



### 1.1.3 Number of Courses/Paper having focus on Employability/Entrepreneurship/Skill development in the Curriculum.

Name of the Program: BTech (CS)

SI. No.	Name of the Course/Paper	Course/Paper code	Activities/Courses with Direct bearing on Employability/Entrepreneurship/Skill Development	Year of Introduction
1	Object Oriented Programming	CS- 1301	<b>Theory</b> :- Introduction of OOPs using C++, Development of Program using C++ <b>Practical</b> :- Writing programs using class and objects, constructor & destructors, inheritance properties	2020
2	Introduction to Java Programming Language	CS- 1529	<b>Theory</b> :- Introduction of Java Programming using J2EE. <b>Practical</b> :- Writing programs using class and objects, constructor & destructors, inheritance properties and Java database connectivity.	2020
3	Database System	CS- 1509	<b>Theory</b> :- Introduction of DBMS, Models and SQL <b>Practical</b> :- Writing Program to create database using SQL query.	2020
4	Web Application Design and development	CS- 1607	<b>Theory</b> :- Introduction of client server side programming Database connectivity, Network Programming & J2EE <b>Practical</b> :- web application design & development using HTML, Java Script, EJB Architecture.	2020
5	Artificial Intelligence	CS- 1718	<b>Theory</b> :- Introduction of Artificial Intelligence & Natural Language Processing. <b>Practical</b> :- Implementation of all algorithms of AI in LISP / Prolog.	2020

Lalit Narayan Mithila University



# *Complete Syllabus*

Of

## *B. Tech.*

***Computer Science & Engineering***



# **Women's Institute of Technology**

Kameshwaranagar, Darbhanga - 846004

# BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE & ENGINEERING

Program	Semester	Course Code	Course Title	L	T	P	Credits	Total Credit / Sem.
<b>B. TECH. (CSE) SEMESTER-1</b>								
CSUG	1	CE-1102	OB& IP.	3	0	0	3	
CSUG	1	MA-1101	MATHEMATICS-I	3	1	0	4	
CSUG	1	CH-1101	ENGINEERING CHEMISTRY	3	0	3	5	
CSUG	1	CE-1101	ENGINEERING MECHANICS	3	0	3	5	
CSUG	1	ME-1101	ELEMENTS OF MECHANICAL ENGINEERING	3	0	3	5	
CSUG	1	ME-1103	WORKSHOP	2	0	3	4	
CSUG	1	GE-1101	EAA-I-NSS					26.0
<b>B. TECH. (CSE) SEMESTER-II</b>								
CSUG	2	HS-1205	COMMUNICATIVE ENGLISH	3	0	0	3	
CSUG	2	MA-1202	MATHEMATICS-II	3	1	0	4	
CSUG	2	PH-1201	PHYSICS	3	0	3	5	
CSUG	2	EE-1201	BASIC ELECTRICAL ENGINEERING	3	0	3	5	

CSUG	2	IT-1201	FUNDAMENTAL OF INFORMATION TECHNOLOGY	3	0	2	5	
CSUG	2	ME-1202	ENGINEERING GRAPHICS	2	0	3	4	
CSUG	2	GE-1202	EAA-II -NSS					26.0
<b>B. TECH. (CSE) SEMESTER-III</b>								
CSUG	3	EC-1303	MATHEMATICS-III	3	1	0	4	
CSUG	3	EC-1303	DIGITAL ELECTRONICS	3	1	2	5	
CSUG	3	CS-1301	OBJECT ORIENTED PROGRAMMING	3	0	3	5	
CSUG	3	MA-1304	NUMERICAL METHODS & COMPUTATIONAL TECHNIQUES	3	0	3	5	
CSUG	3	EC-1301	BASIC ELECTRONICS	3	1	3	5	
CSUG	3	GE-1303	EAA-III-NSS					24.0

Program	Semester	Course Code	Course Title	L	T	P	Credits	Total Credit / Sem.
<b>B. TECH. (CSE) SEMESTER-IV</b>								
CSUG	4	MA-1405	DISCRETE MATHEMATICAL STRUCTURE & GRAPH THEORY	3	1	0	4	
CSUG	4	EC-1405	ANALOG ELECTRONICS	3	0	3	5	
CSUG	4	CS-1403	DATA STRUCTURES	3	0	3	5	
CSUG	4	CS-1402	COMPUTER ARCHITECTURE	3	0	0	3	
CSUG	4	CS-1405	SYSTEMS PROGRAMMING	3	0	3	5	
CSUG	4	CE-1401	ORGANISATIONAL BEHAVIOUR & INDUSTRIAL PSYCHOLOGY	3	0	3	5	
CSUG	4	GE-1404	EAA-IV-NSS					27.0
<b>B. TECH. (CSE) SEMESTER-V</b>								
CSUG	5	EE-1511	MICROPROCESSOR & ITS APPLICATIONS	3	0	3	5	
CSUG	5	CS-1506	DESIGN & ANALYSIS OF ALGORITHMS	3	0	0	3	
CSUG	5	CS-1529	INTRODUCTION TO JAVA PROGRAMMING LANGUAGE	3	0	3	5	
CSUG	5	CS-1509	DATABASE SYSTEMS	3	0	3	5	

CSUG	5	IT-1506	OPERATING SYSTEMS	3	0	3	5	
CSUG	5	CS-1513	COMPUTER NETWORKS	3	0	0	3	
<b>B. TECH. (CSE) SEMESTER-VI</b>								
CSUG	6	CS-1604	OBJECTORIENTED ANALYSIS & DESIGN	3	0	0	3	
CSUG	6	CS-1601	PRINCIPLES OF PROGRAMMING LANGUAGES	3	0	0	3	
CSUG	6	CS-1612	FORMAL LANGUAGES & AUTOMATA THEORY	3	0	0	3	
CSUG	6	HS-1606	INDUSTRIAL ECONOMICS & ACCOUNTANCY	3	1	0	4	
CSUG	6	IT-1614	SOFTWARE ENGINEERING	3	0	3	5	
CSUG	6	CS-1607	WEB APPLICATIONS DESIGN & DEVELOPMENT	3	0	3	5	
CSUG	6	CS-1616	COMPILER DESIGN	3	0	3	5	28.0
<b>B. TECH. (CSE) SEMESTER-VII</b>								
CSUG	7	CS-1715	DISTRIBUTED COMPUTING	3	0	3	5	
CSUG	7	CS-1717	ARTIFICIAL INTELLIGENCE	3	0	3	5	
CSUG	7	XX-17XX	ELECTIVE-I	3	0	0	3	
CSUG	7	XX-17XX	ELECTIVE-II	3	0	0	3	
CSUG	7	XX-17XX	ELECTIVE-III	3	0	0	3	

CSUG	7	CS-1720	PROJECT-I	0	0	6	4	
CSUG	7	CS-1721	INDUSTRIAL TRAINING				2	25.0

### B. TECH. (CSE) SEMESTER-VIII

CSUG	8	CS-1822	DATA MINING	3	0	3	5	
CSUG	8	HS-1804	PERSONAL MANAGEMENT & INDUSTRIAL RELATION	3	0	0	3	
CSUG	8	IT-1805	INFORMATION SECURITY	3	0	0	3	
CSUG	8	XX-18XX	ELECTIVE-IV	3	0	0	3	
CSUG	8	XX-18XX	ELECTIVE-V	3	0	0	3	
CSUG	8	XX-1XX X	ELECTIVE-VI	3	0	0	3	
CSUG	8	CS-1824	PROJECT -II	0	0	9	6	26.0

### B. TECH. (CSE) ELECTIVES\*

CSUG	E L	CS1 X02	Fundamentals of Data Communication	3	0	0	3	
CSUG	E L	CS 1X1 2	Real Time Systems	3	0	0	3	
CSUG	E L	CS1 X18	CRYPTOGRAPHY	3	0	0	3	
CSUG	E L	CS1 X19	MOBILE & WIRELESS COMPUTING	3	0	0	3	

CSUG	E L	CS1 X22	DISTRIBUTED DATABASE	3 0 0 3
CSUG	E L	CS1 X23	PARALLEL COMPUTING	3 0 0 3
CSUG	E L	CS1 X25	ADVANCE COMPUTER ARCHITECTUR E	3 0 0 3
CSUG	E L	CS1 X26	PERFORMANC E EVALUATION OF COMPUTER SYSTEMS	3 0 0 3
CSUG	E L	CS1 X27	OPTIMIZATION THEORY	3 0 0 3
CSUG	E L	CS1 X28	PATTERN RECOGNITION	3 0 0 3
CSUG	E L	CS1 X30	GENETIC ALGORITHM	3 0 0 3
CSUG	E L	CS1 X31	NATURAL LANGUAGE PROCESSING	3 0 0 3
CSUG	E L	CS1 X32	COMPUTATION AL GEOMETRY	3 0 0 3
CSUG	E L	CS1 X35	COMPUTER GRAPHICS	3 0 0 3
CSUG	E L	CS1 X41	NEURAL NETWORKS & IT'S APPLICATIONS	3 0 0 3
CSUG	E L	CS1 X42	SPEECH PROCESSING	3 0 0 3
CSUG	E L	ME1 X23	OPERATIONS RESEARCH	3 1 0 4

CSUG	E L	ME1 X28	COMPUTER AIDED DESIGN & MANUFACTURING	3 0 3 5			
CSUG	E L	ME1 X34	ROBOTICS & ROBOT APPLICATIONS	3 1 0 4			
CSUG	E L	CE1 X02	GEOGRAPHICAL INFORMATION SYSTEMS & REMOTE SENSING	3 0 0 3			
CSUG	E L	CE1 X31	COMPUTER AIDED DESIGN	3 0 0 3			
CSUG	E L	EC1 X03	INTRODUCTION TO COMMUNICATI ON SYSTEM	3 0 3 5			
CSUG	E L	EC1 X06	INTELLIGENT INSTRUMENTS	3 0 3 5			
CSUG	E L	EC1 X10	DIGITAL SIGNAL PROCESSING	3 0 3 5			
CSUG	E L	EC1 X65	MICROELECTR ONICS-IC DESIGN & FABRICATION	3 1 0 4			
CSUG	E L	EC1 X66	MICROCONTRO LLERS	3 1 0 4			
CSUG	E L	EC1 X67	DIGITAL IMAGE PROCESSING	3 0 0 3			

CSUG	EL	EC1 X70	EMBEDDED SYSTEM DESIGN	3	1	0	4
CSUG	EL	EC1 X71	VLSI DESIGN	3	1	0	4
CSUG	EL	EC1 X74	DIGITAL COMMUNICATIO N & TELECOMMUNIC ATION MANAGEMENT	3	0	3	5
CSUG	EL	EC1 X75	NANOTECHNOL OGY & IT'S APPLICATIONS	3	1	0	4
CSUG	EL	EC1 X76	FIBER OPTICS & NETWORKING TECHNOLOGY	3	1	0	4
CSUG	EL	EC1 X80	MOBILE COMPUTING	3	1	0	4
CSUG	EL	IT1X 04	VISUAL PROGRAMMING	3	0	3	5
CSUG	EL	IT1X 08	INTRUSION	3	0	0	3

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## **HS-1102 *Organizational Behaviour and Industrial Psychology***

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

**Credits:- 3**

Concept of Organization and Organizational Behaviour key elements of OB, Problematic issue of Organisation Behaviour and their remedies

**(3 Lectures)**

Personality & Emotion, Concept of Perception, Learning, Determinants of personality , Type of personality,

**(14 Lectures)**

Perception concept of Perception, Factors affecting perception, Perception and its application in OB .-Learning:-Concept, Importance, Determinant of learning, Learning & Behaviour. Attitude:-Work related attitude, job Satisfaction, job involvement& job commitment. Value:- concept and Meaning.

Motivation :- Concept, Need for motivation ,Motivational theories:- Maslaw's need hierarchy theory and herzberg hygiene theory of Motivation.

**(10 Lectures)**

Group of Group and Group Dynamics.Type of Group, understanding work team. Stages of Group development, Reasons for forming and Joining group;

**(8 Lectures)**

Communication:- concept of Organizational Communication, Organization conflict, Reasons, Reasons for conflict in Organization, Power and Politics.

Leadership:- What is Leadership, Function of Leadership and Theories like Trait theory of Leadership and Managerial grid theories.

**(8 Lectures)**

Concept of Organization Theory, Concept of organization Structure. Form of organizational Structure, Organizational Culture.

(7 Lectures)

Concept of Organizational Effectiveness, What is Organizational Change and why it is required , Organizational Development, Managing Global & workforce diversity.

(7 Lectures)

### **Text Books:**

1. Organizational behaviour-Stephen P. Robbins & Seema Sanghi-Pearson.
2. Organizational Behavior- Managing People and Organization Gregor Moorhead Biztantra. ,

### **Reference Books:**

1. Organisation Behavior: Managing People and Organisation- Gregor Moorhead Biztantra.

**Algebra of matrices:**

Elementary transformation, inverse by row transformation, canonical reduction, rank, solution of simultaneous equations, characteristic equation, eigen values – & eigen vectors. Caley-Hamilton theorem, similarity transformation, reduction to diagonal matrices.

**(8 Lectures)**

**Differential Calculus:**

Higher order derivatives (successive differentiation) and Leibnitz theorem, indeterminate form, tangent and normal, review of maxima and minima, concavity and convexity of a curve, point of inflexion, curvature and radius of curvature, pedal equation, asymptotes (for Cartesian curve only), Taylor's and Maclaurin's series, partial derivatives, Euler's theorem on homogeneous functions, harmonic function, Taylor's expansion of several variables, maxima & minima of several variables-Lagrange's method for undetermined multipliers.

**(20 Lectures)**

**Differential equation:**

First order equation, separable, homogeneous, exact, linear and Bernoulli's form, Second and Higher order equation with constant coefficients, Euler's equation: Methods of their solution, dependent and independent of solution- Wronskian's system of first order equation.

**(8 Lectures)**

**Integral calculus I:**

Definite integrals, Beta & Gamma functions (definition & related problems), error function, differentiation under integral sign-Leibnitz rule.

**(8 Lectures)**

**Text Books:**

1. Advance Engineering Mathematics- R. K. Jain & S. R. K. Iyenger, Narosa Publishing House.
2. Higher Engineering Mathematics – B. S. Grewal, Dhanna Publishers.
3. Differential calculus – Das & Mukherjee – U. N. Dhar & Sons.
4. Integral calculus – Das & Mukherjee – U.N. Dhar & Sons.

**Reference Books:**

1. Advance Engineering Mathematics- E. Kreyszig, 8<sup>th</sup> Edition John Wiley & Sons. New York.
2. Advance Engineering Mathematics- Wylie & Barrett- Tata McCraw Hill.
3. Linear Algebra – K. Hoffmann and R. Kunze – Prentice Hall.
4. Differential calculus – Laljee Prasad.
5. Integral calculus – S.N. Thakur and S.B. Prasad
6. Differential Equations - Laljee Prasad

**Unit-1: Water Treatment:** Introduction, Characteristics imparted by impurities in water. Hardness of water. Unit of hardness. Estimation of hardness of water. Disadvantage of hard water. Scale and Sludge formation in boilers, Caustic embitterment, Boiler corrosion, Priming and Foaming. Softening methods. Desalination of Brackish water.

**(7 Lectures)**

**Unit- 2: Electrochemistry & Corrosion of metals and its prevention:** Galvanic cell, Electrode Potential, Nernst equation, Galvanic Series, law of dry Corrosion (Parabolic, Linear, and Logarithmic law). Wet Corrosion, Type of Corrosion (Pitting, Intergranular, Crevice Corrosion, Waterline Corrosion, Stress Corrosion). Protective measures against corrosion by (i) modification of environment, (ii) modification of metals (iii) Use of protective Coatings (vi) Cathodic protection.

**(7 Lectures)**

**Unit- 3: Chemical Thermodynamics: First Law :** Statement, work done in isothermal, adiabatic conditions, work and heat path dependent function, heat changes, isochoric and isobaric conditions, heat capacity,  $C_p$  &  $C_v$  relations, Kirchoff's relation.

**Second Law:** Need of 2<sup>nd</sup> law, Spontaneous process, Reversible process, carnot cycle, concept of entropy, Entropy changes as function of temperature, entropy change during the phase transformation, Gibb's free energy, Free energy change under various conditions. Free energy changes as criteria of reversible and irreversible process. Gibb's helmohltz's equation.

**(7 Lectures)**

**Unit – 4: Organic reaction mechanism:-** Inductive effect, hyperconjugation and Resonance Their importance in Organic Chemistry. A brief discussion of reactive intermediates – Carbonium ion, Carbanion, Carbene & free radical. Types of organic reaction: Substitution, addition and elimination reactions, Mechanism of polymerization. Thermosetting & Thermoplastic resins, Engineering use of Polymeric materials. Organic insulation and dielectric materials biopolymers.

( 8 Lectures)

**Unit – 5: Fuels:-** Classification of fuels, primary and secondary fuels, Calorific value of fuels, Proximate and Ultimate analysis of coal. Significance of the constituents. Determination of Calorific value by bomb calorimeter, Petroleum refining. Knocking and its prevention. Analysis of flue gas by orsat's apparatus, combustion calculation, Nuclear fuel, solar power, rocket fuel and hydrogen as alternative fuel.

(7 Lectures)

**Unit – 6: Fundamentals of Microwave:** - IR and UV-VISIBLE Spectroscopy. Basic concepts of spectroscopy. Selection rule, Determination of molecular structure.

(6 Lectures)

### Text Book:

1. Chemistry in engineering & Technology; Vol.-I and II, by J.C.Kuriacose & J.Rajraman Pub:TMH
2. Engineering Chemistry by Jain & Jain; Pub: Dhanpat Rai Publication
3. Engineering Chemistry by B.K.Sharma; Pub: Kirshna Prakashan Media pvt. Ltd.
4. Essential of Experimental Engineering Chemistry by Shash Chawla; pub: Dhanpat Rai Publication

## **CE-1101 Engineering Mechanics**

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

**Credits:- 5**

**Basic Concepts** of Particle, Rigid body and Law of Mechanics, Force systems: Composition & Resolution of Forces, Moments of a force about a point and about an axis; Law of moments, Equivalent forces and moment, Wrench.

**(7 Lectures)**

**Equilibrium:** Conditions of Equilibrium, Free body diagram; Types of supports and corresponding reactions, Equilibrium under different forces, Problems in equilibrium of Bars, Circular Bodies, Beams, Frames and Trusses.

**(8 Lectures)**

**Friction:** Classification, Laws of Coulomb friction, Angle of friction, Angle of repose, Cone of friction, Wedge and Block friction, Belt friction, Impending motion, Problems involving large and small contact surfaces; screw jack, Principle of virtual work and stability.

**(6 Lectures)**

**Kinematics and Kinetics of particles:** Particle dynamics in rectangular coordinates, Cylindrical coordinates and in terms of path variables, Problems based of rectilinear motion and projectile motion.

**(6 Lectures)**

**Properties of areas:** Center of Mass; Moment of inertia; Kinematics and Kinetics of rigid bodies: Circular motion of rigid bodies and General plane motion, Charle's theorem, Euler's equation of motion, D'A lembert's principle.

**(8 Lectures)**

**Work and Energy & Impulse and Momentum methods for particles and rigid bodies:** Conservation of energy; Energy and work equations in translation & rotational motion; Impulse force and momentum, coefficient of restitution and moment of momentum equation. (Vector approach to mechanics will be followed for all the topics).

(6 Lectures)

### **Text Books:**

1. Engineering Mechanics by Shames, Pearson's Education.
2. Mechanics for Engineers Beer, F.P. and Johnston, Tata McGraw Hill, New Delhi.

### **Practical:**

1. Determination of reactions of beams for simply supported beams;
2. Determination of coefficient of friction by Belt friction;
3. Determination of  $g$  by Compound bar pendulum;
4. Practical based on mechanical advantage of different machines;
5. Verification of polygon law of forces by Universal force table;
6. Moment of Inertia of a flywheel;
7. Determination of coefficient of restitution for Direct central impact;
8. Problem solving based on theory classes.

**Energy Resources:** Renewable or non-conventional sources of energy, their origin, forms-solar, wind, biogas and biomass energy, their merits & demerits, major applications and Brief description.

**(4 Lecture)**

Non renewable or conventional sources of energy, the fossil fuel, coal, petroleum and natural gas.

**(2 Lecture)**

**Review of basic concepts of Thermodynamics:** Thermodynamics system properties state processes and cycles, Heat, work, and Internal energy.

**(4 Lecture)**

**Steam Generators:** Types of boilers, water tube and fire tube boilers- their merits and demerits, boiler mountings and accessories- simple description.

**(6 Lecture)**

**Prime Movers:** simple steam turbine Gas turbine, IC engines (SI and CI) their brief description and Principles of working.

**(8 Lecture)**

**Power Plant:** Principles of working of thermal hydal and nuclear power plants work output and efficiency.

**(6 Lecture)**

**Basic concept of Refrigeration and Air Conditioning :** Principles of working of vapour compression vapour absorption and air refrigeration, principles of air conditioning systems.“

**(6 Lecture)**

**Engineering Materials and Their Properties:** Ferrous and non-ferrous metals, mechanical properties e.g. strength, hardness resilience etc.

(4 Lecture)

**Heat Treatment of Steel:** Annealing, tempering quenching, case hardening etc.

(2 Lecture)

### **Text Book:**

- (1) Basic Mechanical Engineering by TJ Prabhu, V. Jaiganeswaran  
by Scitech.

### **Practical: Study of**

1. Model of I.C.Engine- sectional view;
2. Model of Boiledrs-sectional view;
3. Model of Turbines- sectional view;
4. Model of Thermal/Hydel/Nuclear Powe plant;

**(IT&CSE)**

**ME-1103**

**Workshop**

**L-T-P: 2-0-3**

**Credits:-4**

**(A) Black smithy shop:** Introduction, study & use of black smith forging tools, anvil, swage block chisels, punches, hammers, sledge hammer, study of air blower M/c & sheering M/c

**Job making – (i) Eye nail & Ring.** (Lecture:7)

**(B) Carpentry shop:** Introduction, Study & use of various tools, marking tools, measuring tools, striking tools, drilling and boring tools, holding tools etc. Study of wood turning lather machine.

**Job madding – (i) Half lap joint (ii) dovetail joint  
(iii) file Handel.** (Lecture:7)

**(C) Fitting shop:** Introduction, study & use of different tools, cutting tools, marking tools, drill bit, die & tap , type of files, measuring tools, holding tools.

**Job madding – (i) Matching gauge (ii) Chipping & filing.**  
(Lecture:7)

**(D) Foundry shop:** Introduction, study & use of cupola furnace, various tools, pattern making moulding boxes.

**Job making- (i) Stuffing gland box (ii) Vee block.**  
(Lecture:7)

### **Text Book:**

1. Workshop practice by Hazara Choudhary.
2. Work shop technology by S.K.Garg, University Science Press, Delhi

***Communicative English*****HS- 1201****L-T-P: 3-0-0****Credits: 3**

1. Basic Grammar : Structural pattern; single word substitution; Editing (6 Lectures)
2. Common errors, Comparison (3 Lectures)
3. Antonyms; Homonyms; Sentence building (Vocabulary) (5 Lectures)
4. Reading and writing (Comprehension) (3 Lectures)
5. Precis, Essay & Paragraph writing. (4 Lectures)
6. Expansion (word & phrase) (3 Lectures)
7. Official Correspondence, Memorandum; Circular letter (4 Lectures)
8. Applying for a job ; Resume (3 Lectures)
9. Business Correspondence; Report writing. ( 3 Lectures)
10. Phonetics(Symbol and Transcription); pronunciation, Reading-developing reading skill. (8 Lectures)

**Text book:**

- |   |                                     |
|---|-------------------------------------|
| 1. English Grammar-   | Wren & martin                       |
| 2. English Grammar-   | Dr. D.Thakur                        |
| 3. English Grammar-   | J. Nesfield                         |
| 4. Technical English -  | Sharon j Gerson and Steven M Gerson |
| 5. Business Communication – P.D. Chaturvedi & M. Chaturvedi- Pearson Pub. |                                     |

**Reference books:**

1. Communication in English for Technical Student- Orient Longman
2. Business Correspondence & Report writing -R C. Sharma & Krishna Mohan – Tata Magraw Hill

**Infinite series:**

Notion of convergence and divergence of infinite series- D' Alembert's Ratio test, comparison test, Rabe's Test, Cauchy's Root test, alternating series- Leibniz test absolute and conditional convergence. Uniform Convergence.

**(6 Lectures)****Fourier Analysis:**

Periodic function; Fourier series-Functions of arbitrary period-Even & Odd functions-Half Range Expansions-Harmonic analysis- Complex Fourier series.

Laplace Transform: Definition and properties of Laplace Transform, Shifting Theorem, Transforms of derivatives and integrals, Multiplication by  $t^n$ , Division by  $t$ , Evaluation of integrals by L.T., Inverse Transforms.      **(14 Lectures)**

**Integral calculus II:**

Double & Triple integrals, Rectification, Computation of surfaces & volumes, Change of variables in double integrals, Jacobians of transformations, Integrals dependent on parameters-applications.      **(12 Lectures)**

## **Vector calculus:-**

Scalar & vector point functions, differentiation of vector, velocity and acceleration, direct derivatives, concept of gradient, divergence curl, line integral, greens theorem in plane, Gauss & Stocke's theorem and simple applications.

(12 Lectures)

### **Text Books:**

1. Advance Engineering Mathematics - R.K. Jain & S.R.K. Iyenger, Narosa Publishing House.
2. Higher Engineering Mathematics – B. S. Grewal, Khanna Publishers.
3. Engineering Mathematics – N.P. Bali

### **Reference Books:**

- 1 Advance Engineering Mathematics- E. Kreyszig 8<sup>th</sup> edition, John Wiley & Sons. New York.
- 2 Advance Engineering Mathematics- Wylie & Barrett- Tata McGraw Hill.
- 3 Vector Analysis 2<sup>nd</sup> edition – Chatterjee, Prentice Hall of India.
- 4 Vector Analysis – K.K. Jha
- 5 Real Analysis – N.P. Ball

**Electrostatics and Electromagnetic theory:** The three electric vectors, to show that normal component

of D and tangential component of E are continuous across the boundary between two dielectrics, Continuity equation for charge, displacement current, Maxwell's Equation in free space, speed of plane electromagnetic waves traveling in vacuum, pointing vector, electromagnetic waves propagation in dielectrics in dielectrics and conductors.

**( Lecture10 )**

**Optics and Lasers:** Temporal coherence, Michelson's interferometer for measurement of coherence length of a source, line width spatial coherence, measurement of spatial coherence using Young's interferometer, Fraunhofer diffraction by single slit, double slit and grating.

**( Lectures:6 )**

Lasers and Laser Lights, Einstein's A and B coefficients and laser, population-inversion. Light amplification, optical resonators, resonators, Characteristics of lasers, Ruby Laser, How He-Ne laser works. **( Lecture:5 )**

**Polarization:** Unpolarized light, production of plane polarized light by Polaroid technique (principle of action to be emphasized) Brewster's law, Malus law. Double refraction, production of circular and elliptical lights, analysis of unpolarized and polarized lights, Magneto-optics effect, photo-elastic effect, electro-optic effect. **( Lecture:-8 )**

**Special theory of Relativity:** Michelson – Morleys Expt., Postulates of special theory of relativity, consequences of special theory of relativity, Galilean transformation, Lorenz transformation. **( Lecture:-6 )**

**Quantum Physics:** Planck's theory of black body radiation, Compton effect, wave particle duality, deBroglie waves, deBroglie wave velocity, wave and group velocity, Davisson and Germer experiment, Heisenberg uncertainty principle, application of the uncertainty principle, wave functions and wave equations, Physical interpretation of wave function and their normalization, Expectation values, Schrödinger's equation, time dependent form and steady state form in one dimension (Quantum mechanical operators), particle in a box, potential barrier and tunneling.

(Lecture:-12)

## Text Books:

1. Concept of Modern physics; by Arthur Beiser  
Publication: TMH
2. Elements of Electromagnetic; by Mathew N. O. Sadiku  
Pub: Oxford University Press
3. Introduction to Electrodynamics: by David Griffiths; Pub: Pearson Education.
4. Optics; by Ajoy Ghatak; Pub: TMH
5. Fundamentals of Physics Extended Volume; by Resnick Halliday and Walker; Pub: John Wiley Sons, Inc. Asian Edition.

## Reference Books:

1. Modern Physics; by G. Aruldas & P. Rajagopal; Pub: Prentice Hall of India.
2. Quantum Physics; by H. C. Verma  
Pub: Sun Publications
3. Lasers and Non-Linear Optics; by B. B. Lau  
Pub. New Age International (P) Ltd.
4. Principle of Electricity; by Leigh Page and Norman Ilsley Adams; Pub: Eurasia Publishing House, New Delhi.

**1. Introduction:** Electrical Elements and their classification, KCL, KVL equation and node voltage method, D.C. circuits steady state analysis with independent and dependent sources, Series and parallel circuits, star delta conversion, Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer Theorem.

**(12 Lectures)**

**2. A. C. circuits:** Common signals and there waveform, RMS and Average value, form factor and peak factor of sinusoidal wave, impedance of series and parallel circuits, Phasor diagram, Power, Power factor, Power Triangle, coupled circuits, Resonance and Q-factor, Superposition, Thevenin's and Norton's Maximum Power transfer theorem for A.C. circuits.

**(12 Lectures)**

**3. A. C. circuits:** 3- phase: Star delta, line and phase relation, Power relations, Analysis of balanced and unbalanced 3-phase circuits.      **(8 Lectures)**

**4. Magnetic circuits:** Introduction, Series & Parallel magnetic circuits, Analysis of Linear and non-linear magnetic circuits, Energy storage, A. C. excitation, Eddy current and hysteresis losses.      **(5 Lectures)**

**5. Basic indicating instruments for measurement:** Current voltage, Power, Energy Insulation resistance.

**(5 Lectures)**

### **Text Book:**

1. Basic Electrical Engineering by Fitzgerald, et al, Tata McGraw Hill

## **Reference Books:**

1. Fundamentals of Electrical Engineering By Leonard S. Bobrow, Oxford.
2. Fundamentals of Electrical Engineering by R. L. Prasad, PHI Publication

## **Basic Electrical Engg. Lab**

Experiments concerning verification and application of the concepts defined in Syllabus. Like

1. Kirchoff's Current Law,
2. Kirchhoff's Voltage Law
3. Thevenin's Theorem
4. Norton's Theorem
5. Maximum Power Transfer Theorem (D.C)
6. 1 Phase and 3 Phase A.C. voltage, current and Power measurements
7. 3 Phase A.C. Power measurement by 2 wattmeter method
8. Magnetisation characteristics
9. Resonance in series and parallel circuit.
10. High Resistance measurement using Megger

# ***IT- 1201 Fundamental of Information Technology***

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

**Credits: 5**

**Computer Basics:** Evolution of Computers, Generation and Classification of Computers, Application of Computers, and etc                     **(2 Lectures)**

**Computer Memory and Storage:** Memory Hierarchy, RAM, ROM, Types of Secondary Storage Devices, and etc.                     **(2 Lectures)**

**Information Technology Basics:** Information, Technology, Role of Information Technology, Information Technology and Internet. and etc.  
   **( 2 Lectures)**

**The Internet and its Tools:** Introduction, Evolution of Internet, Basic Internet Terms Getting Connected to Internet, Internet Applications, data over Internet, Web Browser Browsing Internet Using Internet Explorer, E-mail, Search Engines, Instant Messaging                     **(3 Lectures)**

**Emerging Trends in IT:** E-Commerce, Electronic Data Interchange, Smart Cards Mobile Communication, and etc.                     **(3 Lectures)**

**Computer Programming and Languages:** Algorithm, Flow Chart, Pseudo Code Program Control Structures, Programming Languages, Generation of Programming Languages, and et..  
   **(4 Lectures)**

<b>C Language:</b> Basics, Constants, Variables and Data Types, Operators and expression Input & Output operations.	( 8 Lectures)
<b>Control Structures:</b> Decision Making & Branching, Decision Making & Looping.	( 9 Lectures)
<b>Arrays:</b> One & Two dimensional Array.	( 3 Lectures)
<b>Functions:</b> User defined functions, concept of recursion.	( 6 Lectures)

### Text Books:

01. Introduction to Information Technology, by IT Education Solution Ltd., Pearson Education
02. Programming in ANSI C by E Balagurusamy 4 Ed

### Reference Books

01. Fundamental of Computer & IT By A. Jaisw (Weily India)
02. Programming in ANSI C by Ashok N. Kamthan
03. The C programming Language, 2e, by Brian W Kernighan & Dennis M. Ritchie PHI/Pearson Education
04. Programming with C by Gottfried. Tata McGraw Hill (Schaum's Series).
05. Mastering C by K. R. Venugopal, & S. R. Prasad Tata McGraw Hill

### Practical:

Working in Windows environment, Internet, programming based on above syllabus.

Introduction, drawing instruments, sheet layout, lines lettering, dimensioning, engineering curves. (Ellipse, parabola, hyperbola, spiral). **(Lectures: 10)**

Orthographic projection: Projection of points, projection of straight lines. **(Lectures: 10)**

Projection of planes. **(Lectures: 5)**

Projection of solids. **(Lectures: 5)**

Section of solids. **(Lectures: 5)**

Development of surfaces. **(Lectures: 5)**

Intersection of surfaces. **(Lectures: 5)**

Isometric projection. **(Lectures: 5)**

Conversion of pictorial view into orthographic views. **(Lectures: 10)**

Introduction to Computer Aided Drawing.  
**(Lectures: 10)**

### **Text Books:**

1. Engineering drawing by N.D. Bhatt & V.M. Panchal, Charotar book publication, Anand.

### **PRACTICAL**

Understanding the AutoCAD windows and the drafting tools, drawing 2D objects

**ORDINARY DIFFERENTIAL EQUATIONS & SPECIAL FUNCTIONS :** Series solution of differential equations (Frobenious method), Bessel's equation, Its solution, Bessel's function of first & second kind, Recurrence formula, Legendre's equation, Its solution, Legendre polynomials, Rodrigue's formula, Orthogonality of Legendre polynomial. **Lecture : 10**

**PARTIAL DIFFERENTIAL EQUATION:** Basic concept, 1st & 2nd order linear & quasi – linear partial differential equation. Classification of second order P.D.E., Boundary and initial conditions, wave equations, Separation of variables, use of fourier series, D'Alembert's solution of wave equation, Heat equation. Solution by fourier series. **Lecture : 10**

**COMPLEX ANALYSIS - I :** Function of complex variables, limit, continuity, differentiability and analyticity of function, Cauchy-Riemann equations, Laplace's equation, harmonic function, Cauchy's integral theorem, Cauchy's integral formula, Taylor's and Laurent series, Residues and its applications to evaluating real integrals. **Lecture : 10**

**PROBABILITY & STATISTICS :** Theorems on probability including Baye's rule, Random Variable – cumulative distribution function, Probability mass function, probability density function, Mathematical expectation, mean variance, moment, generating function & characteristics function, standard probability model, Binomials, Poisson exponential, Weibull, normal and lognormal sampling & sampling distribution, Chi- square and F distribution, large and small sample tests of significance. **Lecture : 12**

## **Text Books :**

1. Advanced Engineering Mathematics by R.K.Jain & S.R.K. Iyengar
2. Higher engineering mathematics by B.S. Grewal
3. Fundamentals of mathematical statistics by V.K.Kapoor & S.C. Gupta- sultan & sons

## **References :**

1. Advance Engineering Mathematics by E.Kreyszig 8th edition , John Wiley & sons
2. Complex variable and applications by Churchill & Brown – McGraw Hill
3. Elements of Partial Differential equation by I.N.Sneddon - McGraw Hill
4. Introduction to Probability & Statistics for engineering by S.M.Ross  
– John Wiley and Sons, New York.

Digital Principle – Analog vs Digital, Number system, Computer Codes, Digital Signals, Waveforms Positive and Negative logic, Gate: basic, universal and others, Truth Table, Logic functions, IC Chips, Timing Diagram, Electrical Analogy.

(4 Lecture)

Boolean Laws and Theorems – Logic Functions, conversion of Logic functions into Truth Table and Vice – versa. SO and POS forms of representation, Min terms and max term, Simplification of Logic functions by theorems and Karnaugh's Map. Don't care conditions, Design of Special Purpose Computers and related Practical problems.

(5 Lecture)

Analysis and Synthesis of Combinatorial Logic Circuits Adders and Substructures (look-ahead adders). Multiplexers, De-multiplexers, Encoders, Decoders, Code Converters, Magnitude Comparators, Parity generators and Checkers.

(6 Lecture)

Integrated Circuit Logic Families-RTL, DTL, TTL, CMOS, IIL/I<sup>2</sup>L. (Integrated Injection Logic & Emitter Coupled Logic)

(4 Lecture)

Sequential Circuit Blocks-Latches, Flip Flops- race around condition, Master-Slave and edge triggered, SR, JK, D & T flip flop, Shift Registers, Counters – Synchronous and asynchronous; design of ripple counter

(10 Lecture)

Timing Circuits: Multi-vibrators – Mono-stable and Astable Timer: LM555

(4 Lecture)

Use of basic building block in designing larger systems such as Digital to Analog Converters (DAC) – Weighted resistor and R-2R. Analog to Digital (ADC) – Comparator, Counter and Succession.. **(4 Lecture)**

Memories-static and dynamic RAMs, ROM, EPROM, and EEPROM **(.5 Lecture)**

### **Text Books:**

1. Digital Systems – Principles & Applications by Tocci, Widmar and Jain, Pearson;
2. Digital Fundamentals by Floyd and Jain, Pearson;

### **References Books:**

1. Fundaments of VHDL Design by Stephen Brown and Zovenkeo Vrasic, TMH.
2. Introduction to Logic Design with CDROM by Alan N. Marcivity, TMH.
3. Fundamentals of Digital Logic with Verilog Design by Stephen Brown, TMH.
4. Modern Digital Electronics by R. P. Jain, TMH.

### **Practical:**

Experiments Concerning verification and application of concepts defined in Syllabus

1. Verification of Basic Logic gates.
2. Verification of Universal gates
3. Half Adder
4. Full Adder
5. Multiplexer De-multiplexer.
6. SR, JK D & Flip-flops
7. Shift Register.
8. Counters
9. DAC Converter
10. ADC Converter

**Introduction to C++:** Object Oriented Technology, Advantages of OOP, Input-output in C++, Tokens, Keywords, Identifiers, Data Types C++, Derives data types, The *void* data types, Types Modifiers, Typecasting, Constant, Operator, Precedence of Operators, Strings. (Lecture: 3)

**Control Structures:** Decision making statement like *if-else*, *Nested if-else*, *go to*, *break continue*, *switch case*, Loop statements like *for loop*, *nested for loop*, *do-while loop*, (Lecture: 3)

**Function:** Parts of Function, User-defined Functions, Value Returning Function, *Void* Functions, Value Parameters, Function overloading, (Lecture: 3)

**Classes and Data Abstraction:** Structure in C++, Class, Built-in Operations on Classes, Objects (Variables), Member functions Accessor and Mutator Functions, Constructors, default Constructor, Destructors, (Lecture: 15)

**Overloading & Templates:** Operator Overloading, Function Overloading, Function Templates, Class Templates (Lecture: 5)

**Inheritance:** Single & Multiple Inheritance, Virtual Base class, Abstract Class, Pointer and Inheritance, Overloading Member Function. Virtual function . (Lecture: 5)

**Pointers and Arrays:** Void Pointers, Pointer to Class , Pointer to Object, The *this* pointer, Void Pointer, Arrays. (Lecture: 6)

**Exception Handling:** The keywords *try*, *throw* and *catch*, Creating own Exception Classes, Exception Handling Technique (Terminate the Program, Fix the Error and Continue, Log the Error and Continue). Stack Unwinding. (Lecture: 5)

### **Text Books:**

1. Thinking in C++, Volume 1 & 2 by Bruce Eckel, Chuck Allison, Pearson Education,
2. Mastering C++, 1/e by Venu gopal, Tata McGraw Hill
3. Object Oriented Programming with C++, 3/e by E. Balagurusamy, Tata Mcgraw Hill
4. Starting Out with Object Oriented Programming in C++, by Tony Gaddis, Wiley India

### **Reference Book:**

1. The C++ Programming language 3/e by Bjarne Stroustrup, Pearson Education
2. C++ How to Program, 4e, by Deitel, Pearson Education
3. Big C++ by Cay Horstmann, Wiley India.
4. C++ Primer, 3e by Stanley B. Lippman, Josee Lajoie, Pearson Education.
5. C++ and Object Oriented Programming Paradigm, 2e by Debasish Jana. PHI
6. Programming with C++ 2/e by Ravichandran, Tata McGraw Hill
7. C++ Programming Black Book by Steven Holzner, Dreamtech Press

### **Programming Lab (OOP)**

Writing programs using classes and objects, constructors and destructors, Inheritance properties, Overloading operators, Use of pointers list representation. Programs and virtual functions, file handling, I/O manipulator using C++

**CSE**  
**MA 1304 NUMERICAL METHOD &**  
**COMPUTATIONAL TECHNIQUE**

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

**Credit : 5**

**Introduction to computer language :** Machine language, assembly language, higher level language, compilers, problem solving using computer algorithm, flow chart, examples.

**Lecture : 5**

**C/C++ Programming :** Constant & variables, arithmetic expression, I/O statement, specification statement, control statements, subscripted variables, logical expression, function and subroutines, examples of programming should include numeric as well as non numeric applications, matrix operations, searching, sorting etc.

**Lecture:15**

**Iterative Techniques for solution of equations :**

**i. Solution of non linear equation -** Simple iteration scheme by  
Bisection method, Regula-falsi method,  
Newton - Raphson method, Secant method, their rates of convergence, order of errors etc.

**Lecture : 5**

**ii. Solution of linear equation –** Gaussian elimination, matrix inversion by Gaussian method, computation of determinant, Jacobi and Gauss Seidel iteration method.

**Lecture : 4**

**Polynomial approximation :** Interpolation, several forms of interpolating polynomials like Lagrangian interpolation polynomial and Newton's forward and backward difference formula, curve fitting(least square).

**Lecture : 6**

**Numerical integration** : Trapezoidal method, Simpson's rule,  
order of errors in integration.

**Lecture : 4**

**Solution of initial value problem** : Euler's method, Runge-Kutta second order and fourth order methods, solution of boundary value problem - Finite difference method.

**Lecture : 4**

**Text Books:**

1. Numerical methods for scientific and engineering computations by M.K. Jain, S.R.K. Iyengar, and R.K.Jain, New Age International Publishers, New Delhi.
2. Introductory Method of Numerical Analysis by S.S. Sastry, Prentice Hall of India Pvt. Ltd.

**Reference Books**

1. Numerical Analysis in Engineering by Rama B. Bhat, S. Chakravarty, Narosa Publishing House.
2. Advanced Engineering Mathematics by E.Kreyszig, 8th edition by John Wiley & Sons, New York.

Passive Components & Signal sources. [3 Lectures]  
**Semiconductor Diodes** – P-N Junction Diode, dc and incremental Parameters, DC Load- Line, Q point or DC Operating Point, Temperature Effect, Ideal Diode, incremental resistance, Small Signal Equivalent Circuit, Junction Capacitance & Diffusion Capacitance, Avalanche & Zener Breakdowns

[4 Lectures]

**Diode Applications** – Half-wave & Full-wave Rectification, Center Tap & Bridge Rectifier, Filters Zreo Voltage Regulation, Percentage regulation, PIV, Ripple Factor, R-C, L-C &  $\pi$ -filters, Voltage Doublers, Clipping & Clamping Circuits.

[8 Lectures]

Special Application Diodes: Photo-Diode, Light-Emitting-Diode (LED), Tunnel Diode, Varactor Diode, Schottky Diode, [3 Lectures] Bipolar Junction Transistor (CB & CE output and transfer characteristics, dc and incremental parameters) and its application-CE, CC, CB- DC Bias analysis and Incremental Analysis using simple hybrid-pi model. [8 Lectures]

FET & MOSFET – Transfer and Output Characteristics of JFET enhancement- MOSFET, depletion- MOSFET & Amplification Action in Common Source FET Amplifier;

[6 Lectures]

Amplifiers – Multistage Amplifiers, Feed – Back Amplifier, its four topologies and its advantages; [6 Lectures]

Integrated Circuits-Ideal Operational Amplifier (Op-Amp) Applications as Inverting Amplifier, Non-Inverting Amplifier, Summer, Difference, Integrator and Differentiator and nonlinear application as precision rectifiers, logarithmic amplifiers and multi vibrators. [4 Lectures]

Introduction to – Wien Bridge, RC –phase shift, Hartley and Colpitts Oscillators [6 Lectures]

### *Text Book*

1. Electronic Devices & Circuit Theory by Boylestad and Nashelsky, Pearson;
2. Electronic Principles, Albert Malvino & Davis J. Bates, 7<sup>th</sup> Ed. TMH.
3. Art of Electronics by Paul H. Horowitz, Oxford;

### *References*

1. Introduction to Electronic Circuit Design by Spencer, Pearson;
2. Device Electronics for Integrated Circuits by Muller & Kamins with Mansun Chan Wiley Student Edition
3. Principles of Electronics by V.K. Mehta, S.Chand
4. Electronic Circuit & System by R.J.Smith Wiley;.

### **Basic Electronics Lab;**

1. Introduction to DMM (Digital Multimeter);
2. Introduction to passive components (Resistance, capacitance and inductors)-specification and measurements of the actual values by DMM;
3. Introduction to Cathode Ray Oscilloscope (CRO)- Time period measurement, study of different Waveforms, measurement of frequencies of Sinusoidal wave forms by Lissajou's Figuer;
4. Introduction of connectors-multi-strand wires (connecting wires )& single strand wires (hook up wires) and bread boards;
5. Study of Output characteristics of Diode, BJT, FET, UJT & SCR;
6. Application of Diode, BJT, FET, UJT & SCR- Clipping & Clamping, Rectification, Rectification, RC coupled CE and CS FET Amplifiers, Relaxation Oscillator;
7. Application of UA 741-Inverting Amplifiers, Non-inverting Amplifiers Summer Amplifiers. Difference amplifiers, Integrator and Differentiators.

**( CSE)**  
**MA-1405 Discrete Mathematical Structure**  
**& Graph Theory**

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

**Credit: 4**

**Set, relation and function:-**

Basic operation on sets, Cartesian product, disjoint union (sum), and power sets, Different types of relations, their compositions and inverses, Different types of functions, their compositions and inverses.

**(6 Lectures)**

**Propositional logic:-**

Syntax and semantics, connectives, connectives, conditional & biconditional connectives Functionally complete sets of connectives, Two-state Devices and Statement Logic, satisfiability tautology, normal forms Predicate calculus. **(6 Lectures)**

**Algebraic structure:-**

Algebraic structures with one binary operation – semigroup. Monoid and group, Congruence relation, Permutation group.

**(6 Lectures)**

**Partially ordered sets**

Complete partial ordering, chain, lattice, Complete, distributive, modular, and complemented lattices, Boolean lattices, Sublattices.

**(8 Lectures)**

**Introduction to Counting:-**

Basic counting techniques- inclusion and exclusion, pigeon-hole principle permutation, combination, partition & distribution

**(8 Lectures)**

**Introduction to Graph:-**

Graphs and their basic properties- degree, regularity, subgraph isomorphism, Connectedness-path & walk, circuits, cycles component, connectivity, Bipartite graph, Tree, Kuruskal algorithm Prims algorithm, Eulerian and Hamiltonian graph, Graph colouring- vertex colouring, edge colouring planar graph.

**(10 Lectures)**

Text books:

1. Discrete Mathematics – R. Manohar & Tremblay –  
McGraw-Hill Book Co.
2. Discrete Mathematics (For Computer Scientist)- John  
Truss - Pearson Education

Reference Books:

1. Discrete Mathematics – Richard Hohnson Baugh
2. Discrete Mathematical Structures – Bernard Kolmar,  
Robert C Busby, Sharon Cutter Ross
3. Discrete Mathematics – Nborman L. Biggs – Oxford  
University, USA
4. Discrete Mathematics and Structures – Satindre Bal  
Gupta – Laxmi Publication Pvt. Ltd.
5. Set theory- S.N. Thakur

**CSE**  
**EC 1405 ANALOG ELECTRONICS**

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

**Credit: 3**

Four Ideal Amplifiers- Ideal Voltage Amplifiers, Ideal current Amplifiers, Ideal Transresistance Amplifiers and Ideal Transconductance Amplifiers and Distortions (Amplitude of Harmonic Distortion, Frequency Distortion and Distortion);  
**[4 Lectures]**

Mid frequency Analysis of CB, CE & CC amplifiers using Hybrid Model (*Chapter 8 Integrated Electronics by Millman & Halkias*);

Low and High Frequency analysis of CB, CE & CC (*Chapter 11 and Chapter 12 exec Section 12- 10 and 12-11*),

Rise time method for determination of  $f_h$  using the formula  
 $t_r/f_h = 0.35$  and 10% sa method for the determination of  $f_h$  using sag method  
**[15 Lectures]**

Bootstrapping in Emitter Follower, Darlington Pair Amplifier, Cascode Amplifier, CC- CB Cascade;      **[4 Lectures]**

Multistage Amplifiers & Band Width Shrinkage in multistage amplifiers  
**[3 Lectures]**

Incremental Model of FET and incremental analysis

Common Source at Low & High Frequencies

**[3 Lectures]**

Noise & Noise Figure in Amplifiers- Thermal Noise, Shot Noise, Flicker Noise, Friss Formula;      **[4 Lectures]**

Class A, Class B and Class Power amplifiers with reference to Complementary Symmetry Amplifiers;      **[5 Lectures]**

## References

1. Introduction to Electronic Circuit Design by Spencer, Pearson;
2. Device Electronics for Integrated Circuits by Muller & Kamins With Mansun Chan, Will Student Edition
3. Principles of Electronics by V. K. Mehta & Rohit Mehta, Chand
4. Electronic Circuit & System by R.J. Smith, Wiley;

## Basic Electronics Lab:

1. Introduction to DMM (Digital Multimeter);
2. Introduction to passive components (resistance, capacitance and inductors)- specification and measurements of the actual values by DMM;
3. Introduction to Cathode Ray Oscilloscope (CRO)- Time period measurement, study different Waveforms, Measurement of frequencies of Sinusoidal wave forms by Lissajou Figure;
4. Introduction to connectors –multi-strand wires (connecting wires)& single strand wires(hoo up wires) and bread boards;
5. Study of Output characteristics of Dode, BJT, FET, UJT & SCR;
6. Application of Diode, BJT, FET, UJT & SCR- Clipping & Clamping, Rectification, Coupled CE and CS FET Amplifiers Relaxation Oscillator;
7. Application of new A 741-Inverting Amplifiers, Non-inverting Amplifiers, Summer Amplifiers Difference Amplifiers, Integrator and Differentiators;

**Text Book: Lab Manual by Mahaeshwari, PHI;**

**CS-1403**

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

## **( CSE)** **Data Structures**

**Credit: 5**

**Introduction to algorithm:** Analysis for time and space requirements. **Lecture: 2**

**Linear Data Structures and Their Sequential Representation:** Array, Stack, queue, circular queue and their operation's and applications. **Lecture: 7**

**Linear Data Structures and Their Linked Representation:** Linked linear list, circularly linked linear list, Doubly linked list, linked stack, linked queue and their operations and applications **Lecture:10**

**Nonlinear Data Structures:** Binary trees, binary search trees, representations, operations, thread representations, sequential representation, traversals, applications, B-tree, Operation on B-tree, AVL Search tree and operations, Huffman Algorithm, Height Balanced Tree. **Lecture:14**

**Sorting and Searching:** Bubble Sort, Insertion Sort, Selection Sort, Heap Sort, Quick Sort, Radix Sort, Linear and Binary search, Union-Find, Hashing methods, etc. **Lecture:10**

### **Text Books:**

1. Data Structure Using C by ISRD Group, Tata McGraw Hill
2. Data Structures by Lipschutz & Pai, Tata McGraw Hill.
3. Data Structure using C and C++ by Langsam, Pearson Education
4. Data Structures by E. Horowitz and S. Sahni
5. Data Management & File Structures, 2e, by Mary E.S. Loomis, PHI.
6. Data Structures & Algorithm Analysis in C++, 2e, by Mark Allen Weiss, Pearson Education.
7. An Introduction to Data Structures with application, Second Edition, by J. P. Tremblay and P.G. Sorenson, Tata McGraw Hill.

### **Reference Books:**

1. Data Structures using Java by Langsam, Moshe Augenstein, and Aaron M. Tenenbaum.
2. C and Data Structures by P.S. Despande. Wiley India

( CSE)

**CS-1402 Computer Architecture**  
L-T-P: 3-0-0

**Credit: 3**

**Introduction:** Computer Arithmetic, Instruction sets, Introduction to computer organization, CPU Design.

**Lecture: 8**

**Micro programmed Control:** Control Memory, Address sequencing, Micro program example. **Lecture: 5**

**Memory and Input-Output Subsystems:** Hierarchical memory structure, Cache memories, Set Associative memory, Virtual Memory, Paging, Segmentation, Input-Output Interface, Asynchronous Data Transfer, Programmed I/O, Interrupts, Direct Memory access. **Lecture: 15**

**Introduction to Parallel Procession:** Evolution of computer systems (RISC vs. CISC), Parallelism in uniprocessor systems, Architectural classification schemes.

**Lecture: 5**

**Principles of Pipelining and Vector processing:** Pipelining, Overlapped Parallelism, Principles of designing Pipelined processors, Vector Processing Requirements.

**Lecture: 5**

**Structures & Algorithms for Array Processors:** SIMD Array processors, SIMD Interconnection networks

**Lecture: 4**

**Text Books:**

1. Computer System Architecture. 3e by M. Morris Mano, Pearson Education.
2. Computer Architecture and parallel processing by Kai Hwang, Briggs, McGraw Hill
3. Computer Architecture by Carter, Tata McGraw Hill.
4. Computer System Organization & Architecture by John D. Carpinelli, Pearson Education.

**CSE**

**CS 1405 Systems Programming**

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

**Credit: 5**

**Introduction:** System software and its components.

**Lecture:2**

**Assemblers:** Elements of assembly language programming,  
Assembly process Dependent Assembler, Machine-Independent  
Assembler, Design of multi, 2-pass assembler single pass assembler

**Lecture:10**

**Macros and Macro Processor:** Macro definition and call Macro  
expansion, Nested Macro Calls, Design of a Macro preprocessor

**Lecture:8**

**Loaders & Linkers:** Basic Loader Function, Machine-dependent  
Loader, Machine –Independent Loader, Loader Design Options  
Absolute Loader, Bootstrap Loader, Relocation and linking  
concepts, Design of a linker, self Relocating Programs and Overlay  
structure.

**Lecture:10**

**Compiler:** Machine-Dependent Compiler, Machine-independent  
Compiler, Compiler Design Options (Interpreter, P-code  
Compiler), Compiler-Compiler, Case study of Compiler.

**Lecture:10**

**Software Tools:** Software Tools for Program Development  
Editors, Debug Monitors, Programmes, Environments use  
Interfaces.

**Lecture:2**

*Text Book:*

1. System Software: An Introduction to Systems Programming (3<sup>rd</sup> Edition) by Leland L. Beck, Pearson Education.
2. Systems Programming – John J. Donovan.
3. Systems Programming and operating and operating systems – D.M. Dhamdere.
4. IBM PC assembly language & programming by Peter Abel, Niyaz Nizamuddin, Pearson Education.
5. Assembly Language Programming for IBM PC Family by William B. Jones, Dreamtech Press.

### **Programming Lab (System Programming)**

Symbol table (Tree Storage) construction, Implementation of single pass, two pass Assembler, Macro Preprocessor, module binder (with Limited instruction set). Implementation of software tools like Text editor, Interpreter, Program generator etc.

**CE-1402 Environmental Science**

L-T-P: 3-0-3

Credit: 5

**Unit 1:** Humans and Sustainability, Ecology and Sustainability: Ecosystems. (7 Lectures)

**Unit 2:** Evolution of Biodiversity, Biodiversity & Climate; Population Ecology; Sustaining Biodiversity; Sustaining Resources Environmental Quality: Water and Water Pollution, (8 Lectures)

**Unit 3:** Sustaining Resources Environmental Quality : Air Pollution, Behavior and control of air and water pollutants; Hazardous and solid waste and pollution of groundwater and soil, Noise Pollution, Geology and nonrenewable Minerals, Energy. (9 Lectures)

**Unit 4:** Toxicological Chemistry and effects and risks of it on human health. (6 Lectures)

**Unit 5:** Environmental Chemical Analysis. (6 Lectures)

**Unit 6:** Policy and legislation for environmental protection, Current Environmental Issues. (6 Lectures)

**Text Books:**

1. Environmental Science, Miller, Thomson Press.
2. Environmental Chemistry, Sawyer and McCarty, Mc GrawHill.
3. Environmental Chemistry, Manahan Stanley E., Lewis Publishers.

**Practical:**

1. Case Analysis based on theory.
2. Determination of simple environmental parameters in laboratory.
3. Paper Presentation on current environmental issues.

**Intel 8085**

**Introduction:** CPU, Registers, Memory, Buses, Memory Addressing capacity of a CPU, **(4 Lecture)**

CPU Architecture Pin configuration, Instructions, Addressing Modes/Instruction Word Size, Languages.**(4 Lecture)**

Timing Diagram, Read cycle, Write cycle, Fetch cycle, Memory Read, Memory Write, I/O cycle,**(3 Lecture)**

**Programming:** Simple Programming: 8-bit addition & subtraction, 16-bit addition, subtraction, delay, subroutine using register, finding lowers & highest no. in array

**(5 Lecture)**

Data transfer schemes, I/O ports **(6 Lecture)**

8255, 8251, 8253, 8257 chips, pin diagram, control word, operating modes **(6 Lecture)**

Interfacing to ADC, Analog multiplexer **(4 Lecture)**

**Intel 8086**

Architecture, BIU & Execution unit, Pin diagram, Function of different modes, Registers. **(4 Lecture)**

Addressing Modes, Instructions **(4 Lecture)**

Programming **(3 Lecture)**

### **Text Books:**

1. Fundamentals of Microprocessors & Microcomputer  
by B. Ram, Dhanpat Rai & Sons, Delhi
2. Advanced Microprocessor by B. Ram

### **Reference Books:**

1. Microprocessors & Interfacing by B.B. Hall, TMH
2. Microprocessor Architecture, Programming and Applications with 8085/ 8086 A By Ramesh S. Gaonkar, Wiley Easter Ltd.
3. The Intel Microprocessors Architecture, Programming & Interfacing By B. B. Brey, PHI
4. Programming Microprocessor Interfaces for control & Instrumentation by Michael Andrews, PHI, Englewood Cliffs, New Jersey.
5. Microprocessors with Application in Process Control by S.I. Ahson, TMH, New Delhi

**CSE**

# **CS-1506 Design and Analysis of Algorithms**

**Credits: 3**

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

**Introduction:** Algorithm, performance evaluation of algorithms, space & time complexity, notion of optimality.

**Lecture: 5**

**Divide and Conquer:** Finding the maximum and minimum – Quick Sort – Selection – Strassen's matrix multiplication, etc

**Lecture: 4**

**Greedy Algorithm:** Knapsack Problem, (-1 Knapsack, Fractional Knapsack), Activity selection problem, Huffman's Codes, Minimum Spanning Tree, Kruskal's Algorithm, Prim's Algorithm, Dijkstra's Algorithm, etc.

**Lecture: 6**

**Dynamic Programming:** Knapsack problem DP solution, Activity selection problem DP solution, All pairs shortest path, Traveling salesman problem.

**Lecture: 4**

**Randomized Algorithms and Amortized Analysis:** Basis idea of randomized Algorithms (Las Vegas and Carlo types). Simple examples (Randomized Quick sort and its analysis, min-cut algorithm and its analysis) Amortized analysis and its significance (Illustration thorough examples).

**Lecture: 6**

**Graph Algorithms:** Breadth First search (BFS), Depth First Search (DFS), strongly connected components, Euler Tour, Minimum spanning Tree, Kruskal's Algorithm, Prim's Algorithm, single source shortest path.

**Lecture: 14**

**Introduction to NP- Completeness:** Basis concepts.

**Lecture: 4**

## **Reference:**

1. The Design and Analysis of computer Algorithms by A.V. Aho, JE Hopcroft and JD Ullman, Pearson Education.
2. Algorithm- Introduction to Design and Analysis by S. Basu Pearson Education.
3. Algorithms and complexity, by H.S. Wilf, PHI

# CS-1532-INTRODUCTION TO JAVA PROGRAMMING LANGUAGE

L-T-P : 3-0-3

Credit: 5

**Introduction to Java :** Feature to Java, Java Virtual Machine, Differences between C++ and Java, Part of Java, API Document, Starting a Java Program. Important Classes, Formatting the Output

**Lecture 2**

**Naming Conventions and Data Types :** Naming Conventions in Java. Data types in Java, Literals.

**Lecture 1**

**Operators and Control Statements in Java :** Arithmetic Operators, Unary Operators, Relational Operators, Logical Operators, Boolean Operators, Bitwise Operators, Ternary Operators, New Operator, Cast Operator, If else statement, Switch statement, Break statement, Continue statement, Return statement, do ? While loop, while loop, for loop.

**Lecture 4**

**Input and Output :** Accepting Input from the keyboard, reading input in Java, Util, Scanner class, displaying output with System.out. Print(), Displaying formatted output with string, Format.

**Lecture 2**

**Arrays and Strings :** Types of Arrays, Array name, Length, Command Line Arguments, Creating Strings, String Class Methods, String Comparison, Immutability of Strings, Creating String Buffer Objects, String Buffer Class Methods, String Builder Class, String Builder Class Methods.

**Lecture 3**

**Wrapper Classes :** Number class, Character class, Byte class, Short class, Integer class, Long class, Float class, Double class, Boolean class, Math class.

**Lecture 3**

**Introduction to OOPS :** Problems in procedure oriented approach, Features of Object Oriented Programming System, Object creation, Initializing the instance variable Constructors.

**Lecture 2**

**Methods of Java** : Method Prototype, Method Body, Understanding Methods, Static Methods, Static Block, The keyword 'this', Instance Methods, Passing Primitive Data Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion, Factory Methods.

### Lecture 4

**Inheritance and Polymorphism** : Inheritance, The Keyword 'super', The Protected Specified, Types of Inheritance, Polymorphism with variables, Polymorphism using methods, Polymorphism with Static Methods, Polymorphism with Private Methods, Abstract Classes.

### Lecture 3

**Packages** : Package, Different types of Packages, Interface in a Package, Access Specifies in Java.

### Lecture 3

**Exceptional handling** : Errors in Java Program, Exceptions throws and throw clause, Types of exceptions, Re-throwing an exception.

### Lecture 2

**Threads** : Single and Multitasking, Creating and terminating the thread, Single and Multi tasking using threads, Deadlock of threads, Thread communication.

### Lecture 3

**Introduction to AWT and Applets** : AWT components, Creating and closing the frame, Drawing in the frame, Displaying dots and text in the frame, Event Handling, Listeners and Listener methods, Creating and uses of Applets, An applet with swing components, Applet parameters.

### Lecture 4

**Introduction on Java database connectivity** : Database servers and clients, JDBC, Connecting to a Database, Stored Procedures and Callable Statement, Storing file and Image into database, retrieving a file and images from database, Types of JDBC drivers.

### Lecture 4

## Text Books :

1. Core Java by R Nageswara & Kogent Solution Inc, Dreamtech.
2. The Complete Reference Java Tata McGraw Hill.
3. Java 6 Programming Black Book, w/CD by Kogent Solutions Inc,, Dreamtech .

## Reference Books:

1. Professional Java, JDK 6 Ed. by Richardson Avondolio Wrox.
2. Programming with Java by E Balagurusamy Tata McGraw Hill.

**Introduction:** Purpose of database systems, View of data, data models, & interface, Database language, transaction management, storage management, database administrator, database users, overall system structure, Classification of Database Management System, Three-Schema Architecture.

Lecture: 3

**Data Modeling:** Entity-Relationship Model, Basic concepts, design issues, mapping constraints, keys, E-R diagram, weak entity sets, extended E-R features, design of an E-R database schema, reduction of an E-R schema to tables.

Lecture: 5

**Relational Model:** Structure of relational databases, relational algebra, tuple relational calculus, domain relational calculus, extended relational-algebra operations, modification of the database and view, SQL and Other.

Lecture: 5

**Relational Languages:** Background, basic structure, set operations aggregate functions, null values, nested sub-queries, derived database, joined relations DOL embedded SQL and other SL features, query-by-example.

Lecture: 5

**Integrity Constraints:** Domain constraints, referential integrity, assertions triggers and functional dependencies.

Lecture: 3

**Relational Database Design:** Pitfalls in relational database design, decomposition, normalization using functional, multi-valued and join dependencies, domain key normal form and alternative approaches to database design.

Lecture: 5

**Query Processing:** Overview, catalog information for cost estimation, measures of query cost, selection operation, sorting, join operation, other operations, evaluation of expressions, Translating SQL query into Relational Algebra, transformation of relational expressions, Query Optimization.

### Lecture: 8

**Transactions:** Transaction concept, transaction state, system log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation transaction definition in SQL, Testing for serializability

### Lecture: 8

#### Text Books:

1. Database System Concepts 3<sup>rd</sup> edition, by A.Silberschatz H. F. Korth, & S. Sudhatshan, McGraw Hill,
2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education.
3. An Introduction to database system by C. J. Date, A. Kanana, S. Swamynathan, Pearson Education

#### Reference Books:

1. Database management System, by Rajesh Narang. PHI
2. Database Systems by Rob, Coronel, Galgotia Publicatin.

**Introduction:** Introduction to OS. Operating System functions, evaluation of O.S., Different types of O.S., batch, multi-programmed, time-sharing, real-time, distributed, parallel.

Lecture:8

**Processes:** Concept of processes, process scheduling, operations on processes, inter-process communication, Communication in Client-Server Systems, overview & benefits of threads.

Lecture:4

**Process Scheduling:** Scheduling criteria, preemptive & non-preemptive scheduling, scheduling algorithms.

Lecture:4

**Process Synchronization:** Background, critical section problem, critical region, synchronization hardware, classical problems of synchronization, semaphores.

Lecture:6

**Deadlocks:** System model, deadlock characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock.

Lecture:6

**Memory Management:** Background, logical vs. physical address space, swapping, contiguous memory allocation, paging, segmentation, paging, segmentation.

Lecture:6

**Virtual Memory:** Background, demand paging, page replacement, page replacement algorithms allocation of frames, thrashing.

Lecture:4

**File Systems:** File concept, access methods, directory structure

Lecture:2

**Disk Management:** Disk structure, disk scheduling (FCFS, SSTF, SCAN, SCAN)

Lecture:4

- Text Books:*
- 01. Operating System Principles by Silberschatz A and Peterson  
J.L., Wiley
  - 02. Operating Systems by Dhamdhere, TMH

*References:*

- 01 Operating Systems by Deitel, Deitel & Choffnes.
- 02 Operating Systems by Stalling, Pearson

**Practical:**

Familiarization with UNIX / Linux and Windows  
Operating Systems

**List of experiment**

- 01 Study Experiment- UNIX basics
- 02 Basic Shell Programming (Fibonacci Series generation, Factorial of a given number, Checking for Armstrong number)
- 03 Designing a Arithmetic calculator
- 04 Generation of Multiplication table
- 05 Base Conversion (Decimal to Binary, Binary to Decimal)
- 06 Checking for a palindrome of a number
- 07 Finding the information about the Login name and File name
- 08 Students Evaluation
- 09 Process Creation (Basics, Arithmetic operations on processes, Displaying process ID,)
- 10 System calls (Usage of Link (), Usage of dup (), Renaming a file)

**CS 1514 Computer Networks**

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

**Credit: 3**

**Introduction:** Network Hardware & Software, OSI Reference Model, TCP/ IP Model, Comparison of the OSI & TCP/ IP model.

**Lecture:2**

**The Physical Layer:** Guided Transmission Media, Physical Layer Standard.

**Lecture:2**

**The Data Link Layer:** Need for Data Link Control, Service Provided by the Data Link Layer, Frame Design Consideration, Flow Control Mechanism. Data Link Error Control, in Stop-and-wait Mechanism & Sliding Window Mechanism, Sequence numbering, Piggybacking Acknowledgements, Data Link Management.

**Lecture:8**

**MAC Protocols:** Random Access Protocols – ALOHA.

**Lecture:2**

**IEEE 802.3 Ethernet:** Contention Access, CSMA, CSMA/CD, Physical Topology of Ethernet, Ethernet Repeater, Types of Ethernet.

**Lecture:5**

**Bridges and Layer-2 Switches:** LAN Bridge , Transparent Bridges, Spanning Tree Algorithm, Source Routing Bridge, Route Discovery in Source Routing, Layer 2 Ethernet Switches.

**Lecture:5**

**The Network Layer:** Network Layer Design Issue, Purpose of Network Layer, Functions of the Network Layer. **Lecture:5**

**Introduction to Internet Protocol:** IPv4 Format, ICMP.

**Lecture:2**

**Routing Algorithms:** Static Routing, Dynamic Routing, Distance Vector Routing Algorithm, Routing Information Protocol, Link State Routing, OSPF Routing Protocol, Interior and Exterior Protocol, and Border Gateway Protocol.

**Lecture:10**

## *Introduction to Transport Layer: TCP & UDP.*

**Lecture:1**

## *Introduction to application Layer: TCP/IP Application Protocol.*

**Lecture:1**

### **Text Books:**

1. Data Communication & Networking by Forouzan, Tata Mcgraw Hill.
2. Computer Network, 4e by Andrew S. Tanenbaum, Pearson Education / PHI
3. Data Communication and Computer Networks, by Prakash C. Gupta, PHI
4. Networking All-In –One Desk Reference by Doug Lowe, Wiley Dreamtech

### **Reference Books:**

1. Computer Networking: A Top-Down Approach featuring the Internet, 3e by James F. Kurose
2. Computer Network by Godbole, Tata Mcgraw Hill.
3. Computer Networking, by Stanford G. Rowe, Marsha L. Schuh

**(CSE)**

# **1604 OBJECT ORIENTED ANALYSIS AND DESIGN**

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

**Credit : 3**

**Introduction:** Object Oriented Development & themes, Usefulness of OOPS, Object Modeling Technique.

## **Lecture 6**

**Object Technique:** Link Association, Generalization, Inheritance, Aggregation, Abstract Classes, Dynamic Modeling event & States. State Diagram, Nested State Diagram, Relation of Object & Dynamic Model, Functional Modeling, Data Flow Diagram, SSD, Use Case.

## **Lecture 15**

**Design Methodology:** OMT Methodology, Analysis, Iterating the Analysis, System Design, Object Design, Comparison of Methodologies.

## **Lecture 15**

**Case Studies :** Object oriented Language Relational Database

## **Lecture 8**

### **Text Books:**

1. Object Oriented Modeling and Design by Rumbaugh, Pearson Education.
2. Object Oriented Analysis and Design: Understanding System Development with UML by Mike O Doherty, Wiley India.
3. Object Oriented Analysis and Design by Kahate, Tata McGraw Hill.

### **Reference Books:**

1. Object Oriented Analysis and Design with Application by Grady Booch, Pearson Education.

**(CSE)**

# **CS-1610 PRINCIPLES OF PROGRAMMING LANGUAGES**

L-T-P : 3-0-0

Credit : 3

**Language Design Issues:** Impact on Programming paradigm,  
Role of Programming Environment.

**Lecture 3**

**Impact of Machine Architecture :** Computer H/w, Firmware  
Computer, Transistor and virtual Architecture

**Lecture 5**

**Language Translation Issues :** Programming Language  
Syntax, Stages in translation, Formal Translation model (BNF  
Grammars, etc.), Formal properties of Languages, Languages  
Semantics Program Verification.

**Lecture 5**

**Data Types :** Properties of Types and Objects, Scalar Data  
Types, Composite Data Types, Structures Data Types, Abstract  
Data Types, Encapsulation by subprogram, Type Definitions.

**Lecture 4**

**Inheritance:** Derived class, Abstract Class, Inheritance &  
software Reuse, Polymorphism.

**Lecture 4**

**Sequence Control :** Implicit & Explicit Sequence control,  
Sequencing with Arithmetic Expression Sequence control,  
between statements, sequencing with Non-arithmetic Expression.

**Lecture 5**

**Subprogram Control :** Subprogram sequence control, Attributes  
of Data Control Parameter transmission, Static Scope, Dynamic  
scope, Block Structure.

**Lecture 5**

**Storage Management :** Element Requiring Storage. Programmer  
and system Controlled Storage, Static Storage management, Heap  
storage management.

**Lecture : 4**

**Distributed Processing** : Exceptions & Exception Handlers, C<sub>0</sub>, routines, Scheduled Subprogram, Parallel Programming, Persistence data & Transaction Systems, Network & Client server Computing.

**Lecture : 4**

**Case Study** : Comparison between Ada, C, C++, Fortran, Java, LISP, ML, Perl, Prolog, Smalltalk, Postscript.

**Lecture : 4**

### **Text Book:**

- 1 .Programming Languages: Design and Implementation, 4/e by Terrance W. Pratt, Marvin V. Zelkovitz, T. V. Gopal, Pearson Education.
- 2 .Programming Languages: Concepts and Constructs by R. Sethi, Pearson Education.

### **Reference Books:**

1. Fundamentals of Programming Languages by E. Horowitz, Galgotia,
2. Programming Languages , Paradigm and Practice by D. Appleby, McGraw Hill.

**CSE**

# **51612 Formal Languages and Automata Theory**

**Credit: 3**

L.F.P: 3-0-0

**Introduction to Automata:** Study and Central concepts of automata theory. An informal picture of Finite automata, deterministic and non-deterministic finite automata, application of finite automata, finite automata with epsilon transitions.

**Lecture:3**

**Regular Expression and Languages:** Regular expression, finite automata and regular expressions, applications of regular expressions, algebraic laws of regular expressions.

**Lecture:6**

**Properties of Regular Language:** Proving languages not to be regular, closure properties of regular languages, equivalence and minimization of automata.

**Lecture:4**

**Context-free Grammars and Languages:** Parse trees, Applications of context free grammars, Ambiguity in grammars and languages,

**Lecture:6**

**Pushdown Automata:** Pushdown (PDA), the language of PDA, equivalence of PDA's and CFG's, deterministic pushdown automata.

**Lecture:6**

**Properties of Context-Free Languages:** Normal forms of context free grammars, pumping lemma for context free languages, closure properties of context free languages.

**Lecture:5**

**Introduction to Turing Machine:** The Turing machine, programming techniques for Turing machine, extensions to the basic Turing machine, restricted Turing Machines, Turing machines and Computers Undecidable Problem about Turing Machine, Post's Correspondence Problem.

**Lecture: 7**

**Text Books:**

1. Introduction to Automata Theory Languages and Computation, 2e, by Johan E. Hopcroft, Rajeev Motwani, and Jeffery D. Ullman, Pearson Education
2. Theory of Computer Science (Automata, Languages and Computation ), 2e, K. L. P. Mishra and N. Chandrasekharan. PHI

**CSE**

**HS-1613 INDUSTRIAL ECONOMICS &  
ACCOUNTING**

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

**Credit: 3**

Various definition of Economics-Nature of Economic Problem, Relation between Science, Engineering, Technology & Economics. **(3 Lecture)**

Meaning of Demand, Law of Demand, Elasticity of Demand, Practical importance & application of the concept of elasticity of Demand. **(5 Lecture)**

Meaning of Production and factor of production-Land, Labour, Capital, Entrepreneur & Organization-their characteristics, Law of variable proportion, Return to Scale **(5 Lecture)**

Cost Analysis-various concept of cost, Cost function, Short & Long run cost, Concept of Revenue, Break-Even Analysis. **(6 Lecture)**

Meaning of Market- Type of market-Perfect Competition, Monopoly, Oligopoly, Monopolistic competition (Main feature of these market) Meaning of Supply and Law of supply, Role of Demand & Supply in price determination imperfect competition. **(7 Lecture)**

**Engineering Economy :**(a) Simple and compound interest, Annuities (b) Basic methods for making economy studies- (c) Comparison of alternative - (i) Present worth method (ii) Future worth method (iii) I.R.R method (c) Comparison of alternative – (i) Present worth method (ii) Future worth method (iii) I.R.R method

**(7 Lecture)**

**( 57 )**

**Accounting:** Meaning, Scope and Role of Accounting, Accounting concept & convention, Accounting as an information system Recording of transaction in Journal and Ledgers, Trial – Balance, Preparation of final Account. (9 Lecture)

### **Text books:**

1. H.L. Ahuja-Modern Micro Economic Theory, S.Chand
2. M.L.Jhingan-Advance Economic Theory-Konark Publication
3. Degarmo, Sullivan& Canada- Engineering Economics – Macmillan
4. Double Entry Book Keeping – T.S.Grewal- S. Chand

### **Reference books:**

1. Stonier & Hague – A test book of Economic Theory – Pearson
2. Industrial Organisation and Engg. Economics, Banga& Sharma

**Introduction:** S/W Engineering Discipline-Evolution and Impact, Program vs S/W Product, Emergence of S/W Engineering  
**(4 Lecture)**

**Software Life Cycle Models:** Waterfall, Prototyping, Evolutionary, Spiral Models and their comparisons  
**(5 Lecture)**

**Software Project Management:** Project Manager responsibilities, Project Planning, Project Size Estimation Metrics, Project estimation Techniques, COCOMO, Staffing Level Estimation, Scheduling, Organization & Team Structures, Staffing, Risk Management, S/W Configuration Management

**(6 Lecture)**

**Requirements Analysis and Specification:** Requirement Gathering and Analysis, SRS, Formal System Development Techniques, Axioma and Algebraic Specification

**Software Design:** Overview, Cohesion and Coupling, S/W Design Approaches, Object-Oriented vs Function-Oriented Design  
**(8 Lecture)**

**Function-Oriented S/W Design:** SA/SD Methodology, Structured Analysis, DFDs, Structure Design, Detailed Design, Design Preview  
**(4 Lecture)**

**Object Modelling Design UML:** Overview, UML, UML Diagrams, Use Case Model, Classes Diagrams etc  
**(4 Lecture)**

**Object-Oriented Software Development:** Design Patterns, Object-Oriented analysis Design Process, OOD Goodness Criteria  
**(5 Lecture)**

**User Interface Design:** Characteristics, Basic Concepts, Types, Components Based Development User Interface Design  
Methodology (4 Lecture)

**Coding and Testing:** Coding, Code Review, Testing, Unit Testing, Black Box Testing, Box Testing, Debugging, Program Analysis, Tools, Integration Testing, System Testing, Gen Issues (5 Lecture)

**Software Reliability and Quality Management:** S/W Reliability, Statistical Testing, Quality, S/W Quality Management System, ISO 9000, SEI CMM, Personal Software Product Six Sigma (4 Lecture)

**Computer Aided Software Engineering:** CASE and its Scope, Environment, Support, Characteristics (3 Lecture)

**Software Maintenance:** Characteristics, S/W Reverse Engineering, S/W Maintenance Product Models, Estimation of Maintenance Cost (4 Lecture)

**Software Reuse:** Basic Issues, Reuse Approach, Reuse at Organization Level (2 Lecture)

### Text Books:

01. Fundamentals of Software Engineering by Rajib Mall, PHI
02. Software engineering by James F. Peters, Wiley
03. Software engineering A Practitioner's Approach by Pressman, MGH

### Reference Books:

01. Software Project Management From Concept to Deployment By Kieron Concept dreamtech Press
02. Software engineering, by Sommerville, Pearson education
03. Software engineering, by Jawadekar,

**CSE**

**CS-1607 WEB APPLICATION DESIGN  
AND DEVELOPMENT**

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

**Credit : 5**

**Database Connectivity :** Concept of JDBC (Java Database Connectivity), working with SQL, Stored Procedures.

**Lecture 5**

**Client Server Side Programming :** Java Script- Introduction, data types, variables, operators, Array Objects, Date, Objects, String Objects, Document Object Model, Image Object, Event handling, Browser Object, Window Object, Location Object, History Object, Submit event and data validation. Understanding Servlet programming, its Life-Cycle, Servlet Configuration, understanding Servlet sessions understanding of JSP and JSLT, JSP documents, Elements, tag extensions, tag libraries, validation, translation time mechanism translation-time classes, Understanding Java Server Pages Standard Tag Library, tags in JSLT, core tag library, XML tag library using Internationalization Actions.

**Lecture 20**

**J2EE :** Advantages of J2EE, Enterprise Architecture Types, Understanding EJB, its architecture, EJB Roles, Benefits and limitations of Enterprise beans, session beans: Stateful and Stateless beans, Entity Beans, Beans Managed Persistence, Container Managed Persistence, Introduction to Web Containers.

**Lecture 10 Network Programming :** Java Socket programming for TCP and UDP, RMI (Remote Method Invocation).

**Lecture 5**

**Case Study : Web Applications, Web Applications Life Cycle,  
Enterprise Application Development process, Deploying Web  
Applications.**

**Lecture 5**

**Text Books:**

1. Java Server Programming J2EE, 1.4 Edition Black Book (Dreamtech Press)
2. Core Java TM Volume II by Cay S. Horstmann & Gray Cornell (Pearson)

**Reference Book:**

1. J2EE 1.4 Bible by McGovern (Wiley India)

**Introduction to Compilers:** Compilers and translators, the phases of a compiler, Compiler writing tools, The Lexical and Syntactic structure of a language, operators, Assignment statements and parameter translation.

### Lecture:2

**Lexical Analysis:** The role of the lexical analyzer, Specification of tokens, lexical analysis tool.

### Lecture:2

**Syntax Analysis:** Role of Parser, CFG, Top-down parsing, bottom-up parser, Operator-precedence parsing, LR Parsers, The Canonical Collection of LR (0) items, Construction SLR, Canonical LR, and LALR parsing tables, Use of ambiguous grammars in LR parsing, An automatic parser generator, Implementation of LR parsing tables, and constructing LALR sets of items.

### Lecture:10

**Syntax Directed Translation:** Syntax tree, Bottom-up evolution of S-attributed definitions, L-attributed definition, top-down translation, Bottom-up evaluation of inherited attributed, Recursive evaluators.

### Lecture:5

**Type Checking:** Static vs. Dynamic Checking, Type expression, Type Checking, Type Equivalence, Type Conversion.

### Lecture:2

**Symbol Tables:** Structure of Symbol Table, Simple Symbol Table (Linear Table, Ordered List, Tree, Hash Table), Scoped Symbol Table (Nested Lexical Scoping, One Table per Scope, One Table for all Scopes).

### Lecture:3

**Intermediate Code Generation:** Intermediate Language, Intermediate representation Technique, Three-address code, quadruples and triples, Translation of assignment statements, Boolean expressions, Control Flow, Case Statement, and Function Call.

### Lecture:4

**Code Generation:** Factors affecting code generation, Basic Block, Code generation for tree, Register Allocation and assignment, DAG representation, Code Generation using dynamic programming, Code-Generator generators.

### Lecture:4

**Error Detection and Recovery:** Errors. Lexical- Phase errors, Syntactic- Phase errors Semantic errors.

### Lecture:2

**Code Optimization:** Need for optimization, Optimization of Basic Blocks, Loops in flow graph, Optimizing transformation (Compile time evaluation, common sub-expression elimination, Variable Propagation, Code Movement Optimization, Strength Reduction, Dead code optimization, Loop Optimization), Global Optimization, Computing Global data flow equation, Setting up data flow Equations, Iterative Data Flow Analysis.

### Lecture:10

#### Text Books:

1. Compilers: Principles, Techniques, and Tools by Alferd V. Aho Ravi Seethi, Jeffery D. Ullman, Pearson Education.
2. Compiler Design by Santanu Chattopadhyay, PHI

#### Reference Book:

1. Modern Compiler Design by Dick Grune, E. Bal, Ceriel J.H. Jacobs, and Ken G. Langendoen. Wiley Dreamtech.

#### Programming Lab (Compiler Design):

Design of lexical analyzers. Design of parsers like recursive-descent parser for a block structured language with typical constructs. Typical exercises using LEX and YACC. Quadruples/Triples generation using LEX and YACC for a subset of a block structured language, LR (0), SLR, LALR error detection, and recovering with code optimization.

**(CSE)**

*IT-1713 Distributed Computing & its  
applications*

**Credits: 5**

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

**Introduction to Distributed Computing Systems:** Different Forms of Computing Distributed Computing Paradigms.

**Lecture 5**

**Java & Distributed Computing:** Socket API(TCP and UDP based Sockets). Remote Invocation (RMI), introduction to Remote procedure Call. RPC implementation in java RMI, Concept of CORBA.

**Lecture 8**

**Understanding Servlet Programming:** Using Servlets, its life cycle. Deploying Serlets, Web Server. Working with Request and Response Object. Understanding Servlet Session tracking mechanism.

**Lecture 9**

**Understanding of JSP:** Understanding the web page life cycle in JSP. JSP Document Elements. JSP Tag extensions. Tag libraries and its validation.

**Lecture 7**

**Working with Enterprise Java Beans:** EJB Overview, Client View of a Session Bean, Session Bean Component Contract, Session Bean Lifecycle, Client View of an Entity, Component Contract for Container-Managed Persistence (CMP), CMP Entity Bean Lifecycle, Entity Bean EJB-QL, Message-Driven Bean Component Contract, Transactions, Exceptions, Enterprise Environment, Security Management

**Lecture 12**

**Text Book:**

01. Distributed Computing – Principles and Applications  
M.L.Liu (Pearson Education)
02. JAVA – How To Programm, by Deitel & Deitel
03. J2EE 1.4 Bible By McGovern (Wiley India)

**Reference Book:**

01. Java Server Programming (Black Book )(Dreamtech Pres.)
02. The J2EE tutorial 2/e by Bodoff, (Sun-Pearson Education Asia)

**Introduction:** Why AI, Importance of AI, LISP, Prolog and other programming language fore AI. **(Lecture: 3)**

**Search strategies:** Representation Scheme, Blind Search technique, Heuristic Search technique, algorithm, monotone restriction – Specialized production systems – AO\* algorithm, **(Lecture: 15)**

**Searching game trees:** Minimax procedure, alpha-beta pruning - Introduction to predicate calculus – Resolution refutation systems – Answer extraction, **(Lecture: 4)**

**Knowledge representation, reasoning:** Knowledge representation, Knowledge acquisition, Logical Representation scheme, Procedural representation scheme, network representation scheme, STRIPS robot Problem solving system, Structured representations of knowledge (Semantic Nets, Frames, Scripts) KRR system, KR language, Domain modeling, Semantic net.

**(Lecture: 8)**

**Uncertainly:** Non monotonic & monotonic reasoning, confidence factors, Bates theorem, Dempster & Shafer's Theory of evidence, non-classical logic, Fuzzy reasoning. **(Lecture: 6)**

**Natural language processing:** An Introduction to Natural language Understanding, Perception, Learning.

**(Lecture: 4)**

**Applications of Artificial Intelligence:** AI in E-commerce, AI in E-tourism, AI in Industry, AI in Medicine. **(Lecture: 2)**

***Text Books:***

1. Introduction to Artificial Intelligence by Rajendra Akerkar, PHI
2. Introduction to Artificial Intelligence by Eugene Charniak, Pearson Education
3. Artificial Intelligence by Rich & Knight, Tata McGraw-Hills.
4. Introduction to Artificial Intelligence & Expert system by Dan W. Patterson PHI

***Reference Books:***

1. Artificial Intelligence: A Modern Approach by Stuart Russell, Peter Norvig, and Pearson Education.
2. Introduction to Expert System, Peter Jackson, Pearson Education.
3. Artificial Intelligence application programming by M. Tim Jones, Dreamtech Press

**Programming Lab (AI)**

Implementation in all algorithms in LISP/ Prolog.

## **PROJECT I & ELECTIVES**

<b>XX-17XX</b>	<b>Elective-1</b>
<b>XX-17XX</b>	<b>Elective-2</b>
<b>XX-17XX</b>	<b>Elective-3</b>
<b>CS-1720</b>	<b>PROJECT-I</b>
<b>CS-1721</b>	<b>INDUSTRIAL TRAINING</b>

**Fundamentals:** Three concept view, Supervised learning, Unsupervised clustering, Data Mining or Data Query, Expert System or Data Mining?, A simple data Mining Process Model, Data Mining Strategies, Supervised Data Mining techniques, Association Rules, Clusterir Techniques, Evaluating Performance  
**(Lectures 6)**

**Basic Data Mining Technique:** Decision Trees, Generating Association Rules, K-Mear Algorithm, Genetic learning, Choosing Technique,  
**(Lectures 5)**

**An Excel-based Data Mining Tool: *iData Analyzer*.**

**(Lectures 3)**

**Knowledge Discovery in Databases:** KDD Process model, Noisy data, Missing data, Data Transformation, CRISP-DM process Model.  
**(Lectures 4)**

**Data Warehousing:** Operational Database, Data warehouse design, OLAP, Excel Pivot Table for data analysis.

**(Lectures 4)**

**Formal Evaluation Techniques:** Evaluation criteria, Tools, Computing Test Set Confidence Intervals, Comparing Supervised Learner Models, Attribute Evaluation, Unsupervised Evaluation Techniques  
**(Lectures 6)**

**Neural Networks:** Feed – Forward Neural Networks, NN Training, Building Neural Network with iDA

**(Lectures 4)**

**Statistical Techniques:** Linear Regression Analysis, Logistic Regression, Bayes Classified Clustering Algorithm, Query and Visualization Techniques, Machine Learning and Statistical Techniques  
**(Lectures 6)**

**Specialized Techniques:** Time Series Analysis, Mining the Web Mining Textual Data Improving Performance

**(Lectures 4)**

### **Text Books:**

01. Data Mining: A tutorial-based Primer, by Richard J. Roiger, Michael W. Geatz, Pearson Education
02. Data Mining Introductory & advanced topic, by Margaret H. Dunham, Pearson Education

### **Reference Books:**

01. Data Warehousing, Data Mining & OLAP by Berson/ Smith, TMH
02. The Microsoft Data Warehouse Toolkit: With SQL server 2005 and the Microsoft business Intelligence toolset by Ralph Kimball, Wiley India
03. Building the Data warehousing by W. H. Inmon, Wiley India
04. Data Warehousing: Design, Development & best practices, by Soumendra Mohanty, McGraw Hill.

**(CSE)**

# **HS 1804 PERSONNEL MANAGEMENT & INDUSTRIAL RELATION**

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

**Credit: 3**

Introduction: Concept, Function and Importance, Role and Status of Personnel Manager, Organization of personnel Department, Personnel policies. **(5 Lectures)**

Procurement of Personnel: Assessing Human Resource Requirement, Job analysis, Job description & specification, Uses of Job analysis information Recruitment-Meaning, Source of recruitment; Selection-Meaning, Objective, Method of Selection, Placement & Induction **(7 Lectures)**

Training & Development: Training-Meaning, Need for Training, Method of Training; Development-Concept, The Development method **(6 Lectures)**

Performance Appraisal & Job change: The Concept, Objective and the method of Performance appraisal, Job change-Transfer, Promotion and Separation **(6 Lectures)**

Compensation-Concept, Type, Method of compensation **(6 Lectures)**

Maintenance: Health, Safety, & Welfare, Concept of social security. **(6 Lectures)**

Industrial Relation & Trade Union

**(6 Lectures)**

## **Text Books:**

1. Personnel Management- C. B. Memoria & G. V. Gankar – Himalaya
2. Personnel Management & Industrial Relation – P. C. Tripathi – Schand

## **Reference Book:**

1. Industrial Relation, Trade Union & Labour Relation – G.P.Sinha & PRN Sinha- Pearson

**(CSE)**

## **IT- 1809 Information Security**

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

**Credits: 3**

**Information and Security Planning:** Introduction to Information Theory, Threat Agents and Risk Information and the Law, Information Security Planning Model      **(Lectures 12)**

**Cryptographic Principles and Methods** Cryptographic Philosophy, Mathematical Principles of Cryptography, Symmetrical Key Cryptography, Public Key Infrastructure

**(Lectures 11)**

**Information System Security** Securing the Information System  
Viruses, Worms, and c Malicious Software

**(Lectures 10)**

### **Text Books:**

- 01.** Information Security Intelligence: Cryptographic Principles & Applications by Calabrese, Thomson

### **Reference Books:**

- 01.** Information Security Principles & Practice by Mark Stamp, Wiley
- 02.** Introduction to computer Security by Bishop and Venkatramanaya, Pearson Education
- 03.** Cryptography and Network Security: principles and Practice by Stallings, PHI

## **Project-II & Elective**

<b>XX-18XX</b>	<b>ELECTIVE-IV</b>	<b>3</b>	<b>0</b>	<b>0</b>		
<b>XX-18XX</b>	<b>ELECTIVE-V</b>	<b>3</b>	<b>0</b>	<b>0</b>		<b>3</b>
<b>XX-1XXX</b>	<b>ELECTIVE-VI</b>	<b>3</b>	<b>0</b>	<b>0</b>		<b>3</b>
<b>CS-1824</b>	<b>PROJECT -II</b>	<b>0</b>	<b>0</b>	<b>9</b>		<b>6</b>