dialog design, design using FSM (finite state machines) State charts and (classical) Petri Nets in dialog design

UNIT V: Introduction to CA, CA types, relevance of CA in IS design Model

Human Processor (MHP), OOP- Introduction OOM- Object Oriented Modeling of User Interface Design.

Text/Reference Books:
- The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.
- Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.
- Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL BEALG, PEARSON.
- Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech, 3. User Interface Design, SorenLauesen , Pearson Education.

BTCSPEC506C: Bioinformatics

UNIT I : Introduction: Basics of biology.

UNIT II Sequences: Problem Statement, Edit distance and substitution matrices, HMMs and pairwise HMMs, Global and local alignments, Spliced alignment, Space-efficient sequence alignment, multiple alignment, Database searching tools, Sequence by hybridization, Profile HMMs

UNIT III : Structures: Protein structure alignment, Protein structure prediction

UNIT IV : Phylogenetic trees: Large parsimony and small parsimony problems, Probabilistic approaches, Grammar-based approaches

UNIT V: Miscellaneous topics: Pathways and networks, Microarrays, Biomedical images

Text/Reference Books:

- Ghosh Z. and Bibekanand M. (2008) Bioinformatics: Principles and Applications. Oxford University Press.
- Pevsner J. (2009) Bioinformatics and Functional Genomics. II Edition. Wiley-Blackwell. Campbell A. M., Heyer L. J. (2006)
- Discovering Genomics, Proteomics andBioinformatics. II Edition. Benjamin Cummings.

BTCSPCC 507: Computer Graphics & Multimedia Lab

List of Experiments:

1. Implementation of Line, Circle and ellipse attributes
2. To plot a point (pixel) on the screen
3. To draw a straight line using DDA Algorithm
4. Implementation of mid-point circle generating Algorithm
5. Implementation of ellipse generating Algorithm
6. Two Dimensional transformations - Translation, Rotation, Scaling, Reflection, Shear
7. Composite 2D Transformations

8. Cohen Sutherland 2D line clipping and Windowing
9. Sutherland – Hodgeman Polygon clipping Algorithm
10. Three dimensional transformations - Translation, Rotation, Scaling
11. Composite 3D transformations
12. Drawing three dimensional objects and Scenes
13. Generating Fractal images

List of Experiments:
1. Introduction: Objective, scope and outcome of the course.
2. To identify whether given string is keyword or not.
3. Count total no. of keywords in a file. [Taking file from user]
4. Count total no of operators in a file. [Taking file from user]
5. Count total occurrence of each character in a given file. [Taking file from user]
6. Write a C program to insert, delete and display the entries in Symbol Table.
7. Write a LEX program to identify following:
    1) Valid mobile number
    2) Valid url
    3) Valid identifier
    4) Valid date (dd/mm/yyyy)
    5) Valid time (hh:mm:ss)
8. Write a lex program to count blank spaces,words,lines in a given file.
9. Write a lex program to count the no. of vowels and consonants in a C file.
10. Write a YACC program to recognize strings aaab,abbb using a^nb^n, where b>=0.
11. Write a YACC program to evaluate an arithmetic expression involving operators +,-,*
    and /.
12. Write a YACC program to check validity of a strings abcd,aabbcd using grammar
    a^nb^nc^md^m, where n , m>0
13. Write a C program to find first of any grammar.

BTCSPCC509: Analysis of Algorithms Lab

List of Experiments:
1. Sort a given set of elements using the Quicksort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read

from a file or can be generated using the random number generator.

2. Implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.

3. a. Obtain the Topological ordering of vertices in a given digraph. b. Compute the transitive closure of a given directed graph using Warshall's algorithm.

4. Implement 0/1 Knapsack problem using Dynamic Programming.

5. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.

6. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's

algorithm.

7. a. Print all the nodes reachable from a given starting node in a digraph using BFS method. b. Check whether a given graph is connected or not using DFS method.

8. Find Minimum Cost Spanning Tree of a given undirected graph using Prim's

algorithm.

9. Implement All-Pairs Shortest Paths Problem using Floyd's algorithm.

10. Implement N Queen's problem using Back Tracking.

BTCSPCC510: Advance Java Lab

List of Experiments:

1. Introduction To Swing, MVC Architecture, Applets, Applications and Pluggable Look and Feel, Basic swing components : Text Fields, Buttons, Toggle Buttons, Checkboxes, and Radio Buttons

2. Java database Programming, java.sql Package, JDBC driver, Network Programming With java.net Package, Client and Server Programs, Content And Protocol Handlers

3. RMI architecture, RMI registry, Writing distributed application with RMI, Naming services, Naming And Directory Services, Overview of JNDI, Object

   serialization and Internationalization

4. J2EE architecture, Enterprise application concepts, n-tier application concepts, J2EE platform, HTTP protocol, web application, Web containers and Application servers

5. Server side programming with Java Servlet, HTTP and Servlet, Servlet API, life cycle, configuration and context, Request and Response objects, Session handling and event handling, Introduction to filters with writing simple filter application

6. JSP architecture, JSP page life cycle, JSP elements, Expression Language, Tag Extensions, Tag Extension API, Tag handlers, JSP Fragments, Tag Files, JSTL, Core Tag library, overview of XML Tag library, SQL Tag library and Functions Tag library

BTCSPSIT 511: Industrial Training & Seminar

BTCSSODECA 512: Social Outreach, Discipline & Extra Curricular Activities

Semester –VI

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
BTCSESC 601	Digital Image Processing	3	-	-	30	70	100	3
BTCSPCC 602	Machine Learning	3	0	0	30	70	100	3
BTCSPCC 603	Information Security System	3	0	0	30	70	100	3
BTCSPCC 604	Computer Architecture and Organization	3	0	0	30	70	100	3
BTCSPCC 605	Artificial Intelligence	3	-	0	30	70	100	3
BTCSPCC 606	Cloud Computing	3	0	0	30	70	100	3
ELECTIVE SUBJECT								
BTCSPEC 607A	Distributed System	3	0	0	30	70	100	3
BTCSPEC 607B	Software Defined Network	3	0	0	30	70	100	3
BTCSPEC 607C	Ecommerce & ERP	3	0	0	30	70	100	3
LABS								
BTCSPCC 608	Digital Image Processing Lab	0	0	2	30	20	50	1
BTCSPCC 609	Machine Learning Lab	0	0	2	30	20	50	1
BTCSPCC 610	Python Lab	0	0	2	30	20	50	1
BTCSPCC 611	Mobile Application Development Lab	0	0	2	30	20	50	1
BT CSSODE CA 612	Social Outreach, Discipline & Extra Curricular Activities						50	1
	TOTAL	21	2	8	330	570	950	26

BTCSESC 601: Digital Image Processing

UNIT I:

Introduction to Image Processing: Digital Image representation, Sampling & Quantization, Steps in image Processing, Image acquisition, color image representation.

UNIT II:

Image Transformation & Filtering: Intensity transform functions,histogram processing, Spatial filtering, Fourier transforms and its properties, frequency domain filters, colour models, Pseudocolouring, colour transforms, Basics of Wavelet Transforms

UNIT III:

Image Restoration: Image degradation and restoration process, Noise Models, Noise Filters, degradation function, Inverse Filtering, Homomorphism Filtering.

UNIT IV:

Image Compression: Coding redundancy, Interpixel redundancy, Psychovisual redundancy, Huffman Coding, Arithmetic coding, Lossy compression techniques, JPEG Compression.

UNIT V:

Image Segmentation & Representation: Point, Line and Edge Detection, Thresholding, Edge and Boundary linking, Hough transforms, Region Based Segmentation, Boundary representation, Boundary Descriptors.

REFERENCES /TEXT BOOK:

1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, "Digital Image Processing Using MATLAB", Third Edition Tata Mc Graw Hill Pvt. Ltd., 2011.
2. Rafael C. Gonzales, Richard E. Woods, "Digital Image Processing", Third Edition, Pearson Education, 2010.
3. Anil Jain K. "Fundamentals of Digital Image Processing", PHI Learning Pvt. Ltd., 2011.
4. Willliam K Pratt, "Digital Image Processing", John Willey, 2002.
5. Malay K. Pakhira, "Digital Image Processing and Pattern Recognition", First Edition, PHI Learning Pvt. Ltd., 2011.

BTCSPCC 602: Machine Learning

UNIT I:

Supervised learning algorithm: Introduction, types of learning, application, Supervised learning: Linear Regression Model, Naïve Bayes classifier Decision Tree, K nearest neighbor, Logistic Regression, Support Vector Machine, Random forest algorithm

UNIT II:

Unsupervised learning algorithm: Grouping unlabelled item susing k-means clustering, Hierarchical Clustering, Probabilistic clustering, Association rule mining, Apriori Algorithm, f-p growth algorithm, Gaussian mixture model.

UNIT III:

Introduction to Statistical Learning Theory, Feature extraction-Principal component analysis, Singular value decomposition. Feature selection–feature ranking and subset selection, filter, wrapper and embedded methods, Evaluating Machine Learning algorithms and Model Selection.

UNIT IV:

Semi supervised learning, Reinforcement learning : Markov decision process (MDP), Bellman equations, policy evaluation using Monte Carlo, Policy iteration and Value iteration, Q-Learning, State-Action-Reward-State-Action (SARSA), Model-based Reinforcement Learning.

UNIT V:

Recommended system, Collaborative filtering, Content-based filtering Artificial neural network, Perceptron, Multilayer network, Back propagation, Introduction to Deep learning.

Refrence/Text Books:

- Tom M Mitchell, Machine Learning, McGraw Hill Education
- Bishop, C. (2006). Pattern Recognition and Machine Learning. Berlin: Springer-Verlag.
- Duda, Richard, Peter Hart, and David Stork. Pattern Classification. 2nd ed. New York, NY: Wiley-Interscience, 2000. ISBN: 9780471056690.
- Bishop, Christopher. Neural Networks for Pattern Recognition. New York, NY: Oxford University Press, 1995. ISBN: 9780198538646.
- Introduction to MachineLearning - Ethem Alpaydin, MIT Press, Prentice hall of India.

BTCSPCC 603: Information Security System

UNIT I:

Introduction to security attacks: services and mechanism, classical encryption techniques-substitution ciphers and transposition ciphers, cryptanalysis, stream and block ciphers.

UNIT II:

Modern block ciphers: Block Cipher structure, Data Encryption standard (DES) with example, strength of DES, Design principles of block cipher, AES with structure, its transformation functions, key expansion, example and implementation. Multiple encryption and triple DES, Electronic Code Book, Cipher Block Chaining Mode, Cipher Feedback mode, Output Feedback mode, Counter mode.

UNIT III:

Public Key Cryptosystems with Applications: Requirements and Cryptanalysis, RSA cryptosystem, Rabin cryptosystem, Elgamal crypto system, Elliptic curve cryptosystem

UNIT IV:

Cryptographic Hash Functions, their applications: Simple hash functions, its requirements and security, Hash functions based on Cipher Block Chaining, Secure Hash Algorithm (SHA).Message Authentication Codes, its requirements and security, MACs based on Hash Functions, Macs based on Block Ciphers .Digital Signature, its properties, requirements and security, various digital signature schemes (Elgamal and Schnorr), NIST digital Signature algorithm.

UNIT V:

Key management and distribution: symmetric key distribution using symmetric and asymmetric encryptions, distribution of public keys, X.509 certificates, Public key infrastructure. Remote user authentication with symmetric and asymmetric encryption, Kerberos Web Security threats and approaches, SSL architecture and protocol, Transport layer security, HTTPS and SSH

Text/ Reference Books:

- Stalling Williams: Cryptography and Network Security: Principles and Practices, 4th Edition, Pearson Education, 2006.
- Kaufman Charlie et.al; Network Security: Private Communication in a Public World, 2nd Ed., PHI/Pearson.
- Pieprzyk Josef and et.al; Fundamentals of Computer Security, Springer-Verlag, 2008.
- Trappe & Washington, Introduction to Cryptography, 2nd Ed. Pearson.

BTCSPCC 604: Computer Architecture and Organization

UNIT I:

Computer Data Representation: Basic computer data types, Complements, Fixed point representation, Register Transfer and Micro-operations: Floating point representation, Register Transfer language, Register Transfer, Bus and Memory Transfers (Tree-State Bus Buffers, Memory Transfer), Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic logical shift unit. Basic Computer Organization and Design Instruction codes, Computer registers, computer instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions, Input-output and interrupt, Complete computer description, Design of Basic computer, design of Accumulator Unit

UNIT II:

Programming The Basic Computer: Introduction, Machine Language, Assembly Language, assembler, Program loops, Programming Arithmetic and logic operations, subroutines, I-O Programming. Micro programmed Control: Control Memory, Address sequencing, Micro program Example, design of control

UNIT III:

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction format, Addressing Modes, data transfer and manipulation, Program Control, Reduced Instruction Set Computer (RISC) Pipeline And Vector Processing, Flynn's taxonomy,

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction, Pipeline, RISC Pipeline, Vector Processing, Array Processors

UNIT IV:

Computer Arithmetic: Introduction, Addition and subtraction, Multiplication Algorithms (Booth Multiplication Algorithm), Division Algorithms, Floating Point Arithmetic operations, Decimal Arithmetic Unit. Input-Output Organization, Input-Output Interface, Asynchronous Data Transfer, Modes Of Transfer, Priority Interrupt, DMA, Input-Output Processor (IOP), CPU IOP Communication, Serial communication

UNIT V:

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory. Multiprocessors: Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Arbitration, Inter-processor Communication and Synchronization, Cache Coherence, Shared Memory Multiprocessors.

Text & References books:

1. Computer Organization and Architecture - William Stallings (Pearson Education Asia)
2. Computer Organization and Architecture -John P. Hayes (McGraw-Hill)
3. Computer Organization -V. Carl. Hamsacher (McGraw-Hill)
4. Computer System Architecture-M. Morris Mano (PHI)

BTCSCPCC 605: Artificial Intelligence

UNIT I:

Introduction to AI and Intelligent agent: Different Approach of AI, Problem Solving : Solving Problems by Searching, Uninformed search, BFS, DFS, Iterative deepening, Bi directional search, Hill climbing, Informed search techniques: heuristic, Greedy search, A* search, AO* search, constraint satisfaction problems.

UNIT II:

Game Playing: Minimax, alpha-beta pruning, jug problem, chess problem, tiles problem

UNIT III:

Knowledge and Reasoning: Building a Knowledge Base: Propositional logic, first order logic, situation calculus. Theorem Proving in First Order Logic. Planning, partial order planning. Uncertain Knowledge and Reasoning, Probabilities, Bayesian Networks

UNIT IV:

Learning: Overview of different forms of learning, Supervised base learning: Learning Decision Trees, SVM, Unsupervised based learning, Market Basket Analysis, Neural Networks.

UNIT V:

Introduction to Natural Language Processing: Different issue involved in NLP, Expert System, Robotics.

Text/ Reference Books:
- E.Rich,K Knight-Artificial Intelligence,Tata McGraw Hills.
- S.Russell,P.Norving-Artificial Intelligence-A Modern Approach,Pearson Education,Asia.
- Thomas Dean-Artificial Intelligence-Theory & Practice,Pearson Education,Asia.
- Alison Caursey - The Essence of Artificial Intelligence, Pearson Education, Asia.

BTCSPCC 606: Cloud Computing

UNIT I:

Introduction: Objective, scope and outcome of the course. Introduction Cloud Computing: Nutshell of cloud computing, Enabling Technology, Historical development, Vision, feature Characteristics and components of Cloud Computing. Challenges ,Risks and Approaches of Migration into Cloud. Ethical Issue in Cloud Computing, Evaluating the Cloud's Business Impact and economics, Future of the cloud. Networking Support for Cloud Computing. Ubiquitous Cloud and the Internet of Things

UNIT II:

Cloud Computing Architecture: Cloud Reference Model, Layer and Types of Clouds, Services models, Data centre Design and inter connection Network, Architectural design of Compute and Storage Clouds. Cloud Programming and Software: Fractures of cloud programming, Parallel and distributed programming paradigms-Map Reduce, Had oop, High level Language for Cloud. Programming of Google App engine.

UNIT III:

Virtualization Technology: Definition, Understanding andBenefits of Virtualization. Implementation Level of Virtualization, Virtualization Structure/Tools and Mechanisms, Hypervisor VMware, KVM, Xen. Virtualization: of CPU, Memory, I/O Devices,Virtual Cluster and Resources Management, Virtualization of Server, Desktop, Network, and Virtualization of data-centre

UNIT IV:

Securing the Cloud: Cloud Information security fundamentals, Cloud security services, Design principles, Policy Implementation, Cloud Computing Security Challenges, Cloud Computing Security Architecture . Legal issues in cloud Computing. Data Security in Cloud: Business Continuity and Disaster Recovery , Risk Mitigation, Understanding and Identification of Threats in Cloud, SLA-Service Level Agreements, Trust Management

UNIT V:

Cloud Platforms in Industry: Amazon web services , Google App Engine, Microsoft Azure Design, Aneka: Cloud Application Platform-Integration of Private and Public Clouds Cloud applications: Protein structure prediction, Data Analysis, Satellite Image Processing, CRM

Text/ Reference Books:

- " Distributed and Cloud Computing " By Kai Hawang , Geofrey C.Fox, Jack J. Dongarra Pub: Elservier
- Cloud Computing ,Principal and Paradigms, Edited By Rajkumar Buyya, Jemes Broberg, A. Goscinski,
- Pub.- Wiley
- Kumar Saurabh, "Cloud Computing" , Wiley Pub
- Krutz , Vines, "Cloud Security " , Wiley Pub
- Velte, "Cloud Computing- A Practical Approach" ,TMH Pub

BTCSPEC 607A: Distributed System

UNIT I:

Distributed Systems :Features of distributed systems, nodes of a distributed system, Distributed computation paradigms, Model ofdistributed systems, Types of Operating systems: Centralized Operating System, Network Operating Systems, Distributed Operating Systems and Cooperative Autonomous Systems, design issues in distributed operating systems. Systems Concepts and Architectures: Goals, Transparency, Services, Architecture Models, Distributed Computing Environment (DCE).Theoretical issues in distributed systems: Notions of time and state, states and events in a distributed system, time, clocks and event precedence, recording the state of distributed systems.

UNIT II:

Concurrent Processes and Programming: Processes and Threads, Graph Models for Process Representation, Client/Server Model, Time Services, Language Mechanisms for Synchronization, Object Model Resource Servers, Characteristics of Concurrent Programming Languages (Languagenot included).Inter-process Communication and Coordination: MessagePassing, Request/Reply and Transaction Communication, Name and Directory services, RPC and RMI case studies

UNIT III:

Distributed Process Scheduling:A System Performance Model, StaticProcess Scheduling with Communication, Dynamic Load Sharing andBalancing, Distributed Process Implementation. Distributed File Systems:Transparencies and Characteristics of DFS, DFS Design

andimplementation, Transaction Service and Concurrency Control, Data andFile Replication. Case studies: Sun network file systems, General Parallelfile System and Window's file systems. Andrew and Coda File Systems

UNIT IV:

Distributed Shared Memory: Non-Uniform Memory Access Architectures, Memory Consistency Models, Multiprocessor Cache Systems, Distributed Shared Memory, Implementation of DSM systems. Models of Distributed Computation: Preliminaries, Causality, Distributed Snapshots, Modelling a Distributed Computation, Failures in a Distributed System, Distributed Mutual Exclusion, Election, Distributed Deadlock handling, and Distributed termination detection.

UNIT V:

Distributed Agreement: Concept of Faults, failure and recovery, Byzantine Faults, Adversaries, Byzantine Agreement, Impossibility of Consensus and Randomized Distributed Agreement. Replicated Data Management: concepts and issues, Database Techniques, Atomic Multicast, and Update Propagation. CORBA case study: Introduction, Architecture, CORBA RMI, CORBA Services

Reference/Text Books:

1. Tannenbaum, A, Van Steen. Distributed Systems, Principles and Paradigm, Prentice Hall India, 2002
2. Tannenbaum, A. Distributed Operating Systems, Pearson Education. 2006
3. Attiya, Welch, "Distributed Computing", Wiley India, 2006
4. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, "Introduction to parallel computing", 2nd Edition, Pearson Education, 2007

BTCSPEC 607B: Software Defined Network

UNIT I:

History and Evolution of Software Defined Networking (SDN):Separation of Control Plane and Data Plane, IETF Forces, Active Networking. Control and Data Plane Separation: Concepts, Advantages and Disadvantages, the Open Flow protocol..

UNIT II:

033Network Virtualization: Concepts, Applications, Existing Network Virtualization Framework (VMWare and others), Mininet based examples. Control Plane: Overview, Existing SDN Controllers including Floodlight and Open Daylight projects

UNIT III:

054Customization of Control Plane: Switching and Firewall Implementation using SDN Concepts. Data Plane: Software-based and Hardware-based; Programmable Network Hardware..

UNIT IV:

075Programming SDNs: Northbound Application Programming Interface, Current Languages and Tools, Composition of SDNs. Network Functions Virtualization (NFV) and Software Defined Networks: Concepts, Implementation and Applications

UNIT V:

076DataCenter Networks: Packet, Optical and Wireless Architectures, Network Topologies.Use Cases of SDNs: Data Centers, Internet Exchange Points, Backbone Networks, Home Networks, Traffic Engineering. Programming Assignments forimplementing some of the theoretical concepts listed above.

References /Text Books:

1. Paul Goransson and Chuck Black, Software Defined Networks: A Comprehensive Approach, First Edition, Morgan Kaufmann, 2014.
2. Thomas D. Nadeau, Ken Gray, SDN: Software Defined Networks, OReilly Media, 2013
3. Siamak Azodolmolky, Software Defined Networking with Open Flow, Packet Publishing, 2013.
4. Vivek Tiwari, SDN and Open Flow for Beginnersll, Amazon Digital Services, Inc., 2013.
5. Fei Hu, Editor, Network Innovation through Open Flow and SDN: Principles and Design, CRC Press, 2014.

BTCSPEC607C: Ecommerce & ERP

UNIT I:

Introduction to E-Commerce:Defining Commerce; Main Activities of Electronic Commerce; Benefits of E-Commerce; Broad Goals of ElectronicCommerce; Main Components of E-Commerce; Functions of ElectronicCommerce–Communication, Process Management, Service Management,Transaction Capabilities; Process of E-Commerce; Types of E-Commerce;Role of Internet and Web in E-Commerce; Technologies Used; E-Commerce Systems; Pre-requisites of E-Commerce; Scope of E-Commerce; E-Business Models.

UNIT II:

E-Commerce Activities:VariousActivities of E-Commerce; VariousModes of Operation Associated with E-Commerce; Matrix of E-CommerceTypes; Elements and Resources Impacting E-Commerce and Changes;Types of E-Commerce Providers and Vendors; Man Power Associated withE-Commerce Activities; Opportunity Development for E-CommerceStages; Development of E-Commerce Business Case; Components andFactors for the Development of the Business Case; Steps to Design andDevelop an E-Commerce Website.

UNIT III:

Internet–The Backbone for E-Commerce:Early Ages of Internet;Networking Categories; Characteristics of Internet; Components ofInternet–Internet Services, Elements of Internet, Uniform ResourceLocators, Internet Protocol; Shopping Cart, Cookies and E-Commerce;Web Site Communication; StrategicCapabilities of Internet.

UNIT IV:

SP, WWW and Portals:Internet Service Provider (ISP); World Wide Web(WWW); Portals–Steps to build homepage, Metadata; Advantages ofPortal; Enterprise Information Portal (EIP).E-Commerce & OnlinePublishing:This unit explains the concept of online publishing, strategiesand approaches of online publishing, and online advertising

UNIT V:

XML and Data Warehousing: Definition of eXtensible MarkupLanguage(XML); XML Development Goals; Comparison between HTML and XML;Business importance in using XML Based Technology; Advantages, Disadvantages and Applications of XML; Structure of an XML Document; XHTML and X/Secure; Data Warehousing; Data Marts and OperationalData Stores.E-Marketing:Traditional Marketing; E-Marketing; Identifying WebPresence Goals–Achieving web presence goals, Uniqueness of the web,Meeting the needs of website visitors, Site Adhesion: Content, format and access; Maintaininga Website; Metrics Defining Internet Units of Measurement; Online Marketing; Advantages of Online Marketing.

Refrence/Text Books:

1. A. Lexis Leon, "Enterprise Resource Planning", TMH
2. Brady, Manu, Wegner, "Enterprise Resource Planning", TMH

BTCSPCC 608: Digital Image Processing Lab

Course Objective:

- To work effectively alone or as a member of a small group working on some programming tasks.
- To prepare and deliver coherent and structured verbal and written technical reports
- To use laboratory equipment effectively.

List of Experiments

1. Point-to-point transformation. This laboratory experiment provides for thresholding an image and the evaluation of its histogram. Histogram equalization. This experiment illustrates the relationship among the intensities (gray levels) of an image and its histogram.
2. Geometric transformations. This experiment shows image rotation, scaling, and translation. Two-dimensional Fourier transform
3. Linear filtering using convolution. Highly selective filters.
4. Ideal filters in the frequency domain. Non Linear filtering using convolutional masks. Edge detection. This experiment enables students to understand the concept of edge detectors and their operation in noisy images.
5. Morphological operations: This experiment is intended so students can appreciate the effect of morphological operations using a small structuring element on simple binary images. The operations that can be performed are erosion, dilation, opening, closing, open-close, close-open.

BTCSPCC 609: Machine Learning Lab

List of Experiments

1. Implement and demonstrate the FIND-Salgorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.

2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.

3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample

4. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets

5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.

6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.

7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.

8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

9. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.

10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

List of Experiments

1. Write a program to demonstrate basic data type in python.

2. Write a program to compute distance between two points taking input from the user Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

3. Write a Program for checking whether the given number is an even number or not. Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . , 1/10

4. Write a Program to demonstrate list and tuple in python. Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

5. Find the sum of all the primes below two million. By considering the terms in the Fibonacci sequence whose values do not exceed four million, WAP to find the sum of the even-valued

terms.

6. Write a program to count the numbers of characters in the string and store them in a dictionary data structure Write a program to use split and join methods in the string and trace a birthday of a person with a dictionary data structure

7. Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file? Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?

8. Write a program to print each line of a file in reverse order. Write a program to compute the number of characters, words and lines in a file.

9. Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on. Write function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

10. Write a program to implement Merge sort. Write a program to implement Selection sort, Insertion sort.

BTCSPCC 611: Mobile Application Development Lab

List of Experiments
1. To study Android Studio and android studio installation. Create "Hello World" application.
2. To understand Activity, Intent, Create sample application with login module.(Check username and password).
3. Design simple GUI application with activity and intents e.g. calculator.
4. Develop an application that makes use of RSS Feed.
5. Write an application that draws basic graphical primitives on the screen
6. Create an android app for database creation using SQLite Database.
7. Develop a native application that uses GPS location information
8. Implement an application that writes data to the SD card.
9. Design a gaming application
10. Create an application to handle images and videos according to size.

BTCSSODECA 612: Social Outreach, Discipline & Extra Curricular Activities

Semester –VII

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
BTCSPCC 701	Internet of Things	3	1	-	30	70	100	4
ELECTIVE SUBJECT								
BTCSOE 702A	Principle of Electronic Communication	3	1	0	30	70	100	4
BTCSOE 702B	Micro and Smart System Technology	3	1	0	30	70	100	4
BTCSOE 702C	Optimization Techniques	3	1	0	30	70	100	4
LABS								
BTCSPCC 703	Internet of Things Lab	0	0	2	30	20	50	1
BTCSPCC 704	Cyber Security Lab	0	0	2	30	20	50	1
BTCSPSIT 705	Industrial Training	0	0	2	30	20	50	1
BTCSPSIT 706	Seminar	0	0	2	30	20	50	1
BTCSSODE CA 707	Social Outreach, Discipline & Extra Curricular Activities						50	1
	TOTAL	6	2	8	180	220	450	13

BTCSPCC 701: Internet of Things

UNIT-1 Introduction: Objective, scope and outcome of the course.

UNIT-2 Introduction to IoT: Definition and characteristics of IoT, Design of IOT: Physical design of IOT, Logical Design of IOT- Functional Blocks, communication models, communication APIs, IOT enabling Technologies- Wireless Sensor Networks, Cloud computing, big data analytics, embedded systems. IOT Levels and deployment templates.

UNIT-3 IoT Hardware and Software: Sensor and actuator, Humidity sensors, Ultrasonic sensor, Temperature Sensor, Arduino, Raspberry Pi, LiteOS, RIoTOS, Contiki OS, Tiny OS.

UNIT-4 Architecture and Reference Model: Introduction, Reference Model and architecture, Representational State Transfer (REST) architectural style, Uniform Resource Identifiers (URIs). Challenges in IoT- Design challenges, Development challenges, Security challenges, Other challenges.

UNIT-5 IOT and M2M: M2M, Difference and similarities between IOT and M2M, Software defined networks, network function virtualization, difference between SDN and NFV for IoT. Case study of IoT Applications: Domain specific IOTs- Home automation, Cities, environment, Energy, Retail, Logistics, Agriculture, Industry, Health and Lifestyles.

REFERENCE BOOKS:

1. Adrian McEwen, "Designing the Internet of Things", Wiley Publishers, 2013, ISBN: 978-1-118-43062-0 2. Daniel Kellmereit, "The Silent Intelligence: The Internet of Things". 2013, ISBN 0989973700

BTCSOE 702A : Principle of Electronic Communication

UNIT-1 Introduction: Objective, scope and outcome of the course.

UNIT-2 Introduction: Need for Modulation, Frequency translation, Electromagnetic spectrum, Gain, Attenuation and decibels. Simple description on Modulation: Analog Modulation-AM, Frequency modulation-FM, Pulse Modulation-PAM, PWM, PCM, Digital Modulation Techniques-ASK, FSK, PSK, QPSK modulation and demodulation schemes.

UNIT-3 Telecommunication Systems: Telephones Telephone system, Paging systems, Internet, Telephony. Networking and Local Area Networks: Network fundamentals, LAN hardware, Ethernet LANs, Token Ring LAN.

UNIT-4 Satellite Communication: Satellite Orbits, satellite communication systems, satellite subsystems, Ground Stations Satellite Applications, Global Positioning systems. Optical Communication: Optical Principles, Optical Communication Systems, Fiber –Optic Cables, Optical Transmitters & Receivers, Wavelength Division Multiplexing.

UNIT-5 Cellular and Mobile Communications: Cellular telephone systems, AMPS, GSM, CDMA and WCDMA. Wireless Technologies: Wireless LAN, PANs and Bluetooth, Zig Bee and Mesh Wireless networks,

Text/Reference Books:

1. Principles of Electronic Communication Systems, Louis E. Frenzel, 3e, McGrawHill publications, 2008.

2. Electronic Communications systems, Kennedy, Davis 4e, MC GRAW HILL EDUCATION, 1999

3. Theodore Rapp port, Wireless Communications - Principles and practice, Prentice Hall, 2002.

4. Haykin S., "Communications Systems", John Wiley and Sons, 2001.

5. Roger L. Freeman, Fundamentals of Telecommunications, 2e, Wiley publications.

6. Introduction to data communications and networking, Wayne Tomasi, Pearson Education, 2005.

7. Taub H. and Schilling D.L, "Principles of Communication Systems" Tata McGraw Hill, 2001

BTCSOE 702B: Micro and Smart System Technology

UNIT-1 Introduction: Objective, scope and outcome of the course.

UNIT-2 INTRODUCTION TO MICRO AND SMART SYSTEMS: (a) Smart-material systems- History, Introduction and evolution of smart materials, structures and systems. Components of a smart system. Application areas. Commercial products. (b) Microsystems-Introduction, History and their evolution, Feynman's vision. Micromachined transducers. Evolution of micro-manufacturing. Multi-disciplinary aspects. Applications areas. Commercial products.

UNIT-3 MICRO AND SMART DEVICES AND SYSTEMS: PRINCIPLES AND MATERIALS: a) Definitions and salient features of sensors, actuators, and systems. b) Sensors: silicon capacitive accelerometer, piezo-resistive pressure sensor, blood analyzer, conductometric gas sensor, fiber-optic gyroscope and surface-acoustic-wave based wireless strain sensor. c) Actuators: silicon micro-mirror arrays, piezo-electric based inkjet print head, electrostatic comb-drive and micromotor, magnetic micro relay, shape memory-alloy based actuator, electro-thermal actuator. d) Systems: micro gas turbine, portable clinical analyzer, active noise control in a helicopter cabin.

UNIT-4 MICROMANUFACTURING AND MATERIAL PROCESSING: a. Silicon wafer processing, lithography, thin-film deposition, etching (wet and dry), wafer-bonding, and metallization. b. Silicon micromachining: surface, bulk, moulding, bonding based process flows. c. Thick-film processing: d. Smart material processing: e. Processing of other materials: ceramics, polymers and metals f. Emerging trends.

UNIT-5 MODELING: a. Scaling issues. b. Elastic deformation and stress analysis of beams and plates. Residual stresses and stress gradients. Thermal loading. Heat transfer issues. Basic fluids issues. c. Electrostatics. Coupled electromechanics. Electromagnetic actuation. Capillary electro-phoresis. Piezoresistive modeling. Piezoelectric modeling. Magnetostrictive actuators.

UNIT-6 INTEGRATION AND PACKAGING OF MICROELECTRO MECHANICAL SYSTEMS: Integration of microelectronics and micro devices at wafer and chip levels. Microelectronic packaging: wire and ball bonding, flip-chip. Low temperature-cofired-ceramic (LTCC) multi-chip-module technology. Microsystem packaging examples. Examples from smart systems and micromachined accelerometer or a thermal cycler BEL pressure sensor, thermal cycler for DNA amplification, and active vibration control of a beam

Text/Reference Books:

1. MEMS & Microsystems: Design and Manufacture, Tai-Ran Tsu,Tata Mc- Graw-Hill.

2. "Micro and Smart Systems" by Dr. A.K.Aatre, Prof. Ananth Suresh, Prof.K.J.Vinoy, Prof. S. Gopalakrishna,, Prof.K.N.Bhat., John Wiley Publications.

3. Microsystems Design, S. D. Senturia, 2001, Kluwer Academic Publishers, Boston, USA. ISBN 0-7923-7246-8.

4. Analysis and Design Principles of MEMS Devices, Minhang Bao, Elsevier, Amsterdam, The Netherlands, ISBN 0-444-51616-6.

5. Design and Development Methodologies, Smart Material Systems and MEMS: V. Varadan, K. J. Vinoy, S. Gopalakrishnan, Wiley.

6. MEMS- Nitaigour Premchand Mahalik, The Mc-GrawHill 2007.

BTCSOE 702C: Optimization Techniques

UNIT-1 Introduction Objective, scope and outcome of the course.

UNIT-2 Introduction and Classification Basic concept of optimization, Mathematical formulation of optimization problems; applications of optimization in chemical engineering. Classification of Optimization Problems - single variable problems, Multivariable problems without constraints, Multivariable problems with constraints, Maximization and minimization problems. Single Variable Optimization Necessary and sufficient conditions for optimum; interpolation method quadratic. Region elimination methods-internal halving, Fibonacci.

UNIT-3 Multivariable Optimization Optimization of Functions One Dimensional Search: Analytical Methods: classification, stationary points, direct substitution, constrained variation, penalty function, Lagrangian Multiplier, Kuhn-Tucker theorem. Numerical methods general principles of numerical search, direction of search, final stage in search, direct search, pattern search.

UNIT-4 Other Optimization Technics Introduction to geometric, dynamic and integer programming and genetic algorithms. Application of Geometric Programming: chemical engineering problems with degree of difficulty equal to zero or one with constraints.

UNIT-5 Applications of Optimization Optimization of staged and discrete processes. Optimal shell-tube heat exchanger design. Optimal pipe diameter.

Text/Reference Books:

1. Hiller and Lieberman, Introduction to Operation Research (Seventh Edition) Tata McGrawHill Publishing Company Ltd

2. Ravindren Philips and Solberg, Operation Research Principles and Practice (Second Edition) John Wiley & Sons.

List of Exercises

1 Start Raspberry Pi and try various Linix commands in command terminal window:

ls, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc.

2 Run some python programs on Pi like:

a) Read your name and print Hello message with name

b) Read two numbers and print their sum, difference, product and division.

c) Word and character count of a given string.

d) Area of a given shape (rectangle, triangle and circle) reading shape and appropriate values from standard input.

3 Run some python programs on Pi like:

a) Print a name 'n' times, where name and n are read from standard input, using for and while loops.

b) Handle Divided by Zero Exception.

c) Print current time for 10 times with an interval of 10 seconds.

d) Read a file line by line and print the word count of each line.

4 a) Light an LED through Python program

b) Get input from two switches and switch on corresponding LEDs

c) Flash an LED at a given on time and off time cycle, where the two times are taken from a file.

5 a) Flash an LED based on cron output (acts as an alarm)

b) Switch on a relay at a given time using cron, where the relay's contact terminals are connected to a load.

c) Get the status of a bulb at a remote place (on the LAN) through web.

6 The student should have hands on experience in using various sensors like temperature, humidity, smoke, light, etc. and should be able to use control web camera, network, and relays connected to the Pi.

BTCSPCC 704: Cyber Security Lab

List of Exercises

1 Implement the following Substitution & Transposition Techniques concepts:

a) Caesar Cipherb) Rail fence row & Column Transformation

2 Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript. Consider the end user as one of the parties (Alice) and the JavaScript application as other party (bob).

3 Implement the following Attack:

a) Dictionary Attack b) Brute Force Attack

4 Installation of Wire shark, tcpdump, etc and observe data transferred in client server communication using UDP/TCP and identify the UDP/TCP datagram.

5 Installation of rootkits and study about the variety of options.

6 Perform an Experiment to Sniff Traffic using ARP Poisoning.

7 Demonstrate intrusion detection systems using any tool (snort or any other s/w).

8 Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures.

PROJECT: In a small area location such as a house, office or in a classroom, there is a small network called a Local Area Network (LAN). The project aims to transfer a file peer-to-peer from one computer to another computer in the same LAN. It provides the necessary authentication for file transferring in the network transmission. By implementing the Server-Client technology, use a File Transfer Protocol mechanism and through socket programming, the end user is able to send and receive the encrypted and decrypted file in the LAN. An additional aim of the project is to transfer a file between computers securely in LANs. Elements of security are needed in the project because securing the files is an important task, which ensures files are not captured or altered by anyone on the same network. Whenever you transmit files over a network, there is a good chance your data will be encrypted by encryption technique.

Any algorithm like AES is used to encrypt the file that needs to transfer to another computer. The encrypted file is then sent to a receiver computer and will need to be decrypted before the user can open the file.

BTCSPSIT 705: Industrial Training

BTCSPSIT 706: Seminar

BTCSSODECA 707: Social Outreach, Discipline & Extra Curricular Activities

Semester –VIII

THEORY PAPERS		No. of Teaching Hours			Marks Allocation			
Code	Subject/Paper	L	T	P	IA	EA	Total	Credits
BTCSPCC 801	Big Data Analytics	3	-	-	30	70	100	3
ELECTIVE SUBJECT								
BTCSOE 802A	Soft Computing	3	0	0	30	70	100	3
BTCSOE 802B	Robotics and Control	3	0	0	30	70	100	3
BTCSOE 802C	Simulation Modeling and Analysis	3	0	0	30	70	100	3
LABS								
BTCSPCC 803	Big Data Analytics Lab	0	0	2	30	20	50	1
BTCSPCC 804	Software Testing and Validation Lab	0	0	2	30	20	50	1
BTCSPSIT 805	Project	0	0	0	120	80	200	4
BTCSSODE CA 806	Social Outreach, Discipline &Extra Curricular Activities						50	1
	TOTAL	6	0	4	240	260	550	13

BTCSPCC 801: Big Data Analytics

UNIT-1

Introduction to Big Data: Big data features and challenges, Problems with Traditional Large-Scale System , Sources of Big Data, 3 V's of Big Data, Types of Data. Working with Big Data: Google File System. Hadoop Distributed File System (HDFS) - Building blocks of Hadoop (Namenode. Data node. Secondary Namenode. Job Tracker. Task Tracker), Introducing and Configuring Hadoop cluster (Local. Pseudodistributed mode, Fully Distributed mode). Configuring XML files.

UNIT-2

Writing MapReduce Programs: A Weather Dataset. Understanding Hadoop API for MapReduce Framework (Old and New). Basic programs of Hadoop MapReduce: Driver code. Mapper code, Reducer code. Record Reader, Combiner, Partitioner.

UNIT-3

Hadoop I/O: The Writable Interface. Writable Comparable and comparators. Writable Classes: Writable wrappers for Java primitives. Text. Bytes Writable. Null Writable, Object Writable and Generic Writable. Writable collections. Implementing a Custom Writable: Implementing a Raw Comparator for speed, Custom comparators.

UNIT-4

Pig:Hadoop Programming Made Easier Admiring the Pig Architecture, Going with the Pig Latin Application Flow. Working through the ABCs of Pig Latin. Evaluating Local and Distributed Modes of Running Pig Scripts, Checking out the Pig Script Interfaces, Scripting with Pig Latin.

UNIT-5

Applying Structure to Hadoop Data with Hive: Saying Hello to Hive, Seeing How the Hive is Put Together, Getting Started with Apache Hive. Examining the Hive Clients. Working with Hive Data Types. Creating and Managing Databases and Tables, Seeing How the Hive Data Manipulation Language Works, Querying and Analyzing Data.

References :

1. "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data" by EMC Education Services
2. "Big Data: Does Size Matter?" by Timandra Harkness
3. "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses" by Michael Minelli

.

Unit-1 INTRODUCTION TO SOFT COMPUTING:

Aims of Soft Computing-Foundations of Fuzzy Sets Theory-BasicConcepts and Properties of Fuzzy Sets-Elements of Fuzzy Mathematics-Fuzzy Relations-Fuzzy Logic

Unit-2 APPLICATION OF FUZZY SETS:

Applications of Fuzzy Sets-FuzzyModeling–Fuzzy DecisionMaking-Pattern Analysis and Classification-Fuzzy ControlSystems-Fuzzy Information Processing-Fuzzy Robotics.

Unit-3

ARTIFICIAL NEURAL NETWORKS:Artificial Neural Networks-Models of Neuron-Architecture of FeedForward Neural Networks, Recurrent Neural Networks-Learningmethods-supervised and unsupervised learning-Time DelayNeural Networks-Radial Basis Function Neural Networks-Adaptive Resonance Theory (ART) Neural Networks-AssociativeNeural Memory Models-Application of ANN

Unit-4

GENETIC ALGORITHMS:

Main Operators-Genetic Algorithm Based Optimization-Principleof Genetic Algorithm-Genetic Algorithm with Directed Mutation-Comparison of Conventional and Genetic Search Algorithms-Issues of GA in practical implementation.Introduction to Particleswarm optimization-PSO operators-GA and PSO in engineeringapplications

Unit-5

NEURO-FUZZY TECHNOLOGY:

Fuzzy Neural Networks and their learning-Architecture of Neuro-Fuzzy Systems-Generation of Fuzzy Rules and membershipfunctions-Fuzzification and Defuzzyfication in Neuro-FuzzySystems-Neuro-Fuzzy Identification-Neuro Fuzzy Control-Combination of Genetic Algorithm with Neural Networks-Combination of Genetic Algorithms and Fuzzy Logic-Neuro-Fuzzyand Genetic Approach in engineering applications.

PROGRAMMING USING MATLAB:Using Neural Network toolbox–Using Fuzzy Logic toolbox-UsingGenetic Algorithm & directed search toolbox.

TEXT BOOKS:

1. Sivanandam.S.N, Deepa.S.N, "Principles of soft computing",2nd Edition,Wiley India Pvt Limited, 2011

.2. Juh Shing Roger Jang, Cheun Tsai Sun, Eiji Mizutani, "Neuro fuzzy andsoft computing", Prentice Hall, 1997.

REFERENCES:

1. Aliev,R.A, Aliev,R.R, "Soft Computing and its Application", WorldScientific Publishing Co. Pvt. Ltd., 2001.

2. Mehrotra.K, Mohan.C.K, Ranka.S, "Elements of Artificial NeuralNetworks", The MIT Press, 1997.

3. Juh Shing Roger Jang,Cheun Tsai Sun,Eiji Mizutani, "Neuro fuzzy andsoft computing", Prentice Hall, 1997.

4. Ronald R.Yager, Lofti Zadeh, "An Introduction to fuzzy logic applicationsin intelligent Systems", Kluwer Academic, 1992.

5. Cordón.O, Herrera.F, Hoffman.F, Magdalena.L "Genetic Fuzzy systems", WorldScientific Publishing Co. Pvt. Ltd., 2001.

BTCSOE 802B: Robotics and control

Unit-1

Introduction:

Introduction to control problem-Industrial Control examples.Transfer function. System response. Control hardware and their models: potentiometers, synchros, LVDT, dc and acservo motors, tacho-generators, electro hydraulic valves, hydraulic servomotors, electropneumatic valves, pneumatic actuators. Closed-loop systems. Blockdiagram and signal flow graph analysis. Stability, steady-state accuracy,transient accuracy, disturbance rejection, insensitivity and robustness.proportional, integral and derivative systems. Feedforward and multi-loop control configurations, stability concept, relative stability, Routhstability criterion

Unit-2

Time response of second-order systems-steady-state errors and errorconstants. Performance specifications in time-domain. Lead and lagcompensation.Frequency-response analysis-Polar plots, Bode plot, stability infrequency domain, Nyquist plots. Nyquist stability criterion. Performance specifications in frequency-domain.. Lead and Lag compensation.07

Unit-3

ROBOT ARM KINEMATICS: Introduction, The direct KinematicsProblem, Rotation Matrices, Composite Rotation Matrix, Rotation matrixabout an arbitrary axis, Rotation matrix with Euler anglerepresentation,Geometric interpretation of Homogeneous transformation matrices,composite homogeneous transformation matrix, Links joints and theirparameters. The Denavit Hartenberg representation. Kinematicequations for manipulators, Otherspecifications of the locations of theEnd-Effector, Classification of Manipulators, The inverse Kinematicsproblem, Inverse Transform Technique for Euler Angles Solution08

Unit-4

Planning of Manipulator Trajectories: Introduction, General considerations on Trajectory planning, joint-interpolated Trajectories, calculation of a 4-3-4 Joint trajectory, Cubic Spline Trajectory. Sensing: Range sensing, Triangulation, Structured Lighting Approach, Time-of-Flight range finders.

Proximity sensing, Inductive sensors, Hall effect sensors, Capacitive Sensors, Ultrasonic sensors, Optical Proximity Sensors, Touch sensors, Binary sensors, Analog sensors, Force and Torque sensing, Elements ofa Wrist sensor. LOW-LEVEL VISION: Image acquisition, illumination Techniques, imaging geometry, some basic transformations, perspective transformations. Higher-Level Vision: Segmentation, Edge Linking and Boundary detection,

Unit-5

Camera model, camera calibration, stereo imaging, some basicrelationships between pixels, Neighbours of a Pixel, connectivity,distance measures, Preprocessing, Spatial-Domain methods, Frequency-Domain methods, Smoothing, Enhancement, Edge detection,Thresholding.Thresholding. Region-oriented segmentation, the use of motion, description, Boundary descriptors, Regional descriptors.

Text/Reference Books:

1. Robotics control sensing Vision and Intelligence-K.S.Fu, R.C.Gonzalez,C.S.G. Lee, McGraw Hill, 1987.
2.Ogata, K., "Modern Control Engineering", Prentice Hall, secondedition,1991.
3.Introduction to Robotics Mechanics and control–John J. Craig,2nd Edition, Pearson education, 2003.
4.Nagrath&Gopal, "Modern Control Engineering", New Age International, NewDelhi
5.James G.Keramas, "Robot Technology Fundamentals",Cengage learning

BTCSOE 802C: Simulation Modeling and Analysis

Unit-1
Physicalmodeling:Conceptofsystemandenvironment,continuousanddiscretesystem,linearandnonlinearsystem,stochasticactivities,staticanddynamicmodels,principlesusedinmodeling,Basicsimulationmodeling,4Roleofsimulationinmodelevaluationandstudies,AdvantagesandDisadvantagesofsimulation.ModelingofSystems,iconicanalog.MathematicalModeling

Unit-2
Computersystemsimulation:Techniqueofsimulation,MonteCarlomethod,experimentalnatureofsimulation,numericalcomputationtechniques,continuoussystemmodels,analogandhybridsimulation,feedbacksystems4Buildingssimulationmodelsofwaitinglinesystem,Jobshop,materialhandlingandflexiblemanufacturingsystems.

Unit-3
Probability concepts in simulation: Stochastic variables, discrete and continuous probability functions mainly Normal, log normal, Weibull, exponential, Uniform, Poisson, Binomial, Triangular, Erlang etc.

Unit-3
RandomNumbers:Properties,Generationsmethods,TestsforRandomnumber-Frequencytest,Runstest,Autocorrelationtest.RandomVariateGeneration:InverseTransformTechni

que-
Exponential,Uniform,Weibull,Triangulardistributions,DirecttransformationforNormalandlognor malDistributions,convolutionmethods-Erlangdistribution, Acceptance Rejection Technique

Unit-4

Input Modeling: Data collection, Identification and distribution with data, parameter estimation, Goodness of fit tests, Selection of input models without data, Multivariate and time series analysis.Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis.

Unit-5

Output Analysis–Types of Simulations with Respect to Output Analysis, Stochastic Nature of outputdata,MeasuresofPerformanceandtheirestimation,Outputanalysisofterminatingsimulation,O utput   analysis   of   steady   state simulations.SelectionofSimulationSoftware,Simulationpackages,TrendinSimulation.   Do modeling using ARENA software which is freely available. Some more suggested simulation packages arePromodel, Quest, Witness, Extend, Simio etc. Students can learn

TEXTBOOK
1. Simulation Modeling and Analysis, Law A.M.,McGrawHill
REFERENCEBOOKS
1. Event System Simulation, Banks and Carsan, Prentice Hall of India

2. Simulation Modeling and Analysis with ARENA, Altiokand Melamed, Academic Press

3. Simulation with ARENA, Keltan, Sadowskiand Turrock, McGrawHil

4. Simulation Modeling and ARENA, Rossetti and Taha,John Wiley and Sons

5Systems Simulation with Digital Computer, Narsingh Deo, PHI Publication (EEE)

BTCSPCC 803: Big Data Analytics Lab

Lab Experiments:

1 Implement the following Data structures in Java i) Linked Lists ii) Stacks iii) Queues iv) Set v) Map

2 Perform setting up and Installing Hadoop in its three operating modes: Standalone, Pseudo distributed, Fully distributed.

3 Implement the following file management tasks in Hadoop:

- Adding files and directories

- Retrieving files

- Deleting files Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

4 Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

5 Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.

6 Implement Matrix Multiplication with Hadoop Map Reduce

7 Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

8 Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes.

9 Solve some real life big data problems.

BTCSPCC 804: Software Testing and Validation Lab

Lab Experiments

1 a) Write a program that calculates the area and perimeter of the circle. And find the Coverage & Test Cases of that program using JaButi Tool.

b) Write a program which read the first name and last name from console and matching with expected result by using JaBuTi.

c) Write a program that takes three double numbers from the java console representing , respectively, the three coefficients a,b, and c of a quadratic equation.

d) Write a program that reads commercial website URL from a url from file .you should expect that the URL starts with www and ends with .com. retrieve the name of the site and output it. For instance, if the user inputs www.yahoo.com, you should output yahoo. After that find the test cases and coverage using JaButi.

e) Write a program for a calculator and find the test case and coverage and Def-use-graph.

f) Write a program that reads two words representing passwords from the java console and outputs the number of character in the smaller of the two. For example, if the words are open and sesame, then the output should be 4, the length of the shorter word, open. And test this program using JaButi

2 Analyze the performance of following website using JMeter.

Site	Website	Type
Amazon	Amazon.com	shopping
Flip kart	Flipkart.com	shopping
Railway reservation	Irctc.co.in	Ticket booking site
Train searching	Erail.in	Train searching

3 Calculate the mutation score of programs given in 1(a) to 1 (f) using jumble Tool.

4 Calculate the coverage analysis of programs given in 1 (a) to 1 (f) using Eclemma Free open source Tool.

5 Generate Test sequences and validate using Selenium tool for given websites below:

Site	Website	Type
Amazon	Amazon.com	shopping
Flip kart	Flipkart.com	shopping
Railway reservation	Irctc.co.in	Ticket booking site
Train searching	Erail.in	Train searching

BTCSPSIT 805: PROJECT

BTCSSODECA 806: Social Outreach, Discipline & Extra Curricular Activities