Scheme & Syllabus for B.Tech (1st Year) according to Choice Based Credit System (CBCS)

(Semester I and Semester II)

For all branches
For Session 2018-19 onwards
(3rd batch onward)

School of Engineering & Technology

CENTRAL UNIVERSITY OF HARYANA
MAHENDERGARH-123031
HARYANA

Central University of Haryana, Mahendergarh

B.Tech. 1ST YEAR (SEMESTER – I) (Common for all branches)

S. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total Marks	Credits	Duration of Exam
			L	T	P		Theory	Practical			
1	BT HUM 101A	ENGLISH LANGUAGE SKILLS (Gr.-A)	2	0	0	30	70	0	100	2	3
2		MATHEMATICS-I	3	1		30	70	0	100	4	3
3	BT CH 102A	PHYSICS (Gr.-A) OR CHEMISTRY (Gr.-B)	3	1		30	70	0	100	4	3
4	BT EE 103A BT CSE104A	BASIC ELECTRICAL ENGINEERING (Gr.-A) OR PROGRAMMING FOR PROBLEM SOLVING (Gr.-B)	3 3	1 0		30 30	70 70	0 0	100 100	4 3	3
5	BT ME 105A BT ME106A	ENGINEERING GRAPHICS & DESIGN (Gr.-A) OR WORKSHOP/ MANUFACTURING PRACTICES (Gr.-B)	1	0	4	30	0	70	100	3	3
6	BT HUM107A	ENGLISH LANGUAGE LAB (Gr.-A)	0	0	2	30	0	70	100	1	3
7	BT CH108A	PHYSICS LAB (Gr.-A) OR CHEMISTRY LAB (Gr.-B)	0	0	3	30		70	100	1.5	3
8	BT EE 109A BT CSE 110A	BASIC ELECTRICAL ENGINEERING LAB(Gr.-A)/ OR PROGRAMMING FOR PROBLEM SOLVING LAB (Gr.-B)	0 0	0 0	2 4	30 30		70 70	100 100	1 2	3
Total		Gr.-A	12	3	10	240	280	280	800	20.5	
		Gr.-B	10	2	10	180	210	210	600	17.5	

MATHEMATICS AND PHYSICS COURSES FOR DIFFERENT BRANCHES

COURSE CODE	COURSE TITLE
MATHEMATICS –I	
BT MAT 111A	MATHEMATICS –I (For computer Science &Engg)
BT MAT 112A	MATHEMATICS –I (common for all branches except CSE)
PHYSICS and PHYSICS LAB (Any One Combination)	
BT PHY 113A BT PHY 114A	MECHANICS MECHANICS LAB (For CE)
BT PHY115A BT PHY116A	WAVES, OPTICS AND QUANTUM MECHANICS WAVES, OPTICS AND QUANTUM MECHANICS LAB (For EE&PPT)
BT PHY117A BT PHY118A	SEMICONDUCTOR PHYSICS SEMICONDUCTOR PHYSICS LAB (For CSE)

Note:

1. Every student has to participate in the MANDATORY INDUCTION PROGRAM OF THREE WEEK DURATION at the start of regular teaching of first semester. It comprises physical activity, creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept/ Branch & Innovations.
2. All the branches are to be divided into groups 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.

For CUH, Mahendergarh: GROUP (Gr.) A: CSE, CE. GROUP (Gr.) B: EE, PPT.

Central University of Haryana, Mahendergarh

B.Tech. 1ST YEAR (SEMESTER – I) (Common for all branches)

S. No.	Course Code	Course Title	Teaching Schedule L	T	P	Marks of Class work	Examination Marks Theory	Practical	Total Marks	Credits	Duration of Exam
1	BT HUM 101A	ENGLISH LANGUAGE SKILLS (Gr.-B)	2	0	0	30	70	0	100	2	3
2		MATHEMATICS-II	3	1		30	70	0	100	4	3
3	BT CH102A	PHYSICS (Gr.-B) OR CHEMISTRY (Gr.-A)	3	1		30	70	0	100	4	3
4	BT EE 103A	BASIC ELECTRICAL ENGINEERING (Gr.-B)	3	1		30	70	0	100	4	3
	BT CSE104A	OR PROGRAMMING FOR PROBLEM SOLVING (Gr.-A)	3	0		30	70	0	100	3	
5	BT ME 105A	ENGINEERING GRAPHICS & DESIGN (Gr.-B)	1	0	4	30	0	70	100	3	3
	BT ME 106A	OR WORKSHOP/ MANUFACTURING PRACTICES (Gr.-A)									
6	BT HUM 107A	ENGLISH LANGUAGE LAB (Gr.-B)	0	0	2	30	0	70	100	1	3
7	BT CH 108A	PHYSICS LAB (Gr.-B) OR CHEMISTRY LAB (Gr.-A)	0	0	3	30		70	100	1.5	3
8	BT EE109A	BASIC ELECTRICAL ENGINEERING LAB Gr.-B)	0	0	2	30		70	100	1	3
	BT CSE 110A	OR PROGRAMMING FOR PROBLEM SOLVING LAB (Gr.-A)	0	0	4	30		70	100	2	
Total		**Gr.-B**	**12**	**3**	**10**	**240**	**280**	**280**	**800**	**20.5**	
		Gr.-A	**10**	**2**	**10**	**180**	**210**	**210**	**600**	**17.5**	

MATHEMATICS AND PHYSICS COURSES FOR DIFFERENT BRANCHES

COURSE CODE	COURSE TITLE
MATHEMATICS –II	
BT MAT 119A	MATHEMATICS –II (For computer Science &Engg)
BT MAT120A	MATHEMATICS –II (common for all branches except CSE)
PHYSICS and PHYSICS LAB (Any One Combination)	
BT PHY 113A BT PHY 114A	MECHANICS MECHANICS LAB (For CE)
BT PHY 115A BT PHY 116A	WAVES, OPTICS AND QUANTUM MECHANICS WAVES ,OPTICS AND QUANTUM MECHANICS LAB (For EE&PPT)
BT PHY 117A BT PHY 118A	SEMICONDUCTOR PHYSICS SEMICONDUCTOR PHYSICS LAB (For CSE)

Note:

1. All the branches are to be divided into groups 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.
2. For CUH, Mahendergarh: GROUP (Gr.) A: CSE, CE. GROUP (Gr.) B: EE, PPT.

B. Tech. (Semester – I) Physics
(For Group-A at CUH, Mahendergarh)

Course Code	Branch Name	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
BT PHY 117A	CSE	Semiconductor Physics	3	1	-	30	70	-	100	4	3
BT PHY 113A	CE	Mechanics	3	1	-	30	70	-	100	4	3

B. Tech. (Semester – II) Physics

(For Group-B at CUH, Mahendergarh)

Course Code	Branch Name	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
BT PHY 115A	EE & PPT	Waves, Optics & Quantum Mechanics	3	1	-	30	70	-	100	4	3

B. Tech. (Semester – I) Physics Lab

(For Group-A at CUH, Mahendergarh)

Course Code	Branch Name	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
BT PHY 118A	CSE	Semiconductor Physics Lab	0	0	3	30	0	70	100	1.5	3
BT PHY 114A	CE	Mechanics Lab	0	0	3	30	-	70	100	1.5	3

B. Tech. (Semester – II) Physics Lab

(For Group-B at CUH, Mahendergarh)

Course Code	Branch Name	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
BT PHY 116A	EE & PPT	Wave, Optics & Quantum Mechanics Lab	0	0	3	30	-	70	100	1.5	3

B.Tech. Semester I/II (Common for All Branches)

Course Title: English Language Skills

Course Code: BT HUM 101A

Category : Humanities

L	T	P	Credits
2	0	0	2

Class Work	:	**30 Marks**
Examination	:	**70 Marks**
Total	:	**100 Marks**
Duration of Examination	:	**3 Hours**

Course objectives:

1. To equip students with English Language skills needed in academic and professional world
2. To make students technically proficient in handling language skills required for competitive exams.
3. To inculcate human/ethical values in the students to ensure their holistic development
4. To develop ability to critically read the literary texts

Course outcomes:

The students will be able to

1. Acquire basic proficiency in English
2. Develop their verbal ability
3. Enhance their writing, reading and analytical skills
4. Develop proficiency in reading along with sensitivity to the impact literary texts can have on their minds/lives

Course Contents:

Unit I: Basic Writing skills

(a) Subject Verb Agreement
(b) Noun Pronoun Agreement
(c) Governance of Nouns Through Prepositions
(d) Basic Verb Patterns (V, SV, SVO, SVOO,SVC,SVOC,SVOA)

Unit II: Vocabulary Building

(a) One word substitution*(List attached)*
(b) Phrasal Verbs* *(List attached)*
(b) Commonly used Idioms * *(List attached)*
(d) Words/Phrases/Idioms from the texts prescribed in Unit IV-- their meaning and use in sentences

Unit III: Creating Grammatical Cohesion

(a) Referring Time in Language(Tenses)
(b) Use of Conditional Sentences
(c) Use of Active and Passive Voice
(d) Synthesis of Sentences using Coordinating and Subordinating Conjunctions

Unit IV: Reading and Writing Practices

(a) Literary Texts:

i. "The Secret of Work" by Swami Vivekananda**
ii. " Public Transport in London and Delhi" by Nirad C. Chaudhuri #
iii. "An Outline of Intellectual Rubbish" by Bertrand Russell #
iv. "Mother Teresa" by Khushwant Singh #

(b) Writing official Letters- Issues Concerning Students' academic and social life
(c) Essay Writing
(d) Paragraph Writing

Recommended Readings:

1. *Bhatnagar, Nitin and Mamta Bhatnagar. *Communicative English for Engineers and Professionals*. Pearson Education, 2013.(The soft copy of the book is available in the university library)
2. # Bhatnagar, k. Manmohan.Ed. *The Spectrum of Life: An Anthology of Modern Prose*. Delhi: Macmillan India Ltd., 2006.
3. Sinha, R.P.*Current English Grammar and Usage*. OUP, 2017.
4. Rizvi, M. Ashraf. *Effective Technical Communication*. McGraw Hill Education (India) Pvt. Ltd., 2014.
5. Eastwood, John. *Oxford Guide to English Grammar*. OUP, 2010.
6. Kumar, Sanjay and Pushp Lata. *Communication Skills*. OUP, 2011.
7. Raman, Meenakshi and Sangeeta Sharma.*Communication Skills*.New Delhi:OUP,2011.
8. Hill, L. A. *A Guide to Correct English*. London:OUP,1965.
9. *Oxford Dictionary of English Idioms*. New Delhi: OUP, 2009
10. **Vivekananda, Swami. *Karma Yoga*. New Delhi: Sahityashila Prakashan, 2015.
11. **http://yousigma.com/religionandphilosophy/swamivivekananda/thescecretofwork.pdf

Note:

1. The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all it sub parts), selecting one question from each unit. All Questions will carry equal marks i.e. 14 marks each.
2. The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

Course Code: **BT MAT 111A**
Category: **Basic Science Course**
Course Title: **Mathematics-I**
B.Tech. (Computer Science & Engg.) Semester-I

L	T	P	
3	1	0	(4 Credits)

Marks for External Exam : 70
Marks for Internal Exam : 30
Total : 100
Duration of Exam : 3 Hours

Course Objectives:

1. To give adequate exposure of basics of Engineering Mathematics so as to enable them to visualize engineering problems by using Mathematical tools and to support their subsequent engineering studies.
2. To familiarize the students with techniques in basic calculus and linear algebra.
3. To equip the students with standard concepts and tools at an intermediate to advanced level.
4. To know the advanced level of mathematics and applications that they would find useful in their disciplines.
5. Students will demonstrate the ability to apply the techniques of multivariable Calculus to problems in mathematics, the physical sciences, and engineering.

Unit-I (12 Lectures)

Matrices addition and scalar multiplication, matrix multiplication; Linear systems of equations, linear Independence, rank of a matrix, determinants, Cramer's Rule, inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.

Unit-II (12 Lectures)

Eigen values, Eigen vectors, Cayley Hamiltan Theorem symmetric, skew-symmetric, and orthogonal Matrices, Eigen space. Diagonalization; Inner product spaces, Gram-Schmidt orthogonalization.

Unit-III (12 Lectures)

Taylor's and Maclaurin theorems with remainders; Maxima and minma of function of single independent variable.

Curvature & Asymptotes (Cartesian and polar form), Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit-IV (12 Lectures)

Vector space, linear dependence and independence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank-nullity theorem, composition of linear Maps, Matrix associated with a linear map.

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9th Edition, Pearson Education.
2. D. Poole, Linear Algebra: A Modern Intaiduction, 2nd Edition, Brooks/Cole, 2005.
3. Veerarajan T., Engineering Mathematics for firstyear, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East-West press, Reprint 2005.

Course Outcomes:

1. The students will learn to apply differential and integral calculus to notions of curvature and to improper integrals.
2. They will have a basic understanding of Beta and Gamma functions.
3. They will understand essential tools of matrices and determinant to solve system of algebraic equation.
4. To know the basic concepts of linear algebra i.e., linear transformations, eigen values, diagonalization and orthogonalization to solve engineering problems.
5. Apply Taylor series to approximate functions and estimate the error of approximation

Note:

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B.Tech. Semester-I

(Common for all Branches except CSE)

Course Title: **Mathematics-I**

Course Code: **BT MAT 112A**

Category: **Basic Science Course**

L	T	P	Credits
3	1	--	4

Class Work	:	**30 Marks**
Examination	:	**70 Marks**
Total	:	**100 Marks**
Duration of Examination	:	**3 Hours**

Course objectives:

1. To familiarize the students with tools and Techniques in calculus and analysis.
2. To equip the students with standard concepts towards tackling various applications that are useful in several disciplines.
3. To understand liner algebra concepts and their application in different fields of engineering.
4. To have the idea of vector calculus and its applications
5. To give adequate exposure of basics of Engineering Mathematics so as to enable them to visualize engineering problems by using Mathematical tools and to support their subsequent engineering studies.
6. To introduce to students the concept of convergence of sequences and series.

Unit-I (12 Lectures)

Determinants; Inverse and rank of a matrix, System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Eigenvalues and eigen vectors; Diagonalization of matrices; Cayley-Hamilton Theorem, Matrix representation, Rank-nullity theorem of a Linear Transformation, Orthogonal transformation.

Unit –II (12 Lectures)

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

Unit-III (12 Lectures)

Taylor's and Maclaurin theorems with remainders; (one variable).Asymptotes, Curvature ,Evolutes and involutes, Curve Tracing; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit-IV (12 Lectures)

Function of several variables: Limit, continuity and partial derivatives, Total derivative; Maxima, minima and saddle points; Method of Lagrange multipliers; Differentiation under Integral Sign., Vector Calculus: Gradient, Directional derivative, curl and divergence.

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9th Edition, Pearson Education.
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3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
4. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

Course outcomes:

1. The students will understand the basic properties of Determinants and matrices & apply these concepts in solving linear simultaneous equations.
2. They will learn the basic concepts regarding convergence of series.
3. The students will learn concepts of vector calculus and apply it in most of the branches of engineering.
4. They will be able to solve Eigen value problems and apply Cayley-Hamilton theorem.

Note:

1. The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all it sub parts), selecting one question from each unit. All Questions will carry equal marks i.e. 14 marks each.
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B. Tech. (Semester – I/ II) Physics

Mechanics

Course Code	Branch Name	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
BT PHY 113A	CE	Mechanics	3	1	0	30	70	0	100	4	3

Pre-requisites: (i) High-school education

Course Objectives:

1. To have basic understanding vector mechanics,
2. To study various frame of references.
3. To get aware about Harmonic motion,
4. To gain knowledge on rigid body mechanics.
5. To study solid body motion and different frictional forces.

Course outcomes

Students will be familiar with

1. Newton's Law
2. Frame of references
3. Harmonic motion
4. Rigid body and its mechanics
5. solid body motion and different frictional forces

Syllabus:

UNIT I

Vector Mechanics of Particles

Transformation of scalars and vectors under Rotation transformation; Forces in Nature; Newton's laws and its completeness in describing particle motion; Form invariance of Newton's Second Law; Solving Newton's equations of motion in polar coordinates; Problems including constraints and friction; Extension to cylindrical and spherical coordinates.

UNIT II

Mechanics of Particles in Motion and Harmonic Motion

Potential energy function; F = - Grad V, equipotential surfaces and meaning of gradient; Conservative and non-conservative forces, curl of a force field; Central forces; Conservation of Angular Momentum; Energy equation and energy diagrams; Elliptical, parabolic and hyperbolic orbits; Kepler problem; Application: Satellite manoeuvres;

Non-inertial frames of reference; Rotating coordinate system: Five-term acceleration formula. Centripetal and Coriolis accelerations; Applications: Weather systems, Foucault pendulum;

Harmonic oscillator; Damped harmonic motion – over-damped, critically damped and lightly-damped oscillators; Forced oscillations and resonance.

UNIT III

Rigid Body Mechanics

Definition and motion of a rigid body in the plane; Rotation in the plane; Kinematics in a coordinate system rotating and translating in the plane; Angular momentum about a point of a rigid body in planar motion; Euler's laws of motion, their independence from Newton's laws, and their necessity in describing rigid body motion; Examples.

Introduction to three-dimensional rigid body motion — only need to highlight the distinction from two-dimensional motion in terms of (a) Angular velocity vector, and its rate of change and (b) Moment of inertia tensor; Three-dimensional motion of a rigid body wherein all points move in a coplanar manner: e.g. Rod executing conical motion with center of mass fixed — only need to show that this motion looks two-dimensional but is three-dimensional, and two dimensional formulation fails.

UNIT IV

Statics of Solids

Free body diagrams with examples on modelling of typical supports and joints; Condition for equilibrium in three- and two- dimensions; Friction: limiting and non-limiting cases; Force displacement relationship; Geometric compatibility for small deformations; Illustrations through simple problems on axially loaded members like trusses.

Suggested Reference Books

(i) Engineering Mechanics, 2nd ed. — MK Harbola, Cengage Learning India publisher

(ii) Introduction to Mechanics — MK Verma, CRC Press

(iii) An Introduction to Mechanics — D Kleppner & R Kolenkow, University Printing House, Cambridge

(iv) Principles of Mechanics — JL Synge & BA Griffiths, McGraw-Hill

(v) Mechanics — JP Den Hartog, Dover Publication

(vi) Engineering Mechanics - Dynamics, 7th ed. - JL Meriam, Wiley Publisher

(vii) Mechanical Vibrations — JP Den Hartog, Dover Publication

(viii) Theory of Vibrations with Applications — WT Thomson, Pearson Publisher

Note:

1. The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all it sub parts), selecting one question from each unit. All Questions will carry equal marks i.e. 14 marks each.
2. The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

B. Tech. (Semester – I/ II)

Waves, Optics & Quantum Mechanics

Course Code	Branch Name	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
BT PHY 115 A	EE &PPT	Waves, Optics & Quantum Mechanics	3	1	0	30	70	0	100	4	3

Course Objectives:

1. To have basic understanding of optics and its applications,
2. To study light propagation.
3. To get aware about wave optics and lasers,
4. To have basic knowledge about Quantum Mechanical phenomena's.
5. To gain knowledge on solids and semiconducting materials.

Course outcomes

Students will be familiar with

1. Wave motion
2. principles, types and applications of lasers
3. basic laws related to quantum mechanics
4. Simple quantum mechanics calculations
5. Various terms related to semiconducting properties of materials

Syllabus:

UNIT – I

Wave and Light Motion

Waves: Mechanical and electrical simple harmonic oscillators, damped harmonic oscillator, forced mechanical and electrical oscillators, impedance, steady state motion of forced damped harmonic oscillator

Non-dispersive transverse and longitudinal waves: Transverse wave on a string, the wave equation on a string, Harmonic waves, reflection and transmission of waves at a boundary, impedance matching, standing waves and their Eigen frequencies, longitudinal waves and the wave equation for them, acoustics waves.

Light and Optics: Light as an electromagnetic wave and Fresnel equations, reflectance and transmittance, Brewster's angle, total internal reflection, and evanescent wave.

UNIT – II

Wave Optics and Lasers

Wave Optics: Huygens' principle, superposition of waves and interference of light by wave-front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer. Farunhofer diffraction from a single slit and a circular aperture, the Rayleigh criterion for limit of resolution and its application to vision; Diffraction gratings and their resolving power.

Lasers: Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne, CO), solid-state lasers (ruby, Neodymium), dye lasers; Properties of laser beams: mono-chromaticity.

UNIT – III

Introduction to Quantum Mechanics

Wave nature of Particles, Time-dependent and time-independent Schrodinger equation for wave function, Born interpretation, probability current, Expectation values, Free-particle wave function and wave-packets, Uncertainty principle.
Solution of stationary-state Schrodinger equation for one dimensional problems–particle in a box, particle in attractive delta-function potential, square-well potential, linear harmonic oscillator. Scattering from a potential barrier and tunneling; related examples like alpha-decay, field-ionization and scanning tunneling microscope, tunneling in semiconductor structures.

UNIT – IV

Introduction to Solids and Semiconductors

Free electron theory of metals, Fermi level, density of states in 1, 2 and 3 dimensions, Bloch's theorem for particles in a periodic potential, Kronig-Penney model and origin of energy bands.
Types of electronic materials: metals, semiconductors, and insulators. Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p -n junction.

References:

1. I. G. Main, "Vibrations and waves in physics", Cambridge University Press, 1993.
2. H. J. Pain, "The physics of vibrations and waves", Wiley, 2006.
3. E. Hecht, "Optics", Pearson Education, 2008.
4. A. Ghatak, "Optics", McGraw Hill Education, 2012.
5. O. Svelto, "Principles of Lasers", Springer Science & Business Media, 2010.
6. D. J. Griffiths, "Quantum mechanics", Pearson Education, 2014.
7. R. Robinett, "Quantum Mechanics", OUP Oxford, 2006.
8. D. McQuarrie, "Quantum Chemistry", University Science Books, 2007.
9. D. A. Neamen, "Semiconductor Physics and Devices", Times Mirror High Education Group, Chicago, 1997.
10. E.S. Yang, "Microelectronic Devices", McGraw Hill, Singapore, 1988.
11. B.G. Streetman, "Solid State Electronic Devices", Prentice Hall of India, 1995.

Note:

1. The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all it sub parts), selecting one question from each unit. All Questions will carry equal marks i.e. 14 marks each.
2. The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

B. Tech. (Semester – I/ II) Physics

Semiconductor Physics

Course Code	Branch Name	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
BT PHY 117 A	CSE	Semiconductor Physics	3	1	0	30	70	0	100	4	3

Pre-requisite: "Introduction to Quantum Mechanics" Desirable

Course Objectives:

1. To give the detailed idea how the electronic bands are formed
2. To characterize materials based on band gap.
3. To provide the sound knowledge on semiconductor physics
4. To study light semiconductor interactions.
5. To know how the band gap and defects concentration can be find out.

Course Outcomes:

1. Able to differentiate how the band originated
2. Successfully differentiate the materials types based on their band gap values and use this knowledge as per their requirements.
3. Know about how the junctions are formed in PN diode and its theory.
4. Students have the idea of solar cell and it's working with advantages.
5. Successfully find the band gap, reflection and transmission percentage of a grown film over substrate with contents of defects.

Syllabus

UNIT - I
Electronic Materials

Free electron theory, Density of states and energy band diagrams, Kronig-Penny model (to introduce origin of band gap), Energy bands in solids, E-k diagram, Direct and indirect bandgaps, Types of electronic materials: metals, semiconductors, and insulators, Density of states, Occupation probability, Fermi level, Effective mass, Phonons.

UNIT - II
Semiconductors

Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal-semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for optoelectronic devices.

UNIT - III
Light-Semiconductor Interaction

Optical transitions in bulk semiconductors: absorption, spontaneous emission, and stimulated emission; Joint density of states, Density of states for photons, Transition rates (Fermi's golden rule), Optical loss and gain; Photovoltaic effect, Exciton, Drude model.

UNIT - IV
Measurements & Engineered Semiconductor Materials

Four-point probe and van der Pauw measurements for carrier density, resistivity, and hall mobility; Hot-point probe measurement, capacitance-voltage measurements, parameter extraction from diode I-V characteristics, DLTS, band gap by UV-Vis spectroscopy, absorption/transmission.
Density of states in 2D, 1d and 0D (qualitatively). Practical examples of low-dimensional systems such as quantum wells, wires, and dots: design, fabrication, and characterization techniques. Heterojunctions and associated band-diagrams

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 Gupta on NPTEL.

Note:

1. The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all it sub parts), selecting one question from each unit. All Questions will carry equal marks i.e. 14 marks each.
2. The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

Course Title: Chemistry

Course Code: BT CH 102A

B. Tech. Semester – I/II (Common for all Branches)

L	T	P	Credits			
3	1	0	4	Class Work	:	30 Marks
				Examination	:	70 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To give students in-depth knowledge of Atomic and molecular structures.
2. To make students understand and analyse periodic properties and related concepts.
3. To give knowledge of Stereochemistry, Organic reactions and synthesis of a drug molecule.
4. To apprise students of Intermolecular forces and potential energy surfaces and use of free energy in chemical equilibria.

UNIT-I

Atomic and molecular structure: Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles. Forms of the hydrogen atom wave functions and the plots of these functions to explore their spatial variations(derivation excluded). Molecular orbitals of diatomic molecules and plots of the multicenter orbitals. Molecular orbital energy level diagrams of diatomic. Pi-molecular orbitals of butadiene and benzene . Crystal field theory and the energy level diagrams for transition metal ions . Band structure of solids and the role of doping on band structures.

Periodic properties: Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes,
ionization energies, electron affinity and electronegativity, polarizability, oxidation states.

UNIT-II

Stereochemistry: Representations of 3 dimensional structures, structural isomers and stereoisomers Configurations, symmetry chirality, enantiomers, diastereomers. Optical activity, absolute configurations and conformational analysis.
Organic reactions and synthesis of a drug molecule: Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule (Asprin/Paracetamol).

UNIT-III

Intermolecular forces and potential energy surfaces: Ionic, dipolar and van der Waals interactions. Equations of state of real gases and critical phenomena. Potential energy surfaces (with example).

Use of free energy in chemical equilibria: Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base equilibria, oxidation reduction and solubility equilibria. Water chemistry. Corrosion. Use of free energy considerations in metallurgy through Ellingham diagrams.

UNIT-IV

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

Suggested Text Books:

(i) University Chemistry by Bruce M. Mahan, 4th Edition, Pearson Education.

(ii) Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane

(iii)Fundamentals of Molecular Spectroscopy, by C. N. Banwell

(iv) Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan

(v) Physical Chemistry, by P. W. Atkins

(vi) Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition.

(vii) Organic chemistry, by R.T Morrison, R.N Boyd, 7th Edition, Pearson Education.

Course Outcomes

1. The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Students will be able to understand these concepts upto advanced level
2. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, students will be able to understand the description of all chemical processes at molecular levels.
3. The course will enable the student to: Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. Rationalise bulk properties and processes using thermodynamic considerations.

4. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and lectronegativity.

Notes:

1.The paper setter will set two question (with /without parts)from each of the four units, a ninth compulsory question comprising of 6 to 10 sub parts, covering the entire syllabus. The examinee will attempt 5 questions in all, along with the compulsory question (with all it subparts), selecting one question from each unit.

2. The use of programmable devices such as programmable calculators, etc is not allowed during the exam.

3.. A specific note shall be inserted in relevant question paper where ever the use of graph papers, semi-log papers, steam tables,etc.shall be allowed during the examination.

Course Title: BASIC ELECTRICAL ENGINEERING
Course Code: BT EE 103A

B. Tech. Semester – I/II (Common for all Branches except Chemical Engineering)

L	T	P	Credits
3	1	0	4

Class Work	:	**30 Marks**
Examination	:	**70 Marks**
Total	:	**100 Marks**
Duration of Examination	:	**3 Hours**

Course Objectives:

1. To analyze dc and ac circuits.
2. To design and analyze RLC networks.
3. To appreciate basic knowledge of electric machines.
4. To assimilate elementary knowledge of electric installations.

UNIT-1

D.C. Circuits & Theorems: Basics of electric circuit elements, Kirchhoff's laws & its applications including those based on dependent sources, Nodal and Loop methods of Analysis, Star-Delta and delta-star transformations. Network Theorems: Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum Power transfer theorem. **(11 Hours)**

UNIT-2

Single A.C. Circuits: Sinusoidal signal, instantaneous & peak values, average and RMS values, form factor, peak factor. Concept of Phasors: Rectangular & Polar, Trigonometric & Exponential forms. Behaviour of R, L, C components in ac circuits. Time domain analysis of first-order RL and RC circuits. Series and parallel circuits: Active and reactive power, power factor, Resonance in series and parallel circuits. Q-factor, cut off frequencies and bandwidth. Three Phase Circuits: Phase and line voltages and currents, balanced star and delta circuits. **(11 Hours)**

UNIT-3

Electrical Machines: Construction, working principle, type, & equation of Single phase Transformer, Ideal Transformer, Phasor diagrams of Single-phase Transformer at no load and on load, Equivalent circuit, losses, efficiency. Three phase Transformer connections.single phase Autotransformer. Rotating Machines: Construction, operating principle of d.c. motors and its torque speed characteristics. Construction and working principle & type of single phase Induction motor & Three-phase Induction motor, concept of slip & torque-speed characteristics, construction and working of synchronous generators.**(11Hours)**

UNIT-4

Electrical and electronics components: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB(Miniature Circuit Breaker), ELCB(Earth Leakage Circuit Breaker), MCCB(Moulded Case Circuit Breaker), Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics of Batteries. Elementary calculations for energy

consumption. Introduction to power factor improvement and battery backup. **(11 Hours)**

Course Outcomes:

1. Students will be able to analyze dc and ac circuits.
2. Students will be able to solve, design and synthesize electrical networks mathematically.
3. Obtain basic knowledge of electric installations.
4. Imbibe elementary knowledge of electric machines.

TEXT BOOKS:

1. Del Toro, "Principles of Electrical Engineering", 2nd Edition,Pearson Education.
2. D.P.Kothari & I. J. Nagarath, "Basic Electrical Engg", TMH, New Delhi, 3rd edition.
3. B.L. Theraja & A. K. Theraja, "Electrical Technology", (Vol-I, Vol-II), S.Chand.
4. Edward Hughes, "Electrical & Electronics Technology", 10th Edition,Pearson Education.

REFERENCE BOOKS:

1. T.K. Nagsarkar & M.S Sukhija, "Basic Electrical Engineering", OXFORD Uni. Press.2004.
2. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press.
3. D.C. Kulshreshtha, "Basic Electrical Engineering", Mc Graw Hill.
4. Hayt & Kemmerly, "Engineering Circuit Analysis", Mc Graw Hill.
5. "Schaum's Outline of Electric Circuits", Mc Graw Hill.
6. A.K.Sawhney. A Course in Electronic Measurements and Instrumentation", Dhanpat Rai & Co.
7. S.K. Sahdev, "Basic Electrical Engineering" Pearson Education.

Note:

1. The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all it sub parts), selecting one question from each unit. All Questions will carry equal marks i.e. 14 marks each.

2. The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

Course Title: Programming for Problem Solving

Course Code: BT CSE 104A

B. Tech. Semester – I/II

L	T	P	Credits
3	0	0	3

Class Work	:	**30 Marks**
Examination	:	**70 Marks**
Total	:	**100 Marks**
Duration of Examination	:	**3 Hours**

[The lab component should have one hour of tutorial followed or preceded by laboratory assignments.]

Pre-requisites (if any): NIL

Course Objectives:

1. To make students understand basics of parts of computers and the programming.
2. To give knowledge of basic constructs of computer programming.
3. To make students understand Recursion.
4. To impart knowledge of Basic Algorithms.

Unit I (10 Lectures)

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.), Introduction to Programming ,Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/ Pseudocode with examples. ,From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

Unit II (10 Lectures)

Arithmetic expressions and precedence, Conditional Branching and Loops, Writing and evaluation of conditionals and consequent branching ,Iteration and loops Arrays: Arrays (1-D, 2-D), Character arrays and Strings, Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference

Unit III (10 Lectures)

Recursion: Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Structure: Defining structures and Array of Structures, Pointers :Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Unit IV (10 Lectures)

Basic Algorithms: Searching (Linear and binary search), Basic Sorting Algorithms (Bubble, Insertion, Quick sort), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)File handling (only if time is available, otherwise should be done as part of the lab)

Suggested Text Books:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

Suggested Reference Books :

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd Edition, Pearson Education.

Course Outcomes:

The student will learn

1. To formulate simple algorithms for arithmetic and logical problems.
2. To translate the algorithms to programs (in C language).
3. To test and execute the programs and correct syntax and logical errors
4. To implement conditional branching, iteration and recursion.
5. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
6. To use arrays, pointers and structures to formulate algorithms and programs.
7. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
8. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.

Note:

1. The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all it sub parts), selecting one question from each unit. All Questions will carry equal marks i.e. 14 marks each.
2. The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

Course Title: Engineering Graphics & Design(Theory and Lab)

Course Code: BT ME 105A

B. Tech. Semester – I/II

L	T	P	Credits
1	0	4	3

Class Work	:	30 Marks
Practical Examination	:	70 Marks
Total	:	100 Marks
Duration of Examination	:	3 Hours

Objectives

All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a CAD laboratory using engineering software. This course is designed to address:

- To prepare the students to communicate effectively through Traditional Engineering Graphics and using Computer Graphics Software.
- To prepare the students to use the techniques, skills, and modern engineering graphics tools necessary for engineering practice.

S. No.	Contents(L-12/P-48)	Contact Hours
1	***Introduction to Engineering Drawing,*** Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only);Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales	L-2 P-4
2	***Orthographic Projections,*** Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes	L-1 P-6
3	***Projections of Regular Solids,*** those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink,shower, etc.	L-1 P-6
4	***Sections and Sectional Views of Right Angular Solids,*** Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)	L-1 P-4
5	***Isometric Projections*** , Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions	L-1 P-4
6	***Overview of Computer Graphics*** listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids]	L-2 P-4

7	***Customisation & CAD Drawing*** consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines Applying various ways of drawing circles	L-1 P-4
8	***Annotations, layering & other functions*** applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models. Part editing and two-dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, multiview, auxiliary, and section views. Spatial visualization exercises. Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling	L-1 P-8
9	***Demonstration of a simple team design project*** Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerancing; Use of solid-modeling software for creating associative models at the component and assembly levels; floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling; Introduction to Building Information Modelling (BIM).	L-1 P-8

Suggested Text/Reference Books:

(i) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
(ii) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
(iii)Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
(iv) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
(v) (Corresponding set of) CAD Software Theory and User Manuals

Course Outcomes

All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software. This course is designed to address:

- to prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- to prepare you to communicate effectively to prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice

The student will learn-

1. Introduction to engineering design and its place in society
2. Exposure to the visual aspects of engineering design
3. Exposure to engineering graphics standards
4. Exposure to solid modelling
5. Exposure to computer-aided geometric design
6. Exposure to creating working drawings
7. Exposure to engineering communication

Course Title: Workshop/ Manufacturing Practices (Theory and Lab)

Course Code: BT ME 106A

B. Tech. Semester – I/II

L	T	P	Credits
1	0	4	3

Class Work	:	**30 Marks**
Practical Examination	:	**70 Marks**
Total	:	**100 Marks**
Duration of Examination	:	**3 Hours**

Objectives This course is aimed to provide:

- Knowledge of different methods employed by manufacturing industries in the production/fabrication process and measurement of their quality parameters.
- Knowledge to decide about the appropriate methods and tool for manufacturing a given product/job.
- Training to fabricate components with their own hands safely while working with different machine tools and hand tools.
- Training to produce small devices through assembly of different components.

Detailed contents (L-10/P-48)

S.No.	contents	Contact Hours
1	**Lectures & videos: (10 hours)**	
i	Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods	3
ii	CNC machining, Additive manufacturing	2
iii	Fitting operations & power tools	1
iv	Carpentry	1
v	Welding (arc welding & gas welding), brazing	1
vi	Metal casting	1
vii	Plastic moulding, glass cutting	1
2.	**Workshop Practice:(48 hours)**	
i	Machine shop	12
ii	Fitting shop	6
iii	Carpentry	6
iv	Welding shop	6
v	Casting	6
vi	Smithy	6
vii	Plastic moulding& Glass Cutting	6

Suggested Text/Reference Books:

(i) Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

(ii) Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition, 2002.

(iii)Gowri P. Hariharan and A. Suresh Babu,"Manufacturing Technology – I" Pearson Education, 2008.

(iv) Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998.

(v) Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.

Course Outcomes

Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials. Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Laboratory Outcomes

- Upon completion of this laboratory course, students will be able to fabricate Components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

B.Tech. Semester I/II (Common for All Branches)

Course Title: **English Language Lab**

Category : **Humanities**
Course Code: **BT HUM 107A**

L	T	P	Credits
0	0	2	1

Class Work	:	**30 Marks**
Examination	:	**70 Marks**
Total	:	**100 Marks**
Duration of Examination	:	**3 Hours**

Course Objectives:

1. To develop English language skills especially speaking and listening of the students
2. To make the students excel in their professional lives through proficiency in communication
3. To enhance the students linguistic and communicative competence
4. To enable them to face the challenges of professional and social life

Course Outcomes:

The Students will be able to

1. Acquire basic proficiency in Spoken English
2. Enhance their listening skills with listening comprehension exercises
3. Polish their speaking skills in English both at social and professional platforms
4. Present themselves confidently and meaningfully in professional and social circles.

Course Contents:

(i) Listening comprehension
(ii) Recognition of phonemes in International Phonetic Alphabet
(iii) Self introduction and introduction of another person
(iv) Conversation and dialogues in common everyday situations
(iv) Communication at work place (Standard phrases and sentences in various situations)
(vi) Telephonic communication
(vii) Speeches for special occasions (Welcome speeches, Introduction speeches, Felicitation
speeches and Farewell speeches)
(viii) Tag Questions
(ix) Formal Presentations on literary texts prescribed in theory paper

Note: Three hour time to each segment is recommended for instruction and practice.

Scheme of End Semester Practical Exam:

1. A small passage may be read out to the examinees and they will have to write the answers to the questions asked at the end of the passage. Questions will be short answer type.
2. Examinees may be asked to identify the sounds of phonemes in given words.
3. Examinees may be asked to introduce themselves or others, participate in role play activities in mock situations, give short responses, engage in hypothetical telephonic conversation or supply the tag questions to statements etc.
4. Examinees may also be asked to deliver speeches on given situations or make presentation on the literary texts prescribed in Unit IV of theory paper.

Recommended Readings:

1. Bhatnagar, Nitin and Mamta Bhatnagar. *Communicative English for Engineers and Professionals.* Pearson Education, 2013.
2. Swan, Michael. *Practical English Usage.* OUP, 1995.
3. Gangal, J.K. *Practical Course in Spoken English.* New Delhi: PHI Learning, 2015.
4. Konar, Nira. *Communication Skills for Professionals.* New Delhi: PHI Learning Pvt. Ltd., 2009.
5. Bansal, R.K. and J.B. Harrison. *Spoken English.* Orient Longman, 1983.
6. Sharma, Sangeeta and Binod Mishra. *Communication Skills for Engineers and Scientists.* Delhi: PHI Learning Pvt. Ltd., 2015.

Note:

1. At least 10 experiments are to be performed by students in the semester.
2. At least 8 experiments should be performed from the above list; remaining two experiments may either be performed from the above list or designed and set by the Dept. as per the scope of the syllabus.

Course Code	Branch Name	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
BT PHY 114A	CE	Mechanics Lab	0	0	3	30	0	70	100	1.5	3

B. Tech. (Semester – I/ II) Physics Lab

Mechanics Lab

Course Objectives:

1. To make aware the students about very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. To understand precision and error calculation in measurements.
3. To perform, take reading, do calculations and analyze the results obtained for the experiments related to mechanics.
4. To seek and co-relate the application of studied practical's in daily life.

Course Outcomes:

1. Students will be able to understand to take readings on very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. Students will be aware about precision and error in measurements.
3. Students can take reading, do calculations and analyze the results obtained for the experiments related to mechanics.
4. Students are expected to co-relate the results of performed practical in daily life and can also seek new applications.

Syllabus:

Note:

Basic experiments on least count and error estimation (during orientation)

1. To aware about the least count of vernier calliper and screw gauge and to find the thickness of a slide using vernier calliper and diameter of wire using screw gauge.
2. Calculation of radius of curvature of a convex surface using spherometer.
3. Angel measurement using spectrometer.

List of Subject related Experiments:

1. To find the moment of inertia measurement of a fly wheel.
2. To find acceleration due to gravity using bar pendulum.

3. To examine resonance phenomena in mechanical oscillators.
4. To examine the behaviour of coupled pendulum.
5. To examine air track experiment and study Collisions between objects, governed by the laws of momentum and energy.
6. To find the modulus of rigidity of a wire using Maxwell's Needle.
7. To determine the moment of inertia of the given disc using Torsion pendulum.
8. To perform experiment on Rotation and Gyroscopic Precession.
9. To measure spring constant using Hook's Law.
10. To measure height of a distant object using sextant.

Note:

1. At least 10 experiments are to be performed by students in the semester.
2. At least 8 experiments should be performed from the above list; remaining two experiments may either be performed from the above list or designed and set by the Dept. as per the scope of the syllabus.

B. Tech. (Semester – I / II) Physics Lab

Course Title: Waves, Optics & Quantum Mechanics Lab

Course Code: BT PHY116A

B. Tech. Semester – II

L	T	P	Credits
0	0	3	1.5

Class Work Marks : 30
Examination Marks : 70
Total Marks : 100

Waves, Optics & Quantum Mechanics Lab

Course Objectives:

1. To make aware the students about very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. To understand precision and error calculation in measurements.
3. To perform, take reading, do calculations and analyze the results obtained for the experiments related to optics and quantum mechanics.
4. To seek and co-relate the application of studied practical's in daily life.

Course Outcomes:

1. Students will be able to understand to take readings on very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. Students will be aware about precision and error in measurements.
3. Students can take reading, do calculations and analyze the results obtained for the experiments related to optics and quantum mechanics.
4. Students are expected to co-relate the results of performed practical in daily life and can also seek new applications.

Syllabus:

Note:
Basic experiments on least count and error estimation (during orientation)

1. To make aware the students about the least count of vernier calliper and screw gauge and to find the thickness of a slide using vernier calliper and diameter of wire using screw gauge.
2. Calculation of radius of curvature of a convex surface using spherometer.
3. Angel measurement using spectrometer.

List of Subject related Experiments:

1. To find out wavelength of monochromatic light using Newton's ring experiment.
2. To find out wavelength of monochromatic light using Diffraction grating.
3. To find out wavelength of monochromatic light using Freshnel's bi-prism

4. To examine interference phenomena using Michelson's Interferometer and to find out wavelength of monochromatic light.
5. To find specific rotation of sugar using Polarimeter
6. To find thickness of hair using He-Ne laser.
7. To find Cauchy's constants of a prism by using spectrometer.
8. To find resolving power of a telescope
9. To determine Planks constant using photocell.
10. To plot the characteristics of solar cell and find out the fill factor.
11. To verify the inverse square law with the help of a photovoltaic cell.
12. To examine Zeeman splitting using EPS/ ESR.

Note:

1. At least 10 experiments are to be performed by students in the semester.
2. At least 8 experiments should be performed from the above list; remaining two experiments may either be performed from the above list or designed and set by the Dept. as per the scope of the syllabus.

B. Tech. (Semester – I / II) Physics Lab

Semiconductor Physics Lab

Course Code	Branch Name	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
BT PHY 118A	CSE	Semiconductor Physics Lab	0	0	3	30	0	70	100	1.5	3

Course Objectives:

1. To make aware the students about very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. To understand precision and error calculation in measurements.
3. To perform, take reading, do calculations and analyze the results obtained for the experiments related to semiconductor physics.
4. To seek and co-relate the application of studied practical's in daily life.

Course Outcomes:

1. Students will be able to understand to take readings on very basic apparatuses like vernier calipers, screw gauge, spherometer, spectrometer etc.
2. Students will be aware about precision and error in measurements.
3. Students can take reading, do calculations and analyze the results obtained for the experiments related to semiconductor physics.
4. Students are expected to co-relate the results of performed practical in daily life and can also seek new applications.

Syllabus:

Note:

Basic experiments on least count and error estimation (during orientation)

1. To aware about the least count of vernier calliper and screw gauge and to find the thickness of a slide using vernier calliper and diameter of wire using screw gauge.
2. Calculation of radius of curvature of a convex surface using spherometer.
3. Angel measurement using spectrometer.

List of Subject related Experiments:

1. To plot the forward and reverse characteristics of P-N junction diode.
2. To plot the characteristics of transistor in common base configuration.

3. To plot the characteristics of transistor in common emitter configuration.

4. To plot the characteristics of Junction field effect (JFET) transistor.

5. To plot the characteristics of Metal oxide semiconductor field effect (MOSFET) transistor.

6. To plot the characteristics of Solar cell and find out the fill factor.

7. To design and study Active and Passive filters.

8. To plot the reverse characteristics of Zener diode and voltage regulation using Zener Diode.

9. To determine Planks constant using photocell.

10. To measure e/m of electron using helical method.

11. To find capacitance of condenser using fleshing and quenching experiment.

12. To find temperature co-efficient of platinum using Callender Griffith bridge.

13. To find out low resistance by Carry Foster bridge.

14. To find resistance of galvanometer by post office box.

15. To compare the capacitance of two capacitors using De'Sauty Bridge.

Note:

1. At least 10 experiments are to be performed by students in the semester.
2. At least 8 experiments should be performed from the above list; remaining two experiments may either be performed from the above list or designed and set by the Dept. as per the scope of the syllabus.

Course Title: CHEMISTRY LAB

Course Code: BT CH 108A

B. Tech. Semester – I/II CHEMISTRY LAB (COMMON FOR ALL BRANCHES)

L	T	P	Credits
0	0	3	1.5

Class Work Marks	:	**30**
Examination Marks	:	**70**
Total Marks	:	**100**

LIST OF EXPERIMENTS:

1 .Determination of surface tension of given solvent by stalgmometer.

2. Removal of Ca^{2+} and Mg^{2+} hardness from given water sample using ion exchange coloumn.

3. Calculate the Rf value of given sample using thin layer chromatography.

4.Calculate the strength of strong acid by titrating it with strong base using conductometer.

5. Calculate the emf value of given cell.

6. Prepare the sample of urea formaldehyde and phenol formaldehyde.

7. Determination of chloride content in given water sample.

8. To find the kinetics of ethyl acetate with NaOH.

9. Preparation of asprin.

10. Calculate the sponification value of given oil sample.

11. Chemical analysis of two anions and two cations in given sample of salt.

12. Determination of the partition coefficient of a substance between two immiscible Liquids.

13. Determine the alkalinity of given water sample.

14. To examine the adsorption phenomena using acetic acid and charcoal.

15. Lattice structures and packing of spheres.

16. Determine the viscosity of given liquid using Ostwald viscometer.

Course Outcomes:

1. The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering.
2. The students will learn to: Estimate rate constants of reactions from concentration of reactants/products as a function of time.
3. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
4. Synthesize a small drug molecule and analyse a salt sample

Suggested Books:

1. A Text book on Experiments and Calculation –Engineering Chemistry by S.S.Dara, S.Chand & Company Ltd.
2. Essential of Experimental Engineering chemistry, Shashi Chawla, Dhanpat Rai Publishing Co.
3. Theory & Practice Applied Chemistry – O.P.Virmani, A.K. Narula (New Age).

Note:

1. At least 10 experiments are to be performed by students in the semester.
2. At least 8 experiments should be performed from the above list; remaining two experiments may either be performed from the above list or designed and set by the Dept. as per the scope of the syllabus.

Course Title: BASIC ELECTRICAL ENGINEERING LABORATORY

Course Code: BT EE 109A

B. Tech. Semester – I/II (Common for all Branches)

L	T	P	Credits
0	0	2	1

Class Work Marks	:	**30**
Examination Marks	:	**70**
Total Marks	:	**100**

LIST OF EXPERIMENTS

1. To plot frequency response of a series R-L-C circuit and determine resonant frequency & Q-factors for various Values of R, L, C.
2. To plot frequency response of a parallel R-L-C circuit and determine resonant frequency & Q-Factors for various values of R, L, C.
3. To perform Open circuit & Short circuit Tests on single phase Transformer.
4. To plot torque- speed characteristic of separately excited DC motor.
5. Demonstration of a DC-DC convertor and DC to AC Convertor and also draw PWM waveform.
6. Speed control of induction motor using DC-AC convertor.
7. Demonstration of Components of LT switch gear like MCB, MCCB, SFU, ELCB and earthing.
8. To obtain torque-slip characteristics of three phase induction motor.
9. To perform voltage control of synchronous generator through field excitation.
10. To plot transient and steady state time response of RLC series circuits.

Laboratory Outcomes

1. Get an exposure to common electrical components and their ratings.
2. Understand the usage of common electrical measuring instruments.
3. Student will be able to understand and design resonant circuits.
4. Understand the basic characteristics of transformers and electrical machines.

Note:

1. At least 10 experiments are to be performed by students in the semester.
2. At least 8 experiments should be performed from the above list; remaining two experiments may either be performed from the above list or designed and set by the Dept. as per the scope of the syllabus.

B. Tech. Semester – I/II

Course Title: **Programming for Problem Solving Lab.**

Course Code: BT CSE110A
Category: Engineering Science Course

L	T	P	Credits
0	0	4	2

Class Work Marks	:	**30**
Examination Marks	:	**70**
Total Marks	:	**100**

Course Objectives:

1. To make students understand basics of computer languages and the programming.
2. To give knowledge of basic constructs of computer programming.
3. To make students understand Recursion in programming.
4. To impart knowledge of Basic Algorithms.

The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.

Tutorial 1: Problem solving using computers:

Lab1: write a program to input your name and print in output.(to understand use of header files)

Tutorial 2: Variable types and type conversions:

Lab 2: write a program to solve simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions:

Lab 3: Write a Program using if-then-else structure.

Tutorial 4: Loops, while and for loops:

Lab 4: Write a program using different types of Loops.(While, Do-While and For Loop)

Tutorial 5: Arrays: searching, sorting:

Lab 5: Write a program using Array with searching and Sorting of Array.

Tutorial 6: 2D arrays and Strings

Lab 6: Write a program using Strings.

Tutorial 7: Functions, call by value:

Lab 7: Write a program using functions and Call by Value.

Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):

Lab 8 and 9: Write a program solving Numerical method problems (Ex-Calculator)

Tutorial 10: Recursion, structure of recursive calls

Lab 10: Write a Program explaining Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation

Lab 11: write a program using Pointers and structures

Tutorial 12: File handling:

Lab 12: Write a program explaining basic File operations.

Course Outcomes:

1. To formulate the algorithms for simple problems
2. To translate given algorithms to a working and correct program To be able to correct syntax errors as reported by the compilers
3. To be able to identify and correct logical errors encountered at run time
4. To be able to write iterative as well as recursive programs
5. To be able to represent data in arrays, strings and structures and manipulate them through a program
6. To be able to declare pointers of different types and use them in defining self-referential structures.
7. To be able to create, read and write to and from simple text files.

Note:

1. At least 10 experiments are to be performed by students in the semester.
2. At least 8 experiments should be performed from the above list; remaining two experiments may either be performed from the above list or designed and set by the Dept. as per the scope of the syllabus.

Course Code: **BT MAT 119A**
Category: **Basic Science Course**
Course Title: **Mathematics-II**
B.Tech. (Computer Science & Engg.) Semester-II

L	T	P	
3	1	0	(4 Credits)

Marks for External Exam	: 70
Marks for Internal Exam	: 30
Total	: 100
Duration of Exam	: 3 Hours

Course Objectives:

1. To give adequate exposure of basics of Engineering Mathematics so as to enable them to visualize engineering problems by using Mathematical tools and to support their subsequent engineering studies
2. To familiarize with the uses of measure of dispersion and central tendency.
3. To equip with various types of Probability distributions.
4. To familiarize the analysis of statistical data using various distributions.
5. To form a specific relation for the given data using Principle of least square method.

UNIT-I (12 Lectures)

Measures of Central tendency: Moments, skewness and Kurtosis- Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameter for these three distributions, Correlation and regression — Rank correlation.

UNIT-II (12 Lectures)

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

UNIT-III (12 Lectures)

Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality.

UNIT-IV (12 Lectures)

Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Reference Books:

1. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
2. S. Ross, A First Course in Probability, 9th Ed., Pearson Education.
3 W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
4. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.

Course Outcomes:

1. The students will be able to apply the concepts of Central tendency in practical work.
2. The students will learn the concept of probability, probability distribution.
3. The students will understand and apply the concept of curve fitting
4. They will be to understood the concept related to , hypothesis tests and bivariate distributions techniques in engineering problems.

Note:

1. The paper setter will set a first compulsory question comprising of 6 to 10 sub parts (short questions), covering the entire syllabus and two questions (with/without parts) from each unit. The examinee will attempt five questions in all, along with the compulsory question (with all it sub parts), selecting one question from each unit. All Questions will carry equal marks i.e. 14 marks each.
2. The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

B.Tech. Semester-II
(Common for all Branches except CSE)

Course Title: Mathematics-II

Course Code: BT MAT 120A

B. Tech. Semester – III (Common for all Branches except Bio-tech. & CSE)

L	T	P	Credits
3	1	0	4

Class Work	:	**30 Marks**
Examination	:	**70 Marks**
Total	:	**100 Marks**
Duration of Examination	:	**3 Hours**

Course objectives:

1. To familiarize the students with techniques in multivariate integration, ordinary and partial differential equations and complex variables.
2. To equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

Unit-I (12 Lectures)

Multiple Integration: Double integrals, change of order of integration, Triple integral and application, Change of variables, Applications to areas and volumes, Centre of mass and Gravity (constant and variable densities) of solids of revolution, orthogonal curvilinear coordinates, vector line integrals, surface integrals, Volume integral Theorems of Green, Gauss and Stokes.

Unit II (12 Lectures)

Ordinary differential Equations of first order and first degree: Exact, linear and Bernoulli's equations, Equations of first order but not of first degree, equation solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

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

Unit III (12 Lectures)

Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

Unit IV (12 Lectures)

Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem and Maximum-Modulus theorem (without proof); Taylor's series, Laurent's series; zeros of analytic functions, singularities, Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich contour.

Course outcomes:

1. The students will learn evaluating multiple integrals and apply it in calculating area and volumes.
2 They will solve first and second order differentiation equations.
3 They are familiar with analytical functions and their applications.
4. The students will know the concepts of singularity and residue and apply these concepts in evaluating definite integrals

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson Education.
2. W. E. Boyce and R. C. Diprima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India, 2009.
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
5. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
6. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed. Mc-Graw Hill, 2004.

Note:

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2. The use of programmable devices such as programmable calculators etc. is not allowed during the exam. Sharing of materials will not be permitted during examination.

DEPT. OF COMPUTER SCIENCE & ENGINEERING
CENTRAL UNIVERSITY OF HARYANA, MAHENDERGARH

Proceedings / Minutes of the Meeting
of Board of Studies in Computer Science & Engg. Held on 24.5.2018

The meeting of the Board of Studies in Computer Science & Engg. was held on 24.5.2018. The following were present

1. Dr. Nawal Kishore
2. Dr. Nasib Singh Gill
3. Ms. Sangeeta

After deliberations, it was resolved/ recommended by the board as follows:

1. In view of AICTE's newly released model curricula for Engg. programmes, it was resolved to adopt, with minor tweaking, the AICTE model curriculum in Engg. for 1st year B.Tech. in CSE. However, 1st yr. curriculum being common, the Scheme of Studies & Examinations and the Syllabi has been tweaked to be offered to B.Tech. in CE, EE & PPT programmes also (Annexure-1).
2. The above new Scheme shall be effective from the Acad. Session 2018-2019 & the new Scheme of Studies & Examinations for the students admitted in the year 2018-19 shall be rolled out in a phased manner for these students. As and when the AICTE revises its curriculum further for Engg. programmes, the same shall *ipso facto* be applied to the curriculum being rolled out at this Univ. However, a tentative Scheme of Studies & Examinations for 3rd to 8th semester is finalized and also appended (Annexure-2).
3. The board suggests that the B.Tech. Ordinance may be amended in the statutory body/ academic body in view of the AICTE's newly released model curricula for Engg. programmes.
4. The existing Scheme of Studies & Examinations and the Syllabi for existing batches of students admitted in 2016-17 & 2017-18 have been tweaked to the extent of balancing the credits therein according to the present B.Tech. Ordinance & minor modifications / amendments effected therein for the betterment of the offered syllabi (Annexure-3)
5. The Panels of Paper Setters & Examiners (Annexure-4 & 5) are approved for B.Tech. 2nd Sem. (common to all branches) & 4th Sem. B.Tech. in CSE.

The meeting ended with vote of thanks to the Chair.

24/5/2018

Ms. Sangeeta | Prof. Nasib Singh Gill | Prof. Nawal Kishore

Scheme for B.Tech (CSE) according to Choice Based Credit System (CBCS)

(Semester III and Semester VIII)

Department of Computer Science and Engineering
For Session 2018-19 onwards
(3rd batch onward)

School of Engineering & Technology

CENTRAL UNIVERSITY OF HARYANA
MAHENDERGARH-123031
HARYANA

Scheme –B. Tech. (CSE 2nd Year)
THIRD SEMESTER

CODE	SUBJECT	L	T	P	CREDIT	Theory	Practical	Internal Assessment	Total Marks
BT CSE 301	Data Structures using C	3	-	-	3	70	-	30	100
BT CSE-302	Discrete Structures	3	-	-	3	70	-	30	100
BT CSE-303	Digital Electronics & Computer Organization	3	-	-	3	70	-	30	100
	GEC-I*	3	-	-	3	70	-	30	100
BT CSE-304	Fundamentals of Management	2	-	-	2	70	-	30	100
	GEC-II*	3	-	-	3	70	-	30	100
BT CSE-305	Data Structures using C Lab	-	-	4	2.0	-	35	15	50
BT CSE 306	Digital Electronics Lab	-	-	2	1.0	-	35	15	50
BT CSE 307	PC Software Lab	-	-	2	1.0	-	35	15	50
	Innovation Lab	-	-	4					
	Total	17	-	12	**21**	420	175	255	850

***GEC to be taken from other Departments**

List of GEC for other Departments

CODE	GEC SUBJECTS
BT CSE-301	Data Structure using C

24/5/18

FOURTH SEMESTER

CODE	SUBJECT	L	T	P	CREDIT	Theory	Practical	Internal Assessment	Total Marks
BT CSE-401	Database Management System (DBMS)	3	-	-	3	70	-	30	100
BT CSE-402	Object Oriented Programming using C++ (OOPS)	3	-	-	3	70	-	30	100
BT ECO-405	Economics	3	-	-	3	70	-	30	100
BT ENV-401	Environmental Sciences	3	-	-	-	70	-	30	100
BT CSE-403	Intelligent Systems	3	-	-	3	70	-	30	100
	GEC-III*	3	-	-	3	70	-	30	100
BT CSE-404	DBMS Lab	-	-	4	2.0	-	35	15	50
BT CSE-405	C++ Programming LAB	-	-	4	2.0	-	35	15	50
BT CSE-406	Intelligent Systems Lab	-	-	2	1.0	-	35	15	50
	Innovation Lab	-	-	4	-	-	-	-	-
	Total	18	-	14	**20**	350	70	210	700

***GEC to be taken from other Departments**

List of GEC for other Departments

CODE	GEC SUBJECTS
BTCSE-403	Object Oriented Programming using C++ (OOPS)

24/5/2018

Scheme –B. Tech. (CSE 3rd Year)
FIFTH SEMESTER

CODE	SUBJECT	L	T	P	CREDIT	Theory	Practical	Internal Assessment	Total Marks
BT CSE-501	Principles of Operating System	3	-	-	3	70	-	30	100
	GEC-IV*	3	-	-	3	70	-	30	100
BT CSE-502	Computer Graphics and Multimedia Technology	3	-	-	3	70	-	30	100
BT CSE-503	Theory of Computation	3	-	-	3	70	-	30	100
	DCEC	3	-	-	3	70	-	30	100
	DCEC	3	-	-	3	70	-	30	100
BT CSE-504	Computer Graphics and Multimedia Lab	-	-	4	2.0	-	35	15	50
BT CSE-505	Operating System Lab	-	-	4	2.0	-	35	15	50
BT CSE-506	Summer Training Report	-	1	-	1.0	-	50	-	50
	Total	18	1	8	23.0	420	120	225	750

List of DCEC

CODE	DCEC SUBJECTS
BT CSE-507	Wireless Communication
BT CSE-508	Fuzzy logic
BT CSE-509	Embedded System
BT CSE-510	Object Oriented System Development
BT CSE- 511	Software Engineering

24/5/2018

SIXTH SEMESTER

CODE	CORE SUBJECTS	L	T	P	CREDIT	Theory	Practical	Internal Assessment	Total Marks
BT CSE-601	Analysis and Design of Algorithms	3	-	-	3	70	-	30	100
BT CSE-602	Security of Information System	3	-	-	3	70	-	30	100
BT CSE-603	Advanced Java	3	-	-	3	70	--	30	100
	DCEC	3	-	-	3	70	-	30	100
	DCEC	3	-	-	3	70	-	30	100
BT CSE-604	Advanced Java Lab	-	-	4	2.0	-	35	15	50
BT CSE -605	HTML & CSS Lab	-	-	4	2.0	-	35	15	50
BT CSE-606	Seminar	-	-	2	1.0	-	-	50	50
	Innovation Lab	-	-	4	-	-	-	-	-
	Total	15	-	12	20.0	350	70	230	650

List of DCEC

CODE	DCEC SUBJECTS
BT CSE 607	Introduction to E-Commerce and ERP
BT CSE 608	Digital Image Processing
BT CSE 609	Data Warehousing & Data Mining
BT CSE 610	Real Time System

24/5/2018

BT CSE 611	Programming Languages
BT CSE 612	Distributed Operating System
BT CSE 613	UNIX & Shell Programming
BT CSE 614	Neural Networks

24/5/2018

SEVENTH SEMESTER

CODE	CORE SUBJECTS	L	T	P	CREDIT	Theory	Practical	Internal Assessment	Total Marks
BT CSE-701	Advanced Computer Architecture	3	-	-	3	70	-	30	100
BT CSE-702	Computer Networks	3	-	-	3	70	-	30	100
BT CSE-703	Compiler Design	3	-	-	3	70	-	30	100
	DCEC	3	-	-	3	70	-	30	100
BT CSE-704	Compiler Design Lab	-	-	4	2.0	-	35	15	50
BT CSE-705	Minor Project	-	-	6	3.0	--	70	30	100
BT CSE-706	Seminar	-	-	2	1.0	-	50	-	50
BT CSE-707	Summer Training Report	-	2	-	2.0		50	-	50
	Total	12	2	12	20.0	280	205	165	650

List of DCEC

CODE	DCEC SUBJECTS
BT CSE 708	Software Project Management
BT CSE 709	Advance Client/Server Technology
BT CSE 710	Natural Language Processing
BT CSE 711	Cloud Computing
BT CSE 712	Software Testing
BT CSE 713	Introduction to VLSI Design
BT CSE 714	Networking Programming & Administration

24/5/2018

EIGHTH SEMESTER

CODE	SUBJECT	L	T	P	CREDIT	Theory	Practical	Internal Assessmen	Total Marks
BTCE-801	Internship/ Project	-	-	-	15.0	-	350	150	500
	Total				15.0		350	150	500

24/5/2018

DEPT. OF COMPUTER SCIENCE & ENGINEERING
CENTRAL UNIVERSITY OF HARYANA, MAHENDERGARH

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of Board of Studies in Computer Science & Engg. Held on 24.5.2018

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The meeting ended with vote of thanks to the Chair.

24/5/2018

Ms. Sangeeta | Prof. Nasib Singh Gill | Prof. Nawal Kishore

Scheme for B.Tech (CSE) according to Choice Based Credit System (CBCS)

(Semester III and Semester VIII)

Department of Computer Science and Engineering
For Session 2016-17(1st batch)
2017-18(2nd batch)

School of Engineering & Technology

CENTRAL UNIVERSITY OF HARYANA
MAHENDERGARH-123031
HARYANA

Scheme –B. Tech. (CSE 2nd Year)
THIRD SEMESTER

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BT CSE-302	Discrete Structures	3	-	-	3	70	-	30	100
BT CSE-303	Digital Electronics & Computer Organization	3	-	-	3	70	-	30	100
	GEC-I*	3	1	-	4	70	-	30	100
BT CSE-304	Fundamentals of Management	2	-	-	2	70	-	30	100
	GEC-II*	3	1	-	4	70	-	30	100
BT CSE-305	Data Structures using C Lab	-	-	2	1.0	-	35	15	50
BT CSE 306	Digital Electronics Lab	-	-	2	1.0	-	35	15	50
BT CSE 307	PC Software Lab	-	-	2	1.0	-	35	15	50
	GEC-I* Lab	-	-	2	1.0	-	35	15	50
	GEC-II* Lab	-	-	2	1.0	-	35	15	50
	Innovation Lab	-	-	4					
	Total	17	1	14	**25**	420	175	255	850

***GEC to be taken from other Departments**

List of GEC for other departments

CODE	GEC SUBJECTS
BT CSE-301	Data Structure using C
BT CSE-303	Digital Electronics & Computer Organization

FOURTH SEMESTER

CODE	SUBJECT	L	T	P	CREDIT	Theory	Practical	Internal Assessment	Total Marks
BT CSE-401	Database Management System (DBMS)	3	1	-	4	70	-	30	100
BT CSE-402	Object Oriented Programming using C++ (OOPS)	3	1	-	4	70	-	30	100
BT ECO-405	Economics	3	-	-	3	70	-	30	100
BT ENV-401	Environmental Sciences	3	-	-	-	70	-	30	100
BT CSE-403	Intelligent Systems	3	-	-	3	70	-	30	100
	GEC-III*	3	1	-	4	70	-	30	100
BT CSE-404	DBMS Lab	-	-	2	1.0	-	35	15	50
BT CSE-405	C++ Programming LAB	-	-	2	1.0	-	35	15	50
BT CSE-406	Intelligent Systems Lab	-	-	2	1.0	-	35	15	50
	Innovation Lab	-	-	4	-	-	-	-	-
	Total	18	4	10	21	350	70	210	700

***GEC to be taken from other Departments**

List of GEC for other departments

CODE	GEC SUBJECTS
BTCSE-403	Object Oriented Programming using C++ (OOPS)
BTCSE-401	Database Management System

Scheme –B. Tech. (CSE 3rd Year)
FIFTH SEMESTER

CODE	SUBJECT	L	T	P	CREDIT	Theory	Practical	Internal Assessment	Total Marks
BT CSE-501	Principles of Operating System	3	-	-	3	70	-	30	100
	GEC-IV*	3	-	-	3	70	-	30	100
BT CSE-502	Computer Graphics and Multimedia Technology	3	-	-	3	70	-	30	100
BT CSE-503	Theory of Computation	3	-	-	3	70	-	30	100
	DCEC	3	-	-	3	70	-	30	100
	DCEC	3	-	-	3	70	-	30	100
BT CSE-504	Computer Graphics and Multimedia Lab	-	-	4	2.0	-	35	15	50
BT CSE-505	Operating System Lab	-	-	4	2.0	-	35	15	50
	Total	18	1	8	23.0	420	120	225	750

List of DCEC

CODE	DCEC SUBJECTS
BT CSE-506	Wireless Communication
BT CSE-507	Fuzzy logic
BT CSE-508	Embedded System
BT CSE-509	Object Oriented System Development
BT CSE- 510	Software Engineering

SIXTH SEMESTER

CODE	CORE SUBJECTS	L	T	P	CREDIT	Theory	Practical	Internal Assessment	Total Marks
BT CSE-601	Analysis and Design of Algorithms	3	1	-	4	70	-	30	100
BT CSE-602	Security of Information System	3	-	-	3	70	-	30	100
BT CSE-603	Advanced Java	3	-	-	3	70	--	30	100
	DCEC	3	-	-	3	70	-	30	100
	DCEC	3	-	-	3	70	-	30	100
BT CSE-604	Advanced Java Lab	-	-	4	2.0	-	35	15	50
BT CSE -605	MAT Lab	-	-	4	2.0	-	35	15	50
	Innovation Lab	-	-	4	-	-	-	-	-
	Total	15	-	12	20.0	350	70	230	650

List of DCEC

CODE	DCEC SUBJECTS
BT CSE 606	Introduction to E-Commerce and ERP
BT CSE 607	Digital Image Processing
BT CSE 608	Data Warehousing & Data Mining
BT CSE 609	Real Time System
BT CSE 610	Programming Languages
BT CSE 611	Distributed Operating System
BT CSE 612	UNIX & Shell Programming
BT CSE 613	Neural Networks

SEVENTH SEMESTER

CODE	CORE SUBJECTS	L	T	P	CREDIT	Theory	Practical	Internal Assessment	Total Marks
BT CSE-701	Advanced Computer Architecture	3	-	-	3	70	-	30	100
BT CSE-702	Computer Networks	3	-	-	3	70	-	30	100
BT CSE-703	Compiler Design	3	-	-	3	70	-	30	100
	DCEC	3	-	-	3	70	-	30	100
BT CSE-704	Compiler Design Lab	-	-	4	2.0	-	35	15	50
BT CSE-705	Minor Project	-	-	6	3.0	--	70	30	100
BT CSE-706	Seminar	-	-	2	1.0	-	50	-	50
BT CSE-707	Summer Training Report	-	2	-	2.0		50	-	50
	Total	12	2	12	20.0	280	205	165	650

List of DCEC

CODE	DCEC SUBJECTS
BT CSE 708	Software Project Management
BT CSE 709	Advance Client/Server Technology
BT CSE 710	Natural Language Processing
BT CSE 711	Cloud Computing
BT CSE 712	Software Testing
BT CSE 713	Introduction to VLSI Design
BT CSE 714	Networking Programming & Administration

EIGHTH SEMESTER

CODE	SUBJECT	L	T	P	CREDIT	Theory	Practical	Internal Assessmen	Total Marks
BTCE-801	Internship/ Project	-	-	-	20.0	-	350	150	500
	Total				20.0		350	150	500

Syllabus for B.Tech (CSE) according to Choice Based Credit System (CBCS)

(Semester III and Semester VIII)

Department of Computer Science and Engineering
For Session 2016-17(1st batch)
2017-18(2nd batch)

School of Engineering & Technology

CENTRAL UNIVERSITY OF HARYANA
MAHENDERGARH-123031
HARYANA

Semester 3

BT CSE 301 **Data Structures Using C**

Total Credit: 4
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3 hrs.

Note: Five questions will be set in all by the examiner.

UNIT-1

Overview of 'C': Introduction, Flow of Control, Input output functions, Arrays and Structures, Functions
Data structures and Algorithms: an overview: concept of data structure, choice of right data structures, types of data structures, basic terminology Algorithms, how to design and develop an algorithm: stepwise refinement, use of accumulators and counters; algorithm analysis, complexity of algorithms Big-oh notation.
Arrays: Searching Sorting: Introduction, One Dimensional Arrays, **Operations Defined:** traversal, selection, searching, insertion, deletion, and sorting. Multidimensional arrays, address calculation of a location in arrays.
Searching: Linear search, Recursive and Non recursive binary Search.
Sorting: Selection sort, Bubble sort, Insertion sort, Merge sort, Quick sort, Shell sort, Heap sort

UNIT-2
Stacks and queues: Stacks, array representation of stack, Applications of stacks. Queues, Circular queues, array representation of Queues, Deque, priority queues, Applications of Queues.
Pointers: Pointer variables, Pointer and arrays, array of pointers, pointers and structures, Dynamic allocation.
Linked Lists: Concept of a linked list,. Circular linked list, doubly linked list, operations on linked lists. Concepts of header linked lists. Applications of linked lists, linked stacks, linked Queues.

UNIT-3
Trees: Introduction to trees, binary trees, representation and traversal of trees, operations on binary trees, types of binary trees, threaded binary trees, B Trees, Application of trees.
Graphs: Introduction, terminology, 'set, linked and matrix' representation, Graph traversal techniques: BFS, DFS, operations on graphs, Minimum spanning trees, Applications of graphs

UNIT-4
Introduction to file handling, Data and Information, File concepts, File organization, files and streams, working with files. AVL trees, Sets, list representation of sets, applications of sets, skip lists

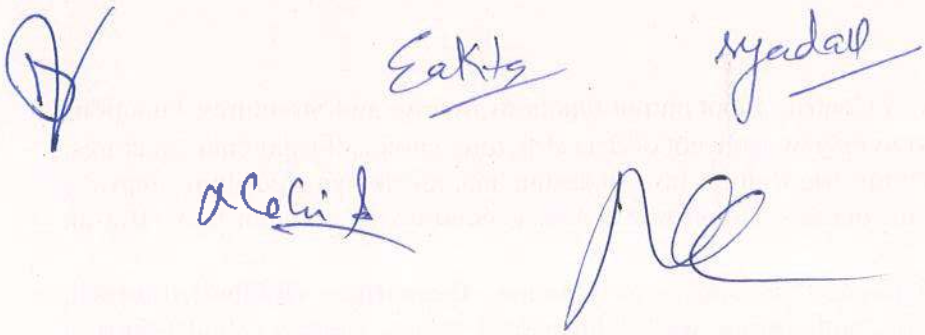
Text Books:

1 Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.
2 Data Structures using C by A. K. Sharma, Pearson

Reference Books:

1 Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.

2 Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983,AW
3 Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
4 Data Structures and Program Design in C By Robert Kruse, PHI,
5 Theory & Problems of Data Structures by Jr. Symour Lipschetz, Schaum's outline by TMH
6 Introduction to Computers Science -An algorithms approach, Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
7 Data Structure and the Standard Template library – Willam J. Collins, 2003, T.M.H



BT CSE 302 **Discrete Structures**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3 hrs.

Note: Five questions will be set in all by the examiner.

UNIT-1

Set Theory: Introduction to set theory, Set operations, Algebra of sets, Finite and Infinite sets, Classes of sets. Power Sets, Multi sets, Cartesian Product, Representation of relations, Types of relation, Equivalence relations and partitions , Partial ordering relations and lattices.

UNIT-2

Propositional Calculus: Basic operations: AND (^), OR (v), NOT (~), Implication and bi-implication, Truth value of a compound statement, propositions, tautologies, contradictions, Universal and Existential quantifiers, methods of proof, Mathematical Induction, Propositional logic, Hypothesis and Inference, CNF, DNF, PCNF, PDNF.

Techniques of Counting: Permutations with and without repetition, Combination.

UNIT-3

Recursion And Recurrence Relation: Linear recurrence relation with constant coefficients, Homogeneous solutions, Particular solutions, Total solution of a recurrence relation using generating functions.

Algebric Structures: Definition and examples of a monoid, Semigroup, Groups and rings, Homomorphism, Isomorphism and Automorphism, Subgroups and Normal subgroups, Cyclic groups, Integral domain and fields, Cosets, Lagrange's theorem

UNIT-4

Graphs And Trees: Introduction to graphs, Directed and Undirected graphs, Homomorphic and Isomorphic graphs, Subgraphs, Cut points and Bridges, Multigraph and Weighted graph, Paths and circuits, Shortest path in weighted graphs, Eurelian path and circuits, Hamilton paths and circuits, Planar graphs, Euler's formula, Trees, Spanning trees, Binary trees and its traversals, Coloring graph problem, bipartite graphs, Travelling salesman problem,

Text Book:

1. Elements of Discrete Mathematics C.L Liu, 1985, McGraw Hill
2. Discrete Mathematical Structures, B. Kolman and R.C. Busby, 1996, PHI
3. Discrete Mathematical Structures with Applications to Computers by Tembley & Manohar,1995, McGrawHillL.

Reference Books:

1. Discrete Mathematics by Johnson Bough R., 5th Edition, PEA, 2001..
2. Concrete Mathematics: A Foundation for Computer Science, Ronald Graham, Donald Knuth and Oren Patashik, 1989, Addison-Wesley.
3. Mathematical Structures for Computer Science, Judith L. Gersting, 1993, Computer Science Press.
4. Applied Discrete Structures for Computer Science, Doerr and Levasseur, (Chicago: 1985,SRA
5. Discrete Mathematics by A. Chtewynd and P. Diggle (Modular Mathematics series), 1995, Edward Arnold, London,

BT CSE 303 **Digital Electronics & Computer Organization**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3 hrs.

Note: Five questions will be set in all by the examiner.

UNIT-1

Fundamentals of Digital Techniques: Digital signal, logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Boolean algebra. Review of Number systems. Binary codes: BCD, Excess-3, Gray, EBCDIC, ASCII, Error detection and correction codes.

Combinational Design Using Gates: Design using gates, Karnaugh map and Quine Mcluskey methods of simplification.

Combinational Design Using MSI Devices: Multiplexers and Demultiplexers and their use as logic elements, Decoders, Adders / Subtractors, BCD arithmetic circuits, Encoders, Decoders / Drivers for display devices.

UNIT-2

Sequential Circuits : Flip Flops : S-R, J-K, T, D, master-slave, edge triggered, shift registers, sequence generators, Counters, Asynchronous and Synchronous Ring counters and Johnson Counter, Design of Synchronous and Asynchronous sequential circuits.

General System Architecture: Store program control concept, Flynn's classification of computers (SISD, MISD, MIMD): Multilevel viewpoint of a machine: digital logic, micro architecture, ISA, operating systems, high level language; structured organization; CPU, caches, main memory, secondary memory units & I/O; Performance metrics; MIPS, MFLOPS.

UNIT-3

Instruction Set Architecture: Instruction set based classification of processors (RISC, CISC and their comparison); addressing modes: register, immediate, direct, indirect, indexed; Operations in the instruction set; Arithmetic and Logical, Data Transfer, Control Flow; Instruction set formats (fixed, variable, hybrid); Language of the machine: 8086; simulation using MSAM.

Basic non pipelined CPU Architecture: CPU Architecture types (accumulator, register, stack, memory/register) detailed data path of a typical register based CPU, Fetch-Decode-Execute cycle (typically 3 to 5 stage); microinstruction sequencing, implementation of control unit, Enhancing performance with pipelining.

UNIT-4

Memory Hierarchy & I/O Techniques: The need for a memory hierarchy (Locality of reference principle, Memory hierarchy in practice: Cache, main memory and Secondary memory, Memory parameters: access cycle time, cost per bit): Main memory (Semiconductor RAM & ROM organization, memory expansion, Static & dynamic memory types); Cache memory (Associative & direct mapped cache organizations)

Text Book :

1. Modern Digital Electronics(Edition III),R. P. Jain; TMH.
2. Digital Design : Morris Mano; PHI.

Reference Book :

1. Digital Integrated Electronics : Taub & Schilling; MGH
2. Digital Principles and Applications : Malvino & Leach; McGraw Hill.

BT CSE 304 **Fundamentals of Management**

Total Credit: 2
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs.

Note: Five questions will be set in all by the examiner.

Unit – I

Meaning of management, Definitions of Management, Characteristics of management, Importance of Management; Management as Art, Science and Profession; Development of Management thoughts- – Fayol's principles of Management, Taylors Scientific Management, Elton Mayo's Human Relations School, System's Approach to Management; Principles of Management. Management Processes- Planning, Organizing, Staffing, Leading and Controlling; Delegation and Decentralization.

Unit - II

Production Management : Definition, Objectives, Functions and Scope, Production Planning and Control; its significance, stages in production planning and control. Brief introduction to the concepts of material management, inventory control; its importance and various methods.

Unit - III

Marketing Management - Definition of marketing, Marketing concept, objectives & Functions of marketing. Marketing Research - Meaning; Definition; objectives; Importance; Limitations; Process. Advertising - meaning of advertising, objectives, functions, criticism.

Unit - IV

An Introduction of Financial Management, Objectives of Financial Management, Functions and Importance of Financial Management, Role of Financial Manager. Brief Introduction to the concept of capital structure and various sources of finance.

Reference Books:

1. Pandey I. P., (2015). Financial Management (11th ed.). New Delhi: Vikas Publishing House.
2. Kotler, P., Keller K. L. (2015). Marketing Management (5th ed.). Pearson.
3. Robbins, S. P., DeCenzo, D., Agarwal, M. N., & Bhattacharyya, S. (2011). Essentials of Management (6 ed.). New Delhi: Pearson Edcuation.
4. Stoner J. F., Freeman R. E., Gilbert D. R.(2003). Manangement (6th ed.). Delhi: Pearson.

BT CSE 305 **Data Structure Using C Lab**

Total Credit: 1
Max Marks: 50
External: 35
Internal Assessment: 15
Time Allowed: 3 hrs

1. Write a program to search an element in a two-dimensional array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3. Write a program to perform following operations on tables using functions only a) Addition b) Subtraction c) Multiplication d) Transpose
4. Using iteration & recursion concepts write the programs for Quick Sort Technique
5. Write a program to implement the various operations on string such as length of string concatenation, reverse of a string & copy of a string to another.
6. Write a program for swapping of two numbers using 'call by value' and 'call by reference strategies.
7. Write a program to implement binary search tree. (Insertion and Deletion in Binary search Tree)
8. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list
9. Write the program for implementation of a file and performing operations such as insert, delete, update a record in the file.
10. Create a linked list and perform the following operations on it
    a) add a node b) Delete a node
11. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000 elements.
12. Write a program to simulate the various graph traversing algorithms.
13. Write a program which simulates the various tree traversal algorithms.

BT CSE 306 **Digital Electronics Lab**

Total Credit: 1
Max Marks: 50
External: 35
Internal Assessment: 15
Time Allowed: 3 hrs

1. Study of TTL gates – AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
2. Design & realize a given function using K-maps and verify its performance.
3. Design of half adder and full adder using NAND gates.
4. To verify the operation of multiplexer & Demultiplexer.
5. To verify the operation of comparator.
6. To verify the truth tables of S-R, J-K, T & D type flip flops.
7. Set up R-S & JK flip flops using NAND Gates.
8. To verify the operation of bi-directional shift register.
9. To design & verify the operation of 3-bit synchronous counter.
10. To design and verify the operation of synchronous UP/DOWN decade counter using J K flip-flops & drive a seven-segment display using the same.
11. To design and verify the operation of asynchronous UP/DOWN decade counter using J K flip-flops & drive a seven-segment display using the same.
12. Study of MUX & DeMUX Circuits and ICs

NOTE: At least ten experiments are to be performed; atleast seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

BT CSE 307 **PC LAB**

Total Credit: 1
Max Marks: 50
External: 35
Internal Assessment: 15
Time Allowed: 3 hrs

PC Software: Applications of MS office.

1. To prepare your bio data using MS word.
2. To prepare list of marks obtained by students in different subjects and show with the help of chart/graph the average, min. and maximum marks of each subject.
3. Prepare a presentation explaining the facilities provided by your institution.
4. Create a database of books in library on a mini scale w.r.t. computers and manipulate the database using different forms and reports.

PC Hardware:

1. To check and measure various supply voltages of pc.
2. To make comparative study of motherboard.
3. To study various cards used in a system viz. display card, LAN card etc.
4. To remove, study and replace hard disk.
5. To remove, study and replace CD ROM drive.
6. To study printer assembly and elementary fault detection of various types of printer.
7. To observe various cables and connectors used in networking.

Semester 4

BT CSE 401 **Database Management Systems**

Total Credit: 4
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3 hrs.

Note: Five questions will be set in all by the examiner.

UNIT-1

Introduction: Overview of database Management System; characteristics of database, database users, Advantages of DBMS over file processing systems, Responsibility of Database Administrator, components of DBMS, Introduction to Database Languages, Three schema architecture, Introduction to Client/Server architecture.

UNIT-2

ER Modeling: Basic concepts, mapping Constraints, Keys, Design of E-R Diagram, Reduction of E-R diagram into tables.

Data Models: Network data model, Hierarchical data model, Relational data model, Respective Advantages and Disadvantages.

File Organization: Overview, Serial file, Sequential File, index sequential files- types of indexing, Hashing techniques, direct files, B and B+ trees.

UNIT-3

Introduction to Query Languages: Relational Algebra, Structured query language, Relational constraints- Domain Constraint, Key Constraint, Integrity Constraints.

Functional dependencies & Normalization: Introduction to functional dependency, Inference rules, minimal cover, closure, Types of keys, desirable properties of decompositions, Normalization & de-normalization process.

UNIT-4

Transactions, Concurrency Management and recovery: Transactions, desirable properties, Concurrent Transactions, Serializable Schedules, Locks, Two Phase Locking (2PL), Timestamp based protocols, Deadlock and its Prevention, What is Recovery, Kinds of failures, Failure controlling methods(Log base recovery, shadow copy scheme, checkpoints)

Distributed Data processing, parallel Databases: Architecture for Parallel databases, Parallel query evaluation, Data Partitioning, Types of distributed databases, Architecture of distributed databases, Fragmentation, Replication, catalog management.

Text Books:

1. Database System Concepts by A. Silberschatz, H.F. Korth and S. Sudarshan, 3rd edition, 1997, McGraw-Hill, International Edition.
2. Introduction to Database Management system by Bipin Desai, 1991, Galgotia Pub.

Reference Books:

1. Fundamentals of Database Systems by R. Elmasri and S.B. Navathe, 3rd edition, 2000, Addision-Wesley, Low Priced Edition.
2. An Introduction to Database Systems by C.J. Date, 7th edition, Addison-Wesley, Low Priced Edition, 2000.
3. Database Management and Design by G.W. Hansen and J.V. Hansen, 2nd edition, 1999, Prentice-Hall of India, Eastern Economy Edition.
4. Database Management Systems by A.K. Majumdar and P. Bhattacharyya, 5th edition, 1999, Tata McGraw-Hill Publishing.
5. A Guide to the SQL Standard, Date, C. and Darwen,H. 3rd edition, Reading, MA: 1994, Addison-Wesley.
6. Data Management & file Structure by Loomis, 1989, PHI

BT CSE-402 **Object Oriented Programming Using C++**

Total Credit: 4
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3 hrs.

Note: Five questions will be set in all by the examiner.

UNIT-1

Basics of Object Oriented Programming (OOP): Introduction to OOP – Difference between OOP and procedure oriented Programming – Classes, objects and Methods – Overview of inheritance and Polymorphism.

Object Oriented Design: Trends in software design – Notation for objects – Hybrid design methods – Seperation of Responsibilities – Responsibility driven design – Design phases and tools – step by step design – UML Approach.

Fundamentals of C & C++: Structure of C/C++ program – Preprocessor directives – data types and declaration – Expressions and operator precedence – Program flow control – Functions – Scope of variables – Default arguments – Dynamic allocation – new and delete operators.

UNIT-2

Data Abstraction:

Class definition – controlling access to other functions – Different types of constructors – Destructor – Objects and classes – Dynamic creation and destruction of objects.

Polymorphism:

Overloading functions and operators – Run time polymorphism – overloading new and delete operators.

UNIT-3

Inheritance:

Derived classes – syntax of derived classes – Access to the base class – overloading inherited member functions – multiple inheritance – virtual base class Virtual functions and Polymorphism: static and dynamic bindings – virtual functions – pure virtual functions – dynamic binding through virtual functions – Virtual function call mechanism

– Implications of polymorphic use of classes – virtual destructors – calling virtual functions in a base class constructor.

UNIT-4

C++ I/O:

Standard I/O using C functions – stream I/O in C++ - manipulators – Formatted I/O – Overloading << and >> operators – File I/O.

Generic Classes in C++:

Necessity of Templates – Generic Classes using Macros – Class templates – Function Templates – Advantages of Templates.

Exception Handling in C++:

Benefits of exception handling-troubles with standard C functions (setjmp and longjmp) – Proposed exception handling mechanism for C++.

Text Books:

1. C++ How to Program by H M Deitel and P J Deitel, 1998, Prentice Hall
2. Object Oriented Programming in Turbo C++ by Robert Lafore ,1994, The WAITE Group Press.
3. Programming with C++ By D Ravichandran, 2003, T.M.H

Reference books:

1. Computing Concepts with C++ Essentials by Horstmann, 2003, John Wiley,
2. The Complete Reference in C++ By Herbert Schildt, 2002, TMH.

BT ECO-405 **Economics**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs.

Note: Five questions will be set in all by the examiner.

Unit-I
Definition of Economics-various definitions, circular flow of economic activity, Production possibility curve. Economic laws and their nature. Relation between Science, Engineering, Technology and Economics. Concepts and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility - its practical application and importance, the concept of equilibrium

Unit-II
Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve, Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & applications of the concept of elasticity of demand, the indifference curve theory, consumers surplus

Unit-III
Objective of business firm, Meaning of production and factors of production; Law of variable proportions, Returns to scale, Internal and External economics and diseconomies of scale. Various concepts of cost - Fixed cost, variable cost, average cost, marginal cost, money cost, real cost opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run.

Unit-IV
Meaning of Market, Types of Market - Perfect Competition, Monopoly, Oligoply, Monoplistic Competition (Main features of these markets) Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on prices.
Nature and characteristics of Indian economy (brief and elementary introduction), national income concept, Privatization - meaning, merits and demerits, Balance of payment, Globalisation of Indian economy - merits and demerits. Elementary Concepts of VAT, WTO, GATT & TRIPS agreement, IMF, World Bank.

Text Books:
1. Principles of Economics: P.N. Chopra (Kalyani Publishers).
2. Modern Economic Theory – K.K. Dewett (S.Chand)

Reference Books:
1. A Text Book of Economic Theory Stonier and Hague (Longman's Landon)
2. Micro Economic Theory – M.L. Jhingan (S.Chand)
3. Micro Economic Theory - H.L. Ahuja (S.Chand)
4. Modern Micro Economics: S.K. Mishra (Pragati Publications)
5. Economic Theory - A.B.N. Kulkarni & A.B. Kalkundrikar (R.Chand & Co.)
6. Indian Economy: Rudar Dutt & K.P.M. Sundhram
7. Indian Economy-Mishra &Puri

BT ENV- 401 **ENVIRONMENTAL STUDIES**

Total Credit: 00
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs.

Note: Five questions will be set in all by the examiner.

Unit 1: Introduction to Environmental Science and Natural Resources

The multidisciplinary nature of Environmental Studies. Definition, scope and importance, need for public awareness

Renewable and non-renewable resources: Land resources: Land as a resource, land degradation, soil erosion and desertification. Forest resources: Use and over-exploitation, deforestation, case studies. Water resources: Use and over-utilization of surface and ground water

Unit 2: Ecosystems, Biodiversity and its Conservation

Concept of an ecosystem. Structure and function of an ecosystem. Energy flow in the ecosystem. Food chains, food webs and ecological pyramids.

Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Hot-spots of biodiversity. Threats to biodiversity, Endangered and endemic species of India. Conservation of biodiversity.

Unit 3: Environmental Pollution, Environment policies & laws

Definition, Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Nuclear hazards. Solid waste management. Pollution case studies.

Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

Unit 4: Human Population and Environment and Fieldwork

Human population growth, Impacts on environment, human health and welfare. Environmental Movements: Chipko, silent valley, Bishnois of Rajasthan.

Visit to a local area to document environmental assets—river/forest/grassland/hill/ mountain. Visit to a local polluted site—Urban/Rural/Industrial/Agricultural.Study of common plants, insects, birds. Study of simple ecosystems—pond, river, hill slopes, etc.

Reference books

1. Cunningham, W.P. and Saigo, B.W., 1995. Environmental Science. W.M.C. Brown Publishers, New York, USA.
2. Enger, D.E. and Smith B.F., 1995. Environment Science–A Study of Interrelationships. W.M.C. Brown Publishers, New York, USA.
3. Gupta, P.K., 1997, Elements of Biotechnology, Rastogi Publications, Meerut.
4. Negi, B.S., 1991, Geography of Resources, Kedar Nath Ram Nath, Meerut.
5. Odum, E.P., 1996, Fundamentals of Ecology, Natraj Publishers, Dehradun.
6. Kaushik A and Kaushik C P. 2008. Perspectives in Environmental Studies, New age International Publishers, New Delhi.
7. Rastogi, V.B., 1993, Environmental Biology and Biochemistry, Kedar Nath Ram Nath, Meerut and Delhi.
8. Sharma, P.D., 1997, Ecology and Environment, Rastogi Publications, Meerut.
9. Singh, S., 1997, Physical-Geography, Prayag Pustak Bhavan, Allahabad.
10. Trivedi, P.R., 1999, Encyclopaedia of Ecology and Environment, 1-10, Indian Institute of Ecology and Environment, New Delhi.

BT CSE-403 **Intelligent Systems**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit 1

Fundamental Issues in IS : Defi. of AI , History ,Domains AI ,AI problems & State space ,Some examples problems representations like Travelling Salespersons ,Syntax analysis Problem .Basic issues to solve AI problems ,Underlying assumptions ,AI techniques ,Level of model ,Criteria for success ,Control strategies ,DFS,BFS

Unit 2

Heuristic search techniques : Generate & Test ,HillClimbing (simple & steepest),Best first search ,A*, AO*, Constraint satisfaction.

Reasoning under uncertainity :An introduction ,Default reasoning & Closed world assumptions ,Model & Temporal logic ,Fuzzy logic ,Basian Probabilstic inference ,Dempster Shafer theory ,Heuristic reasoning methods

Unit 3

Knowledge representation issues :Systax & Semantic for Propositional logic ,Syntax & Semantic for FOPL, Properties for WFF's, Resolution Basics :conversion to clausal form ,Resolution of proposition logic ,Resolution algorithms for predicates ,Problems with FOPL ,Semantic nets ,Frames ,Scripts

Unit 4

Planning & Learning :Planning ,Planning in Situational calculus ,Representation for planning ,Partial order palnning, Partial order palnning algorithm ,Learning by Examples ,Learning by Analogy ,Explanation based learning ,Neurals nets ,Genetics algorithms MINIMAX Game playing strategy ,Natural language processing ,Overview of linguistics ,Grammer & Language ,Transformation Grammer ,Basic Parsing Techniques, Expert System ,Architecture of Rule based Expert system ,Non Rule based Expert system.

Reference Books:

1. Elain Rich & Kevin Knight
2. Principals of AI(Nills .J.Nilsson)
3. DAN. W.Petterson
4. Petrick Henry Winston(AI)

BT CSE-404 **DBMS LAB**

Total Credit: 1
Max Marks: 50
External: 35
Internal Assessment: 15
Time Allowed: 3hrs.

I. Create a database and write the programs to carry out the following operation:

Add a record in the database
Delete a record in the database
Modify the record in the database
Generate queries
Generate the report
List all the records of database in ascending order.

II Develop two menu driven projects for management of database system:

1. Library information system
3 Engineering
4 MCA
2. Inventory control system
2 Computer Lab
3 College Store
3. Student information system
6 Academic
7 Finance
4. Time table development system
8 CSE, IT & MCA Departments
9 Electrical & Mechanical Departments

Usage of S/w:

1. VB, ORACLE and/or DB2
2. VB, MSACCESS
3. ORACLE, D2K
4. VB, MS SQL SERVER 2000

BT CSE-405 **C++ Programming Lab**

Total Credit: 1
Max Marks: 50
External: 35
Internal Assessment: 15
Time Allowed: 3hrs.

1. Raising a number n to a power p is the same as multiplying n by itself p times. Write a function called power ( ) that takes a double value for n and an int value for p, and returns the result as double value. Use a default argument of 2 for p, so that if this argument is omitted, the number will be squared. Write a main ( ) function that gets values from the user to test this function.
2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example, (4,5) represents a point 4 units to the right of the origin along the X axis and 5 units up the Y axis. The sum of two points can be defined as a new point whose X coordinate is the sum of the X coordinates of the points and whose Y coordinate is the sum of their Y coordinates. Write a program that uses a structure called point to model a point. Define three points, and have the user input values to two of them. Than set the third point equal to the sum of the other two, and display the value of the new point. Interaction with the program might look like this:
   Enter coordinates for P1: 3 4 Enter
   coordinates for P2: 5 7 Coordinates of P1 +
   P2 are: 8,
3. Create the equivalent of a four function calculator. The program should request the user to enter a number, an operator, and another number. It should then carry out the specified arithmetical operation: adding, subtracting, multiplying, or dividing the two numbers. (It should use a switch statement to select the operation). Finally it should display the result. When it finishes the calculation, the program should ask if the user wants to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with the program might look like this.
   Enter first number, operator, second number: 10/ 3 Answer
   = 3.333333
   Do another (Y/ N)? Y
   Enter first number, operator, and second number 12+ 100 Answer
   = 112
   Do another (Y/ N)? N
4. A phone number, such as (212) 767-8900, can be thought of as having three parts: the area code (212), the exchange (767) and the number (8900). Write a program that uses a structure to store these three parts of a phone number separately. Call the structure phone. Create two structure variables of type phone. Initialize one, and have the user input a number for the other one. Then display both numbers. The interchange might look like this:
   Enter your area code, exchange, and number:
   415 555 1212 My number is (212) 767-8900
   Your number is (415) 555-1212

5. Create two classes DM and DB which store the value of distances. DM stores distances in metres and centimeters and DB in feet and inches. Write a program that can read values fortheclass objects and add one object of DM with another object of DB. Use a friend function to carry out the addition operation. The object that stores the results maybe a DM object or DB object, depending on the units in which the results are required. The display should be in the format of feet and inches or metres and cenitmetres depending on the object on display.

6. Create a class rational which represents a numerical value by two double values-NUMERATOR & DENOMINATOR. Include the following public member Functions:
   Constructor with no arguments (default). Constructor
   with two arguments.
   void reduce( ) that reduces the rational number by eliminating the highest common factor between the numerator and denominator.
   Overload + operator to add two rational number. Overload >>
   operator to enable input through cin.
   Overload << operator to enable output through cout. Write a main
   ( ) to test all the functions in the class.

7. Consider the following class definition class father
   {
   protected : int age;
   public;
   father (int x) {age=x;} virtual void iam (
)
   { cout < < "I AM THE FATHER, my age is : "<< age<< endl:} };
   Derive the two classes son and daughter from the above class and for each, define iam ( ) to write our similar but appropriate messages. You should also define suitable constructors for these classes.
   Now, write a main ( ) that creates objects of the three classes and then calls iam ( ) for them. Declare pointer to father. Successively, assign addresses of objects of the two derived classes to this pointer and in each case, call iam ( ) through the pointer to demonstrate polymorphism in action.

8. Write a program that creates a binary file by reading the data for the students from the terminal. The data of each student consist of roll no., name (a string of 30 or lesser no. of characters) and marks.

9. A hospital wants to create a database regarding its indoor patients. The information to store include
a) Name of the patient
b) Date of admission
c) Disease
d) Date of discharge
Create a structure to store the date (year, month and date as its members). Create a base class to store the above information. The member function should include functions to enter information and display a list of all the patients in the database. Create a derived class to store the age of the patients. List the information about all the to store the age of the patients. List the information about all the pediatric patients (less than twelve years in age).

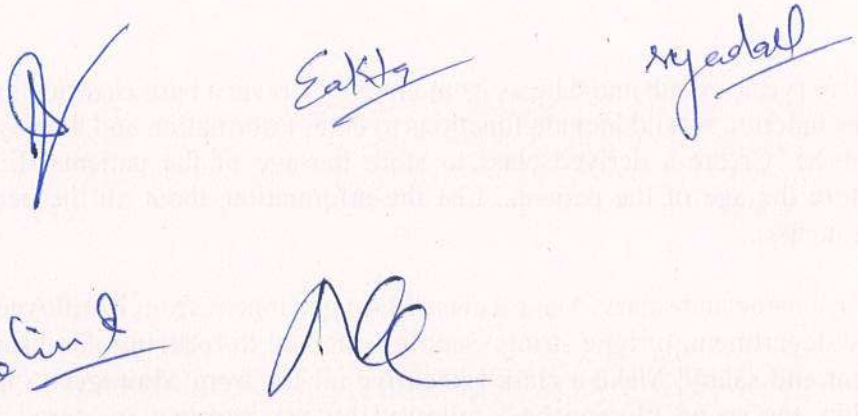
10. Make a class **Employee** with a name and salary. Make a class **Manager** inherit from **Employee**. Add an instance variable, named department, of type string. Supply a method to **toString** that prints the manager's name, department and salary. Make a class **Executive** inherit from **Manager**. Supply a method **to String** that prints the string **"Executive"** followed by the information stored in the **Manager** superclass object. Supply a test program that tests these classes and methods.

11. Imagine a tollbooth with a class called toll Booth. The two data items are a type unsigned int to hold the total number of cars, and a type double to hold the total amount of money collected. A constructor initializes both these to 0. A member function called payingCar ( ) increments the car total and adds 0.50 to the cash total. Another function, called nopayCar ( ), increments the car total but adds nothing to the cash total. Finally, a member function called displays the two totals. Include a program to test this class. This program should allow the user to push one key to count a paying car, and another to count a nonpaying car. Pushing the ESC kay should cause the program to print out the total cars and total cash and then exit.

12. Write a function called reversit ( ) that reverses a string (an array of char). Use a for loop that swaps the first and last characters, then the second and next to last characters and so on. The string should be passed to reversit ( ) as an argument. Write a program to exercise reversit ( ). The program should get a string from the user, call reversit ( ), and print out the result. Use an input method that allows embedded blanks. Test the program with Napoleon's famous phrase, "Able was I ere I saw Elba)".

13. Create some objects of the string class, and put them in a Deque-some at the head of the Deque and some at the tail. Display the contents of the Deque using the forEach ( ) function and a user written display function. Then search the Deque for a particular string, using the first That ( ) function and display any strings that match. Finally remove all the items from the Deque using the getLeft ( ) function and display each item. Notice the order in which the items are displayed: Using getLeft ( ), those inserted on the left (head) of the Deque are removed in "last in first out" order while those put on the right side are removed in "first in first out" order. The opposite would be true if getRight ( ) were used.

14. Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get_data ( ) to initialize base class data members and another member function display_area ( ) to compute and display the area of figures. Make display_area ( ) as a virtual function and redefine this function in the derived classes to suit their requirements. Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively and display the area. Remember the two values given as input will be treated as lengths of two sides in the case of rectangles and as base and height in the case of triangles and used as follows:
Area of rectangle = x * y Area of triangle
= ½ * x * y



BT CSE-406 **Intelligent Systems Lab**

Total Credit: 1
Max Marks: 50
External: 35
Internal Assessment: 15
Time Allowed: 3hrs

1. Study of PROLOG.

Write the following programs using PROLOG.

2. Write a program to solve 8 queens problem.
3. Solve any problem using depth first search.
4. Solve any problem using best first search.
5. Solve 8-puzzle problem using best first search
6. Solve Robot (traversal) problem using means End Analysis.
7. Solve traveling salesman problem.

Semester 5

BT CSE-501 **Principles of Operating Systems**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs.

Note: Five questions will be set in all by the examiner.

Unit-1:
Introduction: Introduction to Operating System Concepts (including Multitasking, multiprogramming, multi user, Multithreading etc)., Types of Operating Systems: Batch operating system, Time-sharing systems, Distributed OS, Network OS, Real Time OS; Various Operating system services, architecture, System programs and calls.

Unit–2:
Process Management: Process concept, process scheduling, operation on processes; CPU scheduling, scheduling criteria, scheduling algorithms -First Come First Serve (FCFS), Shortest-Job-First (SJF), Priority Scheduling, Round Robin(RR), Multilevel Queue Scheduling.
Process-Synchronization & Deadlocks: Critical Section Problems, semaphores; methods for handling deadlocks-deadlock prevention, avoidance & detection; deadlock recovery

Unit–3:
Memory Management: Logical & Physical Address Space, swapping, contiguous memory allocation, non-contiguous memory allocation paging and segmentation techniques, segmentation with paging; virtual memory management - Demand Paging & Page-Replacement Algorithms; Demand Segmentation.
Unit–4:
File System: Different types of files and their access methods, directory structures, various allocation methods, disk scheduling and management and its associated algorithms, Introduction to distributed file system.
UI/O Systems: I/O Hardware, Application I/O Interface, Kernel and Transforming I/O requests, Performance Issues.
Case Study
Unix/Linux system call for processes and file system management, Shell programming, Overview of Windows XP

Text Books:

1. Operating System Concepts by Silberchatz et al, 5th edition, 1998, Addison-Wesley.
2. Modern Operating Systems by A. Tanenbaum, 1992, Prentice-Hall.
3. Operating Systems Internals and Design Principles by William Stallings,4th edition, 2001, Prentice-Hall

Reference Books:

1. Operating System By Peterson , 1985, AW.
2. Operating System By Milankovic, 1990, TMH.
3. Operating System Incorporating With Unix & Windows By Colin Ritche, 1974, TMH.
4. Operating Systems by Mandrik & Donovan, TMH
5. Operating Systems By Deitel, 1990, AWL.
6. Operating Systems – Advanced Concepts By Mukesh Singhal , N.G. Shivaratri, 2003, T.M.H
7. Unix Shell Programming by Yashwant Kanetkar

BT CSE-502 **Computer Graphics & Multimedia technology**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs.

Note: Five questions will be set in all by the examiner.

Unit-1:
Introduction to Computer Graphics: What is Computer Graphics, Computer Graphics Applications, Computer Graphics Hardware and software, Two dimensional
Graphics Primitives: Points and Lines, Line drawing algorithms: DDA, Bresenham's; Circle drawing algorithms: Using polar coordinates, Bresenham's circle drawing, mid point circle drawing algorithm; Filled area algorithms: Scanline: Polygon filling algorithm, boundary filled algorithm.

Unit-2:
Two/Three Dimensional Viewing: The 2-D viewing pipeline, windows, viewports, window to view port mapping; Clipping: point, clipping line (algorithms):- 4 bit code algorithm, Sutherland-cohen algorithm, parametric line clipping algorithm (Cyrus Beck).
Polygon clipping algorithm: Sutherland-Hodgeman polygon clipping algorithm. Two-dimensional transformations: transformations, translation, scaling, rotation, reflection, and composite transformation. Three-dimensional transformations: Three-dimensional graphics concept, Matrix representation of 3-D Transformations, Composition of 3-D transformation.

Unit-3:
Viewing in 3D: Projections, types of projections, the mathematics of planner geometric projections, coordinate systems.
Hidden surface removal: Introduction to hidden surface removal. The Z- buffer algorithm, scan line algorithm, area sub-division algorithm.

Unit-4:
Image Compression & Standards: Making still images; editing and capturing images; scanning images; computer color models; color palettes; vector drawing; 3D drawing and rendering; JPEG-objectives and architecture; JPEG-DCT encoding and quantization, JPEG statistical coding, JPEG predictive loss less coding; JPEG performance; overview of other image file formats as GIF, TIFF, BMP, PNG etc.

Text Books:
1. Computer Graphics Principles and Practices second edition by James D. Foley, Andeies van Dam, Stevan K. Feiner and Johb F. Hughes, 2000, Addision Wesley.
2. Computer Graphics by Donald Hearn and M.Pauline Baker, 2nd Edition, 1999, PHI

Reference Books:
1. Procedural Elements for Computer Graphics – David F. Rogers, 2001, T.M.H Second Edition
2. Fundamentals of 3Dimensional Computer Graphics by Alan Watt, 1999, Addision Wesley.
3. Computer Graphics: Secrets and Solutions by Corrign John, BPB
4. Graphics, GUI, Games & Multimedia Projects in C by Pilania & Mahendra, Standard Publ.

BT CSE-503 **Theory of Computation**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs.

Note: Five questions will be set in all by the examiner.

UNIT-1

Finite Automata and Regular Expressions: Finite State Systems, Basic Definitions Non-Deterministic finite automata (NDFA), Deterministic finite automata (DFA), Equivalence of DFA and NDFA Finite automata with e-moves, Regular Expressions, Equivalence of finite automata and Regular Expressions, Regular expression conversion and vice versa.

UNIT-2

Introduction to Machines: Concept of basic Machine, Properties and limitations of FSM. Moore and mealy Machines, Equivalence of Moore and Mealy machines, Conversion of NFA to DFA by Arden's Method.

Properties of Regular Sets: The Pumping Lemma for Regular Sets, Applications of the pumping lemma, Closure properties of regular sets, Myhill-Nerode Theorem and minimization of finite Automata, Minimization Algorithm.

UNIT-3

Grammars: Definition, Context free and Context sensitive grammar, Ambiguity regular grammar, Reduced forms, Removal of useless Symbols and unit production, Chomsky Normal Form (CNF), Griebach Normal Form (GNF).

Pushdown Automata: Introduction to Pushdown Machines, Application of Pushdown Machines

UNIT-4

Turing Machines: Deterministic and Non-Deterministic Turing Machines, Design of T.M, Halting problem of T.M., PCP Problem.

Chomsky Hierarchies: Chomsky hierarchies of grammars, Unrestricted grammars, Context sensitive languages, Relation between languages of classes.

Computability: Basic concepts, Primitive Recursive Functions.

Text Books:

1. Introduction to automata theory, language & computations- Hopcroaft & O.D.Ullman, R Mothwani, 2001, AW

Reference Books:

2. Theory of Computer Sc.(Automata, Languages and computation):K.L.P.Mishra & N.Chandrasekaran, 2000, PHI.
3. Introduction to formal Languages & Automata-Peter Linz, 2001, Narosa Publ.

BT CSE-504 **Computer Graphics and Multimedia Lab**

Total Credit: 2
Max Marks: 50
External: 35
Internal Assessment: 15
Time Allowed: 3hrs.

List of programs:-

1. Write a program for 2D line drawing as Raster Graphics Display.
2. Write a program for circle drawing as Raster Graphics Display.
3. Write a program for polygon filling as Raster Graphics Display
4. Write a program for line clipping.
5. Write a program for polygon clipping.
6. Write a program for displaying 3D objects as 2D display using perspective transformation.
7. Write a program for rotation of a 3D object about arbitrary axis.
8. Write a program for Hidden surface removal from a 3D object.

BT CSE-505 **Operating System Lab**

Total Credit: 2
Max Marks: 50
External: 35
Internal Assessment: 15
Time Allowed: 3hrs.

1. Simulate the following CPU scheduling algorithms
    a. Round Robin
    b. SJF
    c. FCFS
    d. Priority
2. Simulate all file allocation strategies
    a. Sequential
    b. Indexed
    c. Linked
3. Simulate MVT and MFT memory management techniques.
4. Simulate all File Organization Techniques
    a. Single level directory
    b. Two level
    c. Hierarchical
    d. DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms
    a. FIFO
    b. LRU
    c. LFU
8. Simulate Paging technique of memory management.

List of DCEC: (To be taken by students of the department only.)

BT CSE 506 **Wireless Communication.**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs.

Note: Five questions will be set in all by the examiner.

Unit-1:
Introduction to Wireless Communication System: Evolution of mobile radio communications, examples of wireless communication systems, paging systems, Cordless telephone systems, comparison of various wireless systems.
Modern Wireless Communication System: Second generation cellular networks, third generation wireless networks, wireless in local loop, wireless local area networks, Blue tooth and Personal Area Networks.

Unit-2:
Introduction to Cellular Mobile Systems: Spectrum Allocation, Basic cellular Systems, performance criteria, Operation of Cellular systems, Analog cellular systems, Digital cellular systems.
Cellular System Design Fundamentals: Frequency Reuse, channel assignment strategies, hand off strategies, Interference and system capacity, tracking and grade off service, improving coverage and capacity.

Unit-3:
Multiple Access Techniques for Wireless Communication: Introduction to Multiple Access, FDMA, TDMA, spread Spectrum multiple Access, space division multiple access, packet ratio, capacity of a cellular systems.
Wireless Networking: Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless network, wireless data services, common channel signaling, ISDN (Integrated Service Digital Networks), Advanced Intelligent Networks.

Unit-4:
Intelligent cell concept and application: Intelligent cell concept, Applications of intelligent micro cell systems, in building communication, CDMA cellular radio networks. Bluetooth, GSM

Text Books:

1. Wireless Communications: Theodore S Rappaport; Pearsons
2. Mobile Cellular Telecommunication: W.C.Y. Lee; McGraw Hill

Reference Books:
1. Mobile Communications: Jochen Schiller; Pearson

BT CSE 507 **Fuzzy Logic**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs.

Note: Five questions will be set in all by the examiner.

Unit - 1
Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, a-cuts, Properties of a-cuts, Decomposition, Theorems, Extension Principle,
Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations

Unit -2
Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.
Fuzzy Relations: Crisp & Fuzzy Relations, Projections & Cylindric Extensions, Binary Fuzzy Relations, Binary Relations on single set, Equivalence, Compatibility & Ordering Relations, Morphisms, Fuzzy Relation Equations.

Unit - 3
Possibility Theory: Fuzzy Measures, Evidence & Possibility Theory, Possibility versus Probability Theory.
Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

Unit – 4
Uncertainty based Information: Information & Uncertainity, Nonspecificity of Fuzzy & Crisp sets, Fuzziness of Fuzzy Sets.
Applications of Fuzzy Logic in soft computing.

Text / Reference books :

1. Fuzzy Sets, Uncertainty & Information by G.J.Klir & T.A. Folyger, PHI, 1988.
2. Fuzzy sets & Fuzzy logic by G.J.Klir & B.Yuan, PHI, 1995.

BT CSE 508 **Embedded System Design**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs.

Note: Five questions will be set in all by the examiners.

UNIT – I

Introduction to an embedded systems design & RTOS: Introduction to Embedded system, Processor in the System, Microcontroller, Memory Devices, Embedded System Project Management, ESD and Co-design issues in System development Process, Design cycle in the development phase for an embedded system, Use of target system or its emulator and Incircuit emulator, Use of software tools for development of an ES. Inter-process Communication and Synchronization of Processes, Tasks and Threads, Problem of Sharing Data by Multiple Tasks, Real Time Operating Systems: OS Services, I/O Subsystems, Interrupt Routines in RTOS Environment, RTOS Task Scheduling model, Interrupt Latency and Response times of the tasks.

UNIT – II

Overview of Microcontroller: Microcontroller and Embedded Processors, Overview of 8051 Microcontroller family: Architecture, basic assembly language programming concepts, The program Counter and ROM Spaces in the 8051, Data types, 8051 Flag Bits ad PSW Register, 8051 Register Banks and Stack Instruction set, Loop and Jump Instructions, Call Instructions, Time delay generations and calculations, I/O port programming Addressing Modes, accessing memory using various addressing modes. Arithmetic instructions and programs, Logical instructions, BCD and ASCII application programs. Single-bit instruction programming. Reading input pins vs. port Latch, Programming of 8051 Timers, Counter Programming

UNIT – III

Communication with 8051: Basics of Communication, Overview of RS-232, I2C Bus, UART, USB, 8051 connections to RS-232, 8051 serial communication programming, 8051 interrupts, Programming of timer interrupts, Programming of External hardware interrupts, Programming of the serial communication interrupts, Interrupt priority in the 8051.

UNIT - IV

Interfacing with 8051: Interfacing an LCD to the 8051, 8051 interfacing to ADC, Sensors, Interfacing a Stepper Motor, 8051 interfacing to the keyboard, Interfacing a DAC to the 8051, 8255 Interfacing with 8031/51, 8051/31 interfacing to external memory.

TEXT BOOKS:

1. Raj Kamal, "Embedded Systems", TMH, 2004. 2. M.A. Mazidi and J. G. Mazidi, "The 8051 Microcontroller and Embedded Systems", PHI, 2004.

References Books:

1. David E. Simon, "An Embedded Software Primer", Pearson Education, 1999.
2. K.J. Ayala, "The 8051 Microcontroller", Penram International, 1991.
3. Dr. Rajiv Kapadia, "8051 Microcontroller & Embedded Systems", Jaico Press
4. Dr. Prasad, "Embedded Real Time System", Wiley Dreamtech, 2004.

BT CSE 509 **Object Oriented Systems Development**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs.

Note: Five questions will be set in all by the examiner.

Unit-1:
Introduction: Review of the Traditional Methodologies, Advantages of Object Oriented Methodologies over Traditional Methodologies, Classes, Objects, Encapsulation, Association, Aggregation, Inheritance, Polymorphism, States and Transitions.
Visual Modelling using Unified Modelling Language (UML): What is Visual Modelling? Object Oriented Modelling, Introduction to Unified Modelling Language (UML): History of UML, Overview of UML – Capabilities, Usage of UML.
Introduction to Rational Rose CASE tool: Introduction – Importance of Rational Rose, Capabilities of Rational Rose Case Tool.

Unit-2:
Introduction to Objectory Software Development Process: Introduction, Benefits, Phases and Iterations, Elaboration Stage, Construction Stage, Transition Stage.
Creating Use Case Diagrams: Actors and Use Cases, Use Case Relationships, Types of Relationships, Use Case Diagrams: Creating Main Use Case -,Relationships - , Additional Use Case - Diagrams in Rational Rose, Activity Diagrams Activities, Transitions, Decision Points, Swimlanes

Unit-3:
Identifying Classes ,Packages and drawing a Class Diagram: State, Behaviour, Identity of Objects, Stereotypes and Classes, Creating and Documenting Classes in rational Rose, Packages, Drawing a Class Diagram Specifying Relationships : The Need of Defining Relationships, Association and Aggregation Relationships, Naming Relationships, Role Names, Multiplicity Indicators, Reflexive Relationships, Package Relationships, Inheritance, Finding Relationships, Creating Relationships in Rational Rose
Discovering Object Interactions: Documenting Scenarios using Interaction Diagrams, Types of Interaction Diagrams, Adding Behaviour and Structure: Representing Behaviour and Structure, Creating Attributes & operations and documenting them, Displaying attributes and operations, Association Classes, Analysing Object Behaviour: Modelling Dynamic Behaviour, States

Unit-4:
Checking the Model: Making the Model Homogeneous, Combining Classes, Splitting Classes, Eliminating Classes, Consistency Checking, Scenario Walk-through, Event Tracing, Documentation Review, Designing the System Architecture : The need for Architecture, The "4+1" view of Architecture, The Logical view, The Component View, The Process View, The Deployment View, The Use Case view.
The Iteration Planning Process: Benefits, Goals, Design the User Interface, Adding Design Classes, The Emergence of Patterns, Designing Relationships, Designing Attributes and Operations, Designing for Inheritance, Coding, Testing, and
Documenting the Iteration.

Text Books:

1. "UML User Guide", Grady Booch, James Rumbaugh, Ivar Jacobson, 2000, Addison Wesley.
2. Visual Modeling with Rational Rose 2000 and UMLBy Terry Quatrani Foreword by Grady Booch, 2000

Reference Books:

1. "UML Reference Guide", James Rumbaugh, Ivar Jacobson, Grady Booch, 2000, Addison Wesley.
2. "The Objectory Software Development Process", Ivar Jacobson, Grady Booch,
3. James Rumbaugh, 1999, Addison Wesley.

BT CSE-510 **Software Engineering**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs.

Note: Five questions will be set in all by the examiner.

Unit-1:
Introduction: Evolving role of software, Software Characteristics, Software crisis, Silver bullet, Software myths, Software process, Personal Software Process (PSP), Team Software Process (TSP), emergence of software engineering, Software process, project and product
Software Metrics: Size oriented metrics, Function oriented metrics, Use-case oriented metrics, metrics for software quality, metrics collection and Software metrics program.
Software project management: Project management concepts, Planning the software project, Estimation—LOC based, FP based, Use-case based, empirical estimation COCOMO- A Heuristic estimation techniques, staffing level estimation, team structures, staffing, risk analysis and management, project scheduling and tracking.

Unit-2
Requirements, Analysis and specification: Requirements engineering, system modeling and simulation, Analysis principles, modeling, Specification principles, Representation, the software requirements specification and reviews Analysis Modeling: Data Modeling, Functional modeling and information flow: Data flow diagrams, Behavioral Modeling; The mechanics of structured analysis: Creating entity/ relationship diagram, data flow model, control flow model, the control and process specification; The data dictionary; Other classical analysis methods.

Unit-3
System Design: Design concepts and principles: the design process: Design and software quality, design principles; Design concepts: Abstraction, refinement, modularity, software architecture, control hierarchy, structural partitioning, data structure, software procedure, information hiding; Effective modular design: Functional independence, Cohesion, Coupling; Design Heuristics for effective modularity; The design model; Design documentation.
Architectural Design: Software architecture, Data Design: Data modeling, data structures, databases and the data warehouse, Analyzing alternative Architectural Designs, architectural complexity; Mapping requirements into a software architecture; Transform flow, Transaction flow; Transform mapping: Refining the architectural design. User Interface Design.

Unit-4
Testing and Maintenance: Testing terminology—error, bug/defect/fault, failure, Software Testing Techniques, software testing fundamentals: objectives, principles, testability; Software Testing Strategies: Verification and validation, Test case design, Static testing -- formal technical reviews: The review meeting, review reporting and record keeping, review guidelines, Dynamic testing--- Black box testing—Boundaru value analysis, White box testing-- basis path testing, Control structure testing, testing for specialized environments , architectures and applications., Unit testing, Integration testing,; Validation testing, alpha and beta testing; System testing: Recovery testing, security testing, stress testing, performance testing; The art of debugging, the debugging process debugging approaches.
Software Quality Models and Standards: : Quality concepts, Software quality assurance , SQA activities, Formal approaches to SQA; Statistical software quality assurance; CMM, The ISO 9000 Quality standards: The ISO approach to quality assurance systems, The ISO 9001 standard

Advanced topics in software Engineering: CASE tools, Change Management, Software re-engineering , reverse engineering ,restructuring, forward engineering, Clean Room software engineering

Text Book:

1. Software Engineering – A Practitioner's Approach, Roger S. Pressman, 1996, MGH.

Reference Books:

2. Fundamentals of software Engineering, Rajib Mall, PHI
3. Software Engineering by Ian sommerville, Pearson Edu, 5th edition, 1999, AW,
4. Software Engineering – David Gustafson, 2002, T.M.H
5. Software Engineering Fundamentals Oxford University, Ali Behforooz and Frederick J. Hudson 1995
6. JW&S,
7. An Integrated Approach to software engineering by Pankaj jalote , 1991 Narosa.

Semester 6

BT CSE-601 **Analysis and Design of Algorithms**

Total Credit: 4
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1:
Brief Review of Graphs, Sets and disjoint sets, union, sorting and searching algorithms and their analysis in terms of space and time complexity.
Divide and Conquer: General method, binary search, merge sort, quick sort, selection sort, Strassen's matrix multiplication algorithms and analysis of algorithms for these problems.

Unit-2:
Greedy Method: General method, knapsack problem, job sequencing with dead lines, minimum spanning trees, single source paths and analysis of these problems.

Unit-3:
Dynamic Programming: General method, optimal binary search trees, O/I knapsack, the traveling salesman problem.

Unit-4:
Back Tracking:General method, 8 queen's problem,graph coloring, Hamiltonian cycles, analysis of these problems.
Branch and Bound: Method, O/I knapsack and traveling salesman problem, efficiency considerations. Techniques for algebraic problems, some lower bounds on parallel computations,NP hard ,NP complete

Text Books:

1. Fundamental of Computer algorithms, Ellis Horowitz and Sartaj Sahni, 1978, Galgotia Publ.,
2. Introduction To Algorithms, Thomas H Cormen, Charles E Leiserson And Ronald L Rivest: 1990, TMH

Reference Books:

1. The Design and Analysis of Computer Algorithm, Aho A.V. Hopcroft J.E., 1974, Addison Wesley.
2. Algorithms-The Construction, Proof and Analysis of Programs, Berlion, P.Bizard, P., 1986.
3. Johan Wiley & Sons,
4. Writing Efficient Programs, Bentley, J.L., PHI
5. Introduction to Design and Analysis of Algorithm, Goodman, S.E. & Hedetnieni, 1997, MGH.

BT CSE-602 **Security of Information Systems**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1

Basic Encryption and Decryption: introduction to Ciphers, Mono-alphabetic Substitutions such as the Caesar Cipher, Cryptanalysis of Mono-alphabetic Ciphers, Poly-alphabetic Ciphers such as Vigenere Tableaux, Cryptanalysis of Poly-alphabetic Ciphers, Perfect Substitution Cipher such as the Vernam Cipher, Stream and Block Ciphers..

Unit-2

Properties of Arithmetic Operations: Inverses, Primes, Greatest Common Divisor, Euclidean Algorithm, Modular Arithmetic, Properties of Modular Arithmetic, Computing the inverse, Fermat's Theorem, Algorithm for Computing Inverses, Random number generation.

Secure Secret Key (Symmetric) Systems: Data Encryption Standard (DES), Analyzing and Strengthening of DES, Advance Encryption Standard (AES)

Public Key (Asymmetric key) Encryption Systems: Concept of Public key Encryption System, Introduction to Merkle-Hellman Knapsacks, Rivest-Shamir-Adelman (RSA) Encryption, Digital Signature Algorithms (DSA)

Hash Algorithms: Hash Concept, Description of Hash Algorithms, Message Digest Algorithms such as MD4 and MD5 , Secure Hash Algorithms(SHA) .

Unit–3

Applied Cryptography, Protocols and Practice: Key Management Protocols: Diffie-Hellman Algorithm, Key Exchange with Public Key Cryptography.

Public Key Infrastructure (PKI): Concept of Digital Certificate, Certificate Authorities and it's roles, X509 Structure of Digital Certificate.

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations;

Web Security: Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction

Unit–4

Operating System, Database and Program Security: Operating Systems Security: Security Policies, Models of Security, Security Features of Ordinary and trusted Operating System.

Database Security: Security Requirements of Databases, Reliability and Integrity, Protection of Sensitive Data.

Program Security: Kinds of Malicious Code, Virus Signatures, Preventing Virus Infection, Trapdoors, Convert Channels, Control Against Program Threats.

Books:

1. William Stalling, Cryptography and Network Security, 3rd Edition. PHI New Delhi
2. William Stalling, Network Security Essentials, 2nd Edition. PHI New Delhi
3. Charlie Kaufman, Network Security: Private Communication in Public World, 2nd Edition PHI, New Delhi

BT CSE-603 **Advanced Java**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1

Introduction to Java, Data types, variables, operators, Arrays, Control Statements, Classes & Methods, Inheritance, Exception Handling, Multithreading, Collections, I/O streams, AWT & Applet Programming.

Connecting to a Server, Implementing Servers, Sending E-Mail, Making URL Connections, Advanced Socket Programming

Unit-2

The Design of JDBC. The Structured Query Language, JDBC Installation, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable Result Sets, Matadata, Row Sets, Transactions, Advanced Connection Management, Introduction of LDAP

The Roles of Client and Server, Remote Method Invocations, Setup for Remote Method Invocation, Parameter Passing in Remote Methods Server Object Activation, Java IDL and CCRA, Remote Method Calls with SOAP

Unit-3

SWING: Lists, Trees, Tables, Styled Text Components, Progress Indicators, Component Organizers

AWT :The Rendering Pipeline, Shapes, Areas, Strokes, Paint, Coordinate Transformations, Clipping, Transparency and Composition, Rendering Hints, Readers and Writers for Images, Image Manipulation, Printing. The Clipboard, Drag and Drop

Unit-4

JAVABEANS COMPONENTS: Beans, the Bean-Writing Process, Using Beans to Build an Application, Naming Patterns for Bean Components and Events, Bean Property Tubes Bean info Classes Property Editors Customizes.

SECURITY: Class Loaders, Bytecode Verification, Security Managers and Permissions, Digital Signatures, Code Signing, Encryption

TEXT BOOK:

1. Core Java TM 2, Volume II-Advanced Features, 7th Edition by Cay Horetmann, Gary Cornelll Pearson Publisher, 2004

REFERENCE BOOKS:

1. Professional Java Programming by Brett Spell, WROX Publication
2. Advanced Java 2 Platform, How to Program, 2nd Edition, Harvey. M. Dietal, Prentice Hall

BT CSE-604 **Advanced Java Lab**

Total Credit: 2
Max Marks: 50
External: 35
Internal Assessment: 15
Time Allowed: 3hrs

Development of programs relating to:

1. JDBC
2. Servlets
3. Beans
4. RMI
5. JSP

Note : At least 10 programs are required to be developed in the semester.

BT CSE-605 **MAT Lab**

Total Credit: 2
Max Marks: 50
External: 35
Internal Assessment: 15
Time Allowed: 3hrs

Unit 1:
MAT Lab Fundamentals: Introduction, platforms and versions, launching MATLAB, window, help features, types of file, creating directory and saving files, notation, syntax and operations, constants, variables and expression, some built in function, commands, problems.

Unit 2:
Vectors & Matrices: Addition, subtraction, multiplication, vector products and transpose, commands, problems.

Unit 3:
MAT Lab Programming: Input-Output Statements: data input, interactive input, output command. Programming in M files, script and function files, variables, data types, operators, control structures

Unit 4:
Graphics Using MAT Lab: Creating plots, 2-D, 3-D, multiple plots, editing plots, visualizing function of two variables, image printing graphics, handle graphics, GUI, problems.

Unit 5:
Introduction to Toolboxes: The symbolic math toolbox, control system toolbox, signal processing toolbox, communication toolbox, MATLAB applications, animation, problems.

Unit 6:
Simulink Basics: Introduction, simulink model editor, simulink library, blocksets, running a simulation, building simple model, problems with models.

Reference Books:
1. MATLAB and its Applications in Engineering, Raj Kumar Bansal, Ashok Kumar Goel, Manoj Kumar, Pearson Education.
2. Partha S Mallick, Matlab and Simulink: Introduction to Applications, 2nd edi, SCITECH.
3. K K Mishra, Numerical Technique Lab Matlab Based Experiments, I K international publishing house.

NOTE: At least 10 experiments are to be performed by students in the semester as per the scope of the syllabus.

List of DCEC: (To be taken by students of the department only.)

BT CSE-606 **Introduction to E-commerce & ERP**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1:
Introduction and Concepts: Networks and commercial transactions – Internet and other novelties; networks and electronic transactions today, Model for commercial transactions; Internet environment – internet advantage, worlds wide web and other internet sales venues; Online commerce solutions.
Electronic Payment Methods: Updating traditional transactions; Secure online transaction models; Online commercial environments; digital currencies and payment systems; Offline secure processing; private data networks. Security protocols.

Unit-2:
Electronic Commerce Providers: On-line Commerce options: Company profiles.
Electronic Payment Systems: Digital payment systems; First virtual internet payment system; cyber cash model. On-line Commerce Environments: Servers and commercial environments; Ecommerce servers.
Digital Currencies: Operational process of Digicash, Ecash Trail; Using Ecash; Smart cards; Electronic Data Interchange: basics, EDI versus Internet and EDI over Internet. Strategies, Techniques and Tools, Shopping techniques and online selling techniques.

Unit-3:
ERP- An Enterprise Perspective: Production Finance, Personnel disciplines and their relationship, Transiting environment, MIS Integration for disciplines, Information/Workflow, Network Structure, Client Server Integrator System, Virtual Enterprise.
ERP – Resource Management Perspective: Functional and Process of Resource. Management, Introduction to basic Modules of ERP System: HRD, Personnel Management, Training and Development, Skill Inventory, Material Planning and Control, Inventory, Forecasting, Manufacturing, Production Planning, Production Scheduling, Production Control, Sales and Distribution, Finance, Resource Management in global scenario.

Unit-4:
ERP - Information System perspective: Introduction to OLAP (Online Analysis and Processing), TP, OAS, KBS, MRP, BPR,. SCM, REP, CRM, Information Communication Technology.
ERP-Key Managerial issues: Concept Selling, IT Infrastructure, Implication, of ERP Systems on Business Organization, Critical success factors in ERP System, ERP Culture Implementation Issues, Resistance to change, ERP Selection issues, Return on Investment, Pre and Post Implementation Issue.

Text Book:

1. "Frontiers of electronics Commerce" Ravi lalakota, Andrew Whinston ,1996, Addision
   a. Wesley,

2. Enterprise Resource Planning-Concepts and Practice, V.K. Garg and N.K. Venkita Krishna, 1998, PHI.

Reference Books:

1. The SAP/3 Handbook, John Antonio, Fernandz, TMH.
2. "The E-Business Revolution" Denial amor Addision Wesley
3. "From Edi to E-Commerce: A Business Initiative" Sokol TMH
4. "E Commerce" Greenstein and Feinman TMH
5. "E Commerce" Excel, Diwan, Sharma

BT CSE 607 **Digital Image Processing**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1

Digital Image Processing concepts and Image enhancement: Components of Digital Image Processing System, Image sensing and acquisition, Image sampling, quantization and representation, Basic relationship between pixels. Image Enhancement in the Spatial Domain & Frequency domain: Background, Basic gray level transformation, Histogram processing, Basics of spatial filtering, Smoothing and Sharpening Spatial filters, Introduction to Fourier Transform and the Frequency Domain, Discrete Fourier Transform. Smoothing and Sharpening Frequency-Domain filters.

Unit-2:

Image Restoration: Image Degradation/Restoration Process, Noise models, Restoration in presence of noise, Inverse Filtering, Minimum Mean Square Filtering, Geometric mean filter, Geometric transformations. Color Fundamentals, Color models, Basis of full color image processing, Color transformations.

Unit-3:

Image Compression: Fundamentals, Image compression models, Error free compression, Lossy compression. Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region oriented segmentation.

Unit-4:

Representation, Description and Recognition: Representation-chain codes, polygonal approximation and skeletons, Boundary descriptors-simple descriptors, shape numbers, Regional descriptors- simple, topological descriptors, Pattern and Pattern classes-Recognition based on matching techniques.

Text Book:

1. Digital Image Processing by Rafael C.Gonzalez& Richard E. Woods –2002, Pearson Education

Reference Book:

1. Digital Image Processing by A.K. Jain, 1995,-PHI

BT CSE-608 **Data Warehousing and Data Mining**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1:
Introduction to Data Warehouse: Data warehousing Definition, usage and trends. DBMS Vs data warehouse, Data marts, Metadata, concept hierarchies, Multidimensional data model, Data cubes, Schemas for Multidimensional Database: star, snowflake and fact constellation; OLAP operations.

Unit-2:
Data Warehouse Design: The design process, 3-Tier data warehouse architecture, types of OLAP servers: ROLAP, MOLAP, HOLAP; distributed and virtual data warehouses, data warehouse process managers: Load manager, warehouse manger and query manager.
Data Warehouse Implementation: Computation of data cubes, modeling OLAP data, indexing, data warehouse back-end tools, complex aggregation at multiple granularities, tuning and testing of data warehouse.

Unit-3:
Data Mining: Definition & task, Data mining system architecture, KDD process, KDD versus data mining, data mining tools and applications.
Data mining query language: Basic concepts, task-relevant data specification, specifying knowledge, hierarchy specification, pattern presentation & visualization specification using DMQL, data mining languages and standardization.

Unit-4:
Data Mining Techniques: Association rule mining: a-priori algorithm, generating rules; Clustering techniques: partitioning methods, hierarchical and density based methods; Classification techniques: Decision tree knowledge discovery, back-propagation through Neural Networks, Genetic Algorithm, Rough Sets, Support Vector Machines and Fuzzy techniques; Prediction techniques: linear and non-linear regression.

Books:

1. Data Warehousing In the Real World; Sam Anahory & Dennis Murray; 1997, Pearson
2. Data Mining- Concepts & Techniques; Jiawei Han & Micheline Kamber- 2001, Morgan Kaufmann.
3. Data Mining Techniques; Arun Pujar; 2001, University Press; Hyderbad.
4. Data Mining; Pieter Adriaans & Dolf Zantinge; 1997, Pearson,
5. Data Warehousing, Data Miniing and OLTP; Alex Berson, 1997, Mc Graw Hill.
6. Data warehousing System; Mallach; 2000, Mc Graw Hill.
7. Building the Data Warehouse; W.H. Inman, 1996, John Wiley & Sons.
8. Developing the Data Warehouses; W.H Ionhman,C.Klelly, John Wiley & Sons.

BT CSE-609 **Real Time Systems**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit 1

Embedded Systems: What is an embedded system? Categories: Stand-alone, Real-time, Networked appliances, mobile devices. Requirements of Embedded systems, Challenges and issues in Embedded software development. Embedded Software Development Tools: Host and Target machines, Linker/ locators for embedded software, Getting embedded software into target system.

Real Time Embedded systems: Definition, characteristics, classification, release times, deadlines and timing constraints, temporal parameters of real-time workload, periodic task model, issues involved in real time system design.

Unit 2

Real Time Operating Systems: Typical structure of an RTOS, Scheduling strategies, priority structures, task management, memory management, code sharing, task co-operation and communication, interrupt routines in an RTOS environment, mutual exclusion, Liveness, Minimum operating system Kernel, capabilities of commercial RTOS: VxWorks, pSoS, Micro C/OS II.

Unit 3

Task assignment and Scheduling: Allocation / Scheduling problem, offline scheduling, online scheduling, pre-emptive / non-pre-emptive scheduling, static / dynamic scheduling, Rate-monotonic scheduling algorithm, problem of priority inversion, priority inheritance protocol, priority ceiling protocol, earliest-deadline-first scheduling algorithm

Real-Time Language Issues: Real-time language requirements, data typing, control structures, facilitating hierarchical decomposition, synchronization, packages, exception handling, overloading and generics, multitasking, low-level facilities

Unit 4

Fault Tolerance Techniques: Fault types, fault detection measures, fault detection mechanisms, fault and error containment, Redundancy: Hardware and software redundancy, time redundancy.**Case Study of RTLinux and VxWorks RTOS**

Text Books

1. Programming for Embedded systems by Dreamtech software team, Wiley Dreamtech India Pvt. Ltd.
2. Embedded Realtime systems programming, by Sriram V. Iyer and Pankaj Gupta.

Reference Books:

1. Realtime computer control by Stuart Bennett, Pearson Education
2. Real time systems by C. M. Krishna, McGraw-Hill
3. Embedded Systems by RajKamal, TMH

BT CSE 610 **Programming Languages**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by examiners.

Unit-1
Introduction: Syntactic and semantic rules of a Programming language, Characteristics of a good programming language, Programming language translators compiler & interpreters , Virtua Computers & Binding times; Introduction to procedural, non-procedural ,structured, functional and object oriented programming language, Comparison of C & C++ programming languages.

Unit-2
Elementary & Structured Data Types : Elementary data types – data objects, variable & constants, data types, Specification & implementation of elementary data types, Declarations ,type checking & type conversions , Assignment & initialization, Numeric data types, enumerations, Booleans & characters
Structured data types& data Objects , specification & implementation of structured data types, Declaration & type checking of data structure ,vector & arrays, records Character strings, variable size data structures , Union, pointer & programmer defined data objects, sets, files.

Unit–3
Sequence Control& Data Control: Implicit & explicit sequence control ,sequence control within expressions, sequence control within statement, Subprogram sequence control: simple call return ,recursive subprograms, Exception & exception handlers, co routines, sequence control .
Data Control:-Names & referencing environment, static & dynamic scope, block structure, Local data & local referencing environment, Shared data (dynamic & static scope) ; Parameters& parameter transmission schemes.

Unit-4
Storage Management& other features: Major run time elements requiring storage ,programmer and system controlled storage management & phases , Static storage management , Stack based storage management, Heap storage management ,variable & fixed size elements. Evolution of data type concept, abstraction, encapsulation & information hiding , Subprograms ,type definitions, abstract data types

TEXT BOOKS:
1. Programming languages Design & implementation by T.W. .Pratt, 1996, Prentice Hall Pub.
2. Programming Languages – Principles and Paradigms by Allen Tucker & Robert Noonan, 2002, TMH.
REFERENCE BOOKS:
1. Fundamentals of Programming languages by Ellis Horowitz, 1984, Galgotia publications (Springer Verlag),
2. Programming languages concepts by C. Ghezzi, 1989, Wiley Publications.

BT CSE-611 **Distributed Operating System**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1:
Introduction: Introduction to distributed systems, goals of distributed system, hardware and software concepts, design issues, communication in distributed systems: layered protcols, ATM networks, Client-server model ,Remote Procedure Calls and Group Communication. Middleware and Distributed Operating Systems.

Unit-2:
Synchronization in Distributed System: Clock synchronization, Mutual Exclusion, Election algorithm, the Bully algorithm, a Ring algorithm, Atomic Transactions, Deadlock in Distributed Systems, Distributed Deadlock Prevention, Distributed Deadlock Detection .

Unit-3:
Processes and Processors in distributed systems: Threads, System models, Processors Allocation, Scheduling in Distributed System, Real Time Distributed Systems.
Distributed file systems: Distributed file system Design, Distributed file system Implementation, Trends in Distributed file systems.

Unit-4:
Distributed Shared Memory: What is shared memory, Consistency models, Page based distributed shared memory, shared variables distributed shared memory.
Case study MACH: Introduction to MACH, process management in MACH, communication in MACH. UNIX emulation in MACH.

Text Book:

1. Distributed Operating System – Andrew S. Tanenbaum, PHI.

Reference books:

1. Mullendar S. Distributed Systems, 2nd Ed. Addison, Wesley 1994.
2. Sape Mullender, —Distributed Systemsl, 2nd Edition, Addison Wesley, 1993.
3. Albert Fleishman, —Distributed Systems: Software Design and Implementationl, Springer Verlag, 1994.
4. M. L. Liu, —Distributed Computing Principles and Applicationsl, Pearson Education, 2004.

BT CSE-612 **UNIX and Shell Programming**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit 1

Theoretical Concepts of UNIX Operating system: Evolution of UNIX, Basic features of UNIX, Architecture of UNIX kernel: File subsystem and process control subsystem, UNIX Vs LINUX, Various flavors of UNIX and LINUX.

Unit 2

File system of the UNIX OS: Parent-child relationship of files, Types of files, File system layout, data structures of the file subsystem; internal representation of files: inodes, accessing and releasing inodes, structure of regular files and directories, superblocks, inode and disk block assignment to a new file.
Process control system: Concept of a process, state transitions, data structures, Context of a process, Layout of the system memory, process scheduler, scheduling parameters, Fair share scheduler.
Memory management policies: Swapping: Data structures, implementation of swapping processes in and swapping out; Demand Paging: Data structures, page stealer process, fault handler.

Unit 3

UNIX Shells and Commands: Types of shells and their features, shell's interpretive cycle, Shell wild cards, Structure of UNIX command, Internal and external commands, Basic utilities, logging in and out, changing passwords, File and directory related Commands: Absolute and relative path names, Creation and deletion of files and directories, Compression of files, file permissions, basic operations on files, simple filters and advanced filters, printer commands, Process related commands, Communication related commands, I/O redirection: standard input, output and error, piping; Vi editor and related commands, TCP/IP networking commands.

Unit 4

Shell Programming: Shell variables, interactive shell scripts, shell keywords, positional parameters, using shift on positional parameters, passing command line arguments, arithmetic operations, taking decisions, loop control structures.
System Administration: The administrator privileges, maintaining security, user and group management, startup and shut down, Disk related commands, Backup and recovery, password aging, advanced administration commands.

Text Books:

1. The Design of the UNIX Operating System: Maurice J Bach, PHI
2. UNIX: Concepts and Applications: Sumitabha Das, Tata McGraw Hill.
3. UNIX Shell Programming: Yashwant Kanetkar, BPB publications.

BT CSE-613 **Neural Networks**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1:
Overview of biological neurons: Structure of biological neurons relevant to ANNs.
Fundamental concepts of Artificial Neural Networks: Models of ANNs; Feed forward & feedback networks; learning rules; Hebbian learning rule, perception learning rule, delta learning rule, Widrow-Hoff learning rule, correction learning rule, Winner –lake all learning rule, etc.

Unit-2:
Single layer Perception Classifier: Classification model, Features & Decision regions; training & classification using discrete perception, algorithm, single layer continuous perception networks for linearly separable classifications.
Multi-layer Feed forward Networks: linearly non-separable pattern classification, Delta learning rule for multi-perceptron layer, Generalized delta learning rule, Error back-propagation training, learning factors, Examples.

Unit-3:
Single layer feedback Networks: Basic Concepts, Hopfield networks, Training & Examples.
Self organizing networks: UN supervised learning of clusters, winner-take-all learning, recall mode, Initialization of weights, separability limitations.

Unit-4:
Associative memories: Linear Association, Basic Concepts of recurrent Auto associative memory: retrieval algorithm, storage algorithm; By directional associative memory, Architecture, Association encoding & decoding, Stability.

Books:

1. Introduction to artificial Neural systems by Jacek M. Zurada, 1994, Jaico Publ. House.
2. "Neural Networks :A Comprehensive formulation", Simon Haykin, 1998, AW
3. "Neural Networks", Kosko, 1992, PHI.
4. "Neural Network Fundamentals" – N.K. Bose , P. Liang, 2002, T.M.H

Semester 7

BT CSE-701 **Advanced Computer Architecture**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

UNIT 1
Introduction to Parallel Processing Parallelism in uniprocessor system, pipelining, basic assumptions, design techniques, designing pipelined data path, propagating an instruction queue through the pipeline, pipeline hazards and their detection, forwarding, instruction level parallelism, superscalar architecture, general pipeline and reservation tables, principles of linear pipelining, Instruction and arithmetic pipeline, principles of designing pipelined processor, vector processing overview, micro-programming, general approach, micro-code engine, control store, branching and looping, horizontal and vertical micro-code scheme with example, alternative approach to micro-coding.

UNIT 2
Architecture of Distributed Systems:- Introduction, Examples, Distributed Systems versus Parallel Systems, Partial Orders, Models of Distributed Systems, Architectural Models, Fundamental Models, Interleaving Model, Happened Before Model, Partial Causality Model, Appropriate Model, Models Based on states, Time and Global States, Clocks, Events, Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Vector Clocks, Global States, Distributed Debugging.

UNIT 3
Array Processors SIMD Array Processors-SIMD Computer Organizations, Masking and Data Routing mechanisms, Inter-PE Communications, SIMD interconnection network, Static Vs. Dynamic Networks, Mesh-connected iliac Network, cube interconnection networks, Barrel Shifter and data manipulator, Shuffle exchange and Omega Networks, Parallel Algorithms for array processors – SIMD Matrix multiplication, parallel sorting on Array Processors – SIMD Fast Fourier Transform, connection issues for SIMD Processing, Associative Array processing, Associative memory organizations, Associative processors, associative search algorithms.

UNIT 4
Multiprocessor Architecture Functional structures, loosely coupled multiprocessors, Tightly coupled multiprocessors, processor characteristics for multiprocessing, Inter-connection Networks, time shared or common buses, crossbar switch and multi-port memories, multistage networks for multiprocessors, performance of interconnection networks, Parallel memory organizations, interleaved memory configuration, performance tradeoffs in memory organizations, multi-cache problems and solutions.

TEXT BOOKS:
1. Vincent P. Houring & Harry F. Jordan, Computer Systems Design and Architecture, Addison Wesley Longman, Pearson Education.
2. Hwang and F.A.Briggs: Computer Architecture and Parallel Processing, McGraw Hill.

REFERENCE BOOKS:

1. Distributed Systems: Concepts and Design; G. Colouris, J. Dollimore, T. Kindberg 3/e Pearson Ed. 2002
2. Principals of Distributed Systems; V.K.Garg, Kluwer Academic Publishers, 1996.

BT CSE-702 **Computer Networks**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

UNIT-1
OSI Reference Model and Network Architecture: Introduction to Computer Networks, Overview of Data Communication and Networking - Analog / Digital transmission, Internet, Private Networks, Network Topologies: Bus-, Star-, Ring-, Hybrid -, Tree -, Complete -, Irregular –Topology; Types of Networks: Local Area Networks, Metropolitan Area Networks, Wide Area Networks; Layering architecture of networks, OSI model, Functions of each layer, Services and Protocols of each layer.

UNIT-2
Data Link Layer: Error detection and correction, Data link control - Flow and Error control - Sliding window protocol - ARQ schemes, HDLC protocol - Point to Point Protocol, Multiple Access Techniques - Random Access, Controlled Access, Logical Link Control (LLC) and Medium Access Sub-layer functions - LAN standards - IEEE 802.3 (CSMA/CD) - Fast Ethernet - Giga Bit Ethernet, IEEE 802.4 (Token Bus), IEEE 802.5 (Token Ring), IEEE 802.11 (Wireless LAN).

UNIT-3
Network Layer: Inter-networking - Addressing - Routing - Link state and Distance Vector Routing - Congestion control algorithms - Network Layer Protocols - ARP, RARP, IPv4, ICMP, IPv6 and ICMPv6 - Unicast Routing - RIP, OSPF, BGP and Multicast Routing - IGMP, DVMRP, MOSPF, CBT, PIM.

UNIT-4
Transport Layer: Processes to Processes Delivery - Transmission Control Protocol (TCP) - User Datagram Protocol, Stream Control Transmission Protocol (SCTP) - Data Traffic - Congestion Control and Quality of Service - Techniques to improve QOS - Integrated Services - Differentiated Services, QoS in switched networks.
Session, Presentation and Application Layers: Services, Network security - security Cryptography, Message confidentiality, message integrity, message authentication, Digital Signature, Entity Authentication, Key Management, Application layer- DNS, E-mail (SMTP), FTP, HTTP, Voice over IP. ATM, ISDN,SONET

Text Book:

1. Computer Networks (3rd edition), Tanenbaum Andrew S., International edition, 1996. Forouzan,
2. Data Communications and Networking, TMH, 4 th Edition, 2006. William Stallings, Data and Computer Communications, PHI, 7 th Edition, 2003

BT CSE 703 **Compiler Design**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit – 1

Compilers and Translators, Need of Translators, Tools used for compilation, Structure and Phases of Compiler, Single-Pass and Multi-Pass Compilers, Bootstrapping, Compiler Construction Tools. Bootstrap compilers, Phases of Compilation process. Lexical Analysis: Design, Finite Automata and Regular Expressions, LEX package on LINUX systems. Process of Lexical Analysis, Recognition of Regular Expressions.

Unit – 2

Syntax-Directed Translation: Translation Schemes, Implementation, Postfix Notation, Parse Trees and Syntax Trees, Three-address code and representations, Flow of Control. Building Symbol Tables, Data Structures for symbol table, representing scope information. Run Time Storage Administration: Types of Storage Allocation Schemes, Implementation of Stack Allocation Scheme and Implementation of Block Structured Languages. Error Detection and Recovery: Errors, Lexical-Phase Errors, Syntactic Phase Errors, Semantic Errors.

Unit – 3

Parsing Techniques: Top down & Bottom-up parsing, Shift Reduce parsing, Operator Precedence parsing, Predictive Parsers. Left Recursion and its removal, Recursive Descent parser, LR parsers, Canonical Collection of LR(0) and LR(1) items, SLR parsing tables, Canonical LR parsing tables, LALR parsing tables, Parsing Ambiguous Grammars, Implementation of LR parsing tables, LL(k) and LR(k) Parsers, YACC package on LINUX systems.

Unit – 4

Intermediate Code Generation: Need, Issues in the design of a code generator, Intermediate languages, Quadruples, Register Allocation and Assignment statement, peephole optimization. Code Optimization: Principle sources of Optimization, optimization of basic blocks, Loop Optimizations, DAG Representation of Basic Blocks, Loop Invariant Computation, Reducible Flow Graphs, Global Data Flow Analysis, code improving transformation.

Text Books:

1. Alfred V Aho, "Principles of Compiler Design, Narosa Publishing House.
2. Jean Paul Tremblay and Sorenson, "The Theory and Practice of Compiler Writing", McGraw Hill.

Reference Books:

1. Dhamdhere D.M, System programming and operating system, McGraw Hill.
2. Beck L. Leland, System Software, Pearson Education.
3. Aho, Sethi, & Ullman, Compilers Principles, Techniques and Tools, Pearson Education.

BT CSE 704 **COMPILER DESIGN LAB**

Total Credit: 2
Max Marks: 50
External: 35
Internal Assessment: 15
Time Allowed: 3hrs

1. Practice of LEX/YACC of compiler writing.
2. Write a program to check whether a string belong to the grammar or not.
3. Write a program to generate a parse tree.
4. Write a program to find leading terminals.
5. Write a program to find trailing terminals.
6. Write a program to compute FIRST of non-terminal.
7. Write a program to compute FOLLOW of non-terminal
8. Write a program to check whether a grammar is left Recursion and remove left Recursion.
9. Write a program to remove left factoring.
10. Write a program to check whether a grammar is operator precedent.
11. To show all the operations of a stack.
12. To show various operations i.e. red, write and modify in a text file.

BT CSE 705 **Minor Project**

Total Credit: 3
Max Marks: 100
External: 70
Internal Assessment: 30
Time Allowed: 3hrs

Students may choose a project based on any subject of Computer Science. The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format. The student will have to present the progress of the work through seminars and progress reports.

BT CSE 707 **Summer Training Report**

Total Credit: 2
Max Marks: 50
External: 00
Internal Assessment: 50
Time Allowed: 3hrs

Practical training conducted after sixth semester will be evaluated in the Seventh Semester based on Viva-Voce.

List of DCEC (To be taken by the students of department only.)

BT CSE-708 **Software Project Management**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1:

Introduction to Software Project Management (SPM): Definition of a Software Project (SP), SP Vs. other types of projects activities covered by SPM, categorizing SPs, project as a system, management control, requirement specification, information and control in organization.

Stepwise Project planning: Introduction, selecting a project, identifying project scope and objectives, identifying project infrastructure, analyzing project characteristics, identifying project products and activities, estimate efforts each activity, estimation techniques,COCOMO model, identifying activity risk, allocate resources, review/ publicize plan.

Unit-2:

Project Evaluation & Estimation: Cost benefit analysis, cash flow forecasting, cost benefit evaluation techniques, risk evaluation. Selection of an appropriate project report; Choosing technologies, choice of process model, structured methods, rapid application development, water fall-, V-process-, spiral- models. Prototyping, delivery. Albrecht function point analysis.

Activity planning & Risk Management: Objectives of activity planning, project schedule, projects and activities, sequencing and scheduling activities, network planning model, representation of lagged activities, adding the time dimension, backward and forward pass, identifying critical path, activity throat, shortening project , precedence networks.

Risk Management: Introduction, the nature of risk, managing risk, risk identification, risk analysis, reducing the risks, evaluating risks to the schedule, calculating the z values.

Unit-3:

Resource allocation &Monitoring the control: Introduction, the nature of resources, identifying resource requirements, scheduling resources creating critical paths, counting the cost, being specific, publishing the resource schedule, cost schedules, the scheduling sequence.

Monitoring the control: Introduction, creating the frame work, collecting the data, visualizing progress, cost monitoring, earned value, prioritizing monitoring, getting the project back to target, change control.

Unit-4:

Managing contracts and people: Introduction, types of contract, stages in contract, placement, typical terms of a contract, contract management, acceptance, Managing people and organizing terms: Introduction, understanding behavior, organizational behavior: a back ground, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures.

Software quality: Introduction, the place of software quality in project planning, the importance of software quality, defining software quality, quality factors,ISO 9126, Practical software quality measures, product versus process quality management, external standards, techniques to help enhance software quality, software quality metrices.

Study of any Software Project Management software, Viz. Project 2000 or equivalent

Text Book:

1. Software Project Management (2nd Edition), by Bob Hughes and Mike Cotterell, 1999, TMH

Reference Books:

1. Software Engineering – A Practitioner's approach, Roger S. Pressman (5th edi), 2001, MGH
2. Software Project Management, Walker Royce, 1998, Addison Wesley.
3. Project Management 2/c. Maylor
4. Managing Global software Projects, Ramesh, 2001, TMH.

BT CSE-709 **Advanced Client Server Technology**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1:
Introduction: Introduction to Client-server computing, Evolution of Corporate computing models from centralised to Distributed computing, Client –Server Models, Benefits & pitfalls of client-server computing Introduction to Java, Classes & Interfaces, Inheritance, Exception Handling,Threads and Multithreaded programming, Packages, Collections

Unit-2:
Networking: Connecting to a Server, Implementing Servers, Sending E-Mail, Making URL Connections, Advanced Socket Programming DATABASE NETWORKING The Design of JDBC. The Structured Query Language, JDBC Installation, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable Result Sets, Matadata, Row Sets, Transactions, Advanced Connection Management, Introduction of LDAP

Unit-3
Distributed Objects: The Roles of Client and Server, Remote Method Invocations, Setup for Remote Method Invocation, Parameter Passing in Remote Methods Server Object Activation, Designing Client-server using RMI

Unit-4
Component Models: Beans , Introduction to Enterprise Java Beans , session & entity beans , EJB Deployment , EJB transactional issues, Distributed Component models.
SERVLETS: Overview, Servlet Lifecycle: init(), service(), destroy(), GenericServlet, ServletRequest and ServletResponse, HttpServlet, HttpServletRequest and HttpServletResponse : GET, POST, accessing parameters.

Books:

1. Core JavaTM 2, Volume II-Advanced Features, 7th Edition by Cay Horetmann, Gary Cornelll Pearson Publisher, 2004
2. Professional Java Programming by Brett Spell, WROX Publication

BT CSE-710 **Natural Language Processing**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1:
Components of natural language processing: lexicography, syntax, semantics, pragmatics: word level representation of natural languages prosody & natural languages.

Unit-2:
Formal languages and grammars: chomsky hierarchy, Left-Associative grammars, ambiguous grammars, resolution of ambiguities.
Computation linguistics: recognition and parsing of natural language structures: ATN & RTN,General techniques of parsing: CKY, Earley & Tomitas algorithm.

Unit-3:
Semantics-knowledge representation semantic networks logic and inference pragmatics, graph models and optimization, prolog for natural language semantic.

Unit-4:
Application of NLP: intelligent work processors: Machine translation, user interfaces, Man-Machine interfaces, natural language querying, tutoring and authoring systems, speech recognition, commercial use of NLP.

Text Book:

1. "Natural Language Understanding" James Allen ,Benjamin-1995, cummings Pub. Comp. Ltd.,

Reference Books:

1. "Language as a cognitive process", Terry Winograd 1983, AW
2. "Natural Language processing in prolog" G. Gazder, 1989, Addison Wesley.
3. " Introduction of Formal Language Theory, Mdlj Arbib & Kfaury, 1988, Springer Verlog

BT CSE 711 **Cloud Computing**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by examiners.

UNIT – 1

Cloud Computing: Definition, roots of clouds, characteristics, Cloud Architecture – public, private, hybrid, community, advantages & disadvantages of Cloud Computing. Migrating into a Cloud: broad approaches, seven-step model to migrate Virtualization: benefits & drawbacks of virtualization, virtualization types – operating system virtualization, platform virtualization, storage virtualization, network virtualization, application virtualization, virtualization technologies.

UNIT – 2

Cloud Services & Platforms: Compute services, Storage services Database services, Application Services, Queuing services, E-mail services, Notification services, Media services, Content delivery services, Analytics services, Deployment & management services, Identity & access management services. Case studies of these services. Federated & Multimedia Cloud Computing: architecture, features of federation types, federation scenarios, layers enhancement of federation; Multimedia Cloud.

UNIT – 3

SLA Management in Cloud Computing: traditional approaches to SLA management, types of SLA, life cycle of SLA, SLA management in cloud, automated policy-based management. Cloud Security: challenges, CSA cloud security architecture, authentication, authorization, identity & access management, data security, auditing. Legal Issues in Cloud Computing: data privacy and security issues, cloud contracting models.

UNIT – 4

Developing for Cloud: Design considerations for cloud applications, reference architectures for cloud applications, cloud application design methodologies, data storage approaches Python for Cloud: Python characteristics, data types & data structures, control flows, functions, modules, packages, file handling, date/time operations, classes, Python web application framework – Django.

Text Books:

1. Arshdeep Bahga, Vijay Madisetti, Cloud Computing – A Hands-on Approach, University Press, 2014
2. Saurabh Kumar, Cloud Computing, 2nd Edition, Wiley India Pvt Ltd.
3. Rajkumar Buyya, James Broberg, Andrzej Goscinski, Cloud Computing – Principles and Paradigms, Wiley India Pvt. Ltd.

Reference Books

1. Barrie Sosinsky, Cloud Computing Bible, Wiley India Pvt. Ltd.

2. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing.
3. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pvt Limited, July 2008.

BT CSE-712 **Software Testing**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit 1

Introduction: Definition of testing, goals, psychology, model for testing, effective testing, limitations of testing, Importance of Testing.

Testing terminology and Methodology: Definition of Failure, faults or bug, error, incident, test case, test ware, life cycle of bug, bug effects, bug classification, test case design, testing methodology, development of test strategy, verification, validation, testing life cycle model, testing techniques, testing principles,Testing Metrices.

Unit 2

Verification and validation: Verification activities, verification of requirements, verification of HL design, verification of data design, verification of architectural design, verification of UI design, verification of LL design, introduction to validation activities

Black Box testing: Boundary value analysis, equivalence class portioning, state table based testing, decision table based, grappling, error guessing.

Unit 3

White Box testing: Logic coverage criteria, basic path testing, graph matrices, loop testing, data flow testing, mutation testing

Static testing: Types of static testing, technical reviews, inspections, inspection process, structured walk through, walk through process, adv. Of static testing

Unit 4

Validation Testing: Unit testing, drivers , stubs, integration testing, methods, effect of module coupling and cohesion, functional testing, system testing, recovery testing, security testing, stress testing, performance testing, usability testing

Test Automation and debugging: S/w measurement and testing, testing metrics, tools debugging, debugging techniques, design of practical test cases, reducing no. of test cases.

Text books:-

1. G.J Myers, The Art of Software Testing, John Wiley & Sons, 1979
2. Naresh Chauhan,Software Testing Principles and Practices,OXFORD University Press.

BT CSE-713 **Introduction to VLSI Design**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1:
MOS TECHNOLOGY AND CIRCUITS: MOS Technology and VLSI, Process parameters and considerations for BJT, MOS and CMOS, Electrical properties of MOS circuits and Device modeling. Mos circuit design process: MOS Layers, Stick diagram, layout diagram, propagation delays, Examples of combinational logic design, scaling of MOS circuits.

Unit-2:
DIGITAL CIRCUITS AND SYSTEMS: Programmable Logic Array (PLA) and Finite State Machines, design of ALUs, Memories and Registers.

Unit-3:
ANALOG VLSI AND HIGH SPEED VLSI : Introduction to analog VLSI, Realisation of Neural Networks and Switched capacitor filters, Sub-micron technology and GaAs VLSI technology.

Unit-4:
HARDWARE DESCRIPTION LANGUAGES : VHDL background and basic concepts, structural specifications of hardware design organization and parameterization.

Text Books:

1. Modern VLSI Design by Wayne Wolf, 2nd Edition, PHI, 1998
2. Basic VLSI Design Systems and Circuits by Douglas A. Pucknell and Kamran Eshraghian, PHI, 1993

Reference Books:

1. Introduction to NMOS and CMOS VLSI System Design by Amar Mukherjee, PHI, 1986
2. VLSI Design Techniques for Analog and digital Circuits by Randall L. Geiger and P.E. Allen, MGH, 1990
3. Introduction to VLSI Design by Fabricious, MGH, 1990
4. The designer's Guide to VHDL by Peter J. Aahenden, Harcourt Asia P. L. & Morgan Kauffman, 1996

BT CSE-714 **Network Programming & Administration**

Total Credit: 3
Max Marks: 100
Theory: 70
Internal Assessment: 30
Time Allowed: 3hrs

Note: Five questions will be set in all by the examiner.

Unit-1:
Introduction to networking, TC/IP Protocol architecture, Classful internet addresses, subnets, super netting, address resolution Protocol (RAP) and RARP, IP datagram format, UDP and TCP/data grams , TCP connection establishment and Format, Buffer sizes and limitation, ICMP its purpose , FINGER, NET STAT details & IP config, Ping, TRACERT, ROUTE.

Unit-2:
Socket introduction, Address structures, value - result arguments, Byte ordering and manipulation function and related functions, elementary TCP sockets, TCP client sever, I/O functions, select& poll functions, socket options elementary UDP sockets, elementary node and address conversions, DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information, echo service (TCP and UDP).

Unit-3:
Algorithm and issues in server software design :iterative connectionless servers, (UDP), Iterative, connection oriented servers (TCP), single process, concurrent servers multiprotocol servers (TCP,UDP), multi service servers (TCP,UDP).

Unit-4:
Remote procedure call concept (RCP) :RPC models, analogy between RPC of client and server, remote programs and procedures, their multiple versions and mutual exclusion communication semantics, RPC retransmits, dynamic port mapping ,authentication.
Network file system concept of data link access, debugging techniques ,Routing sockets, broadcasting to mobile network.

Text Books:
1. Unix Network programming Vol -2nd edition, W.Richard Stevens
2. Internet working with TCP/IP Vol-1, Doubles e-commer.
3. Internetworking TCP/IP Vol III Doubles E comer, David L.Stevens

Reference Book:
1. Internetworking with TCP/IP, Vol II

Semester 8

BT CSE 801 **Internship/Major Project**

Total Credit: 20
Max Marks: 500
External: 350
Internal Assessment: 150

Students have to undergo industrial training and they have to submit a project at the end of semester. The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format. The student will have to present the progress of the work through progress reports.