JSS MAHAVIDYAPEETHA

JSS SCIENCE AND TECHNOLOGY UNIVERSITY

Mysuru-570006.

Department of Information Science & Engineering

Bachelor of Engineering

In

Computer Science & Business Systems

SCHEME & SYLLABUS

I to II semesters

2019

Scheme of Teaching and Examination
BE in Computer Science & Business SystemS

First Semester BE

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hours)
				L	T	P	Total		CIE	SEE	Total	
1.	CB110	Discrete Mathematics	IS&E	3	1	0	4	5	50	50	100	3
2.	CB120	Statistics, Probability and Calculus	Mathematics	3	0	0	3	3	50	50	100	3
3.	CB130	Fundamentals of Computer Science	IS&E	3	1	1	5	7	50	50	100	3
4.	CB140	Principles of Electrical Engineering	E&E	3	0	1	4	5	50	50	100	3
5.	CB150	Physics for Computing Science	Physics	3	0	1	4	5	50	50	100	3
6	CB160	Business Communication & Value Science – I	Humanities	2	0	0	2	2	50	50	100	3
		Induction Program (Non Credit)	-	-	-	-	-	-	-	-	-	-
Total				17	2	3	22	27	300	300	600	-

Scheme of Teaching and Examination

BE in Computer Science & Business Systems

Second Semester BE

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hours)
				L	T	P	Total		CIE	SEE	Total	
1.	CB210	LINEAR ALGEBRA	IS&E	3	1	0	4	5	50	50	100	3
2.	CB220	STATISTICAL MODELLING	IS&E	3	1	0	4	5	50	50	100	3
3.	CB230	DATA STRUCTURES & ALGORITHMS	IS&E	3	0	1	4	5	50	50	100	3
4.	CB240	PRINCIPLES OF ELECTRONICS ENGINEERING	IS&E	3	0	1	4	5	50	50	100	3
5.	CB250	FUNDAMENTALS OF ECONOMICS	Humanities	2	0	0	2	2	50	50	100	1.5
6	CB260	BUSINESS COMMUNICATION & VALUE SCIENCE – II	Humanities	2	0	0	2	2	50	50	100	-
Total				16	2	2	20	24	300	300	600	

CB110 DISCRETE MATHEMATICS

Total Teaching Hours: 52 **No. of Credits : 04**

Course Outcomes

On successful completion of the course, students should be able to:

CO1: Explain concepts of Discrete Mathematical Structure, Graph Theory and Combinatorics
CO2: Apply the concepts of Set Theory, Relation, Group, Ring and Filed
CO3: Develop a model the concepts of Boolean Logic ,Graph Theory and Combinatorics
CO4: Evaluate the Proposition logic, relations, Functions and Graph Theory Applications.
CO5: Design and Create to build a model using Discrete Mathematics concepts.

Boolean algebra: **10 hrs**

Introduction of Boolean Algebra, Truth Table, Basic Logic Gate, Basic Postulates of Boolean Algebra, Principle of Duality, Canonical Form, Karnaugh Map.

Logic: **10 hrs**

Propositional calculus - Propositions and Connectives, Syntax; Semantics - Truth Assignments and Truth Tables, Validity and Satisfiability, Tautology; Adequate set of connectives; Equivalence and Normal forms; Compactness and Resolution; Formal reducibility - Natural Deduction System and Axiom System; Soundness and Completeness.

Abstract algebra: **10 hrs**

Set, Relation, Group, Ring, Field.

Combinatorics: **10 hrs**

Basic counting, Balls and Bins Problems, Generating Functions, Recurrence Relations. Proof Techniques, principle of mathematical induction, pigeonhole principle.

Graph Theory: **10 hrs**

Graphs and digraphs, complement, isomorphism, contentedness and reachability, adjacency matrix, Eulerian paths and circuits in graphs and digraphs, Hamiltonian paths and circuits in graphs and tournaments, trees; Planar graphs, Euler's formula, dual of a planer graph, independence number and clique number, chromatic number, statement of Four-color theorem.

Text Books:

1. *Topics in Algebra,* I. N. Herstein, John Wiley and Sons.
2. *Digital Logic & Computer Design,* M. Morris Mano, Pearson.
3. *Elements of Discrete Mathematics,* (Second Edition) C. L. LiuMcGraw Hill, New Delhi.
4. *Graph Theory with Applications,* J. A. Bondy and U. S. R. Murty, Macmillan Press, London.
5. *Mathematical Logic for Computer Science,* L. Zhongwan, World Scientific, Singapore.

Reference Books:

1. *Introduction to linear algebra.* Gilbert Strang.
2. *Introductory Combinatorics,* R. A. Brualdi, North-Holland, New York.
3. *Graph Theory with Applications to Engineering and Computer Science,* N. Deo, Prentice Hall, Englewood Cliffs.Principles of Electrical Engineering
4. *Introduction to Mathematical Logic,* (Second Edition), E. Mendelsohn, Van-Nostrand, London.

CB120 PROBABILITY AND STATISTICS

Total Teaching Hours: 40 **No. of Credits : 03**

Probability: Concept of experiments, sample space, event. Definition of Combinatorial Probability. Conditional Probability, Bayes Theorem. Probability distributions: discrete & continuous distributions, Binomial, Poisson and Geometric distributions, Uniform, Exponential, Normal, Chi-square, t, F distributions. Expected values and moments: mathematical expectation and its properties, Moments (including variance) and their properties, interpretation, Moment generating function.

Introduction to Statistics: Definition of Statistics. Basic objectives. Applications in various branches of science with examples. Collection of Data: Internal and external data, Primary and secondary Data. Population and sample, Representative sample. Descriptive Statistics: Classification and tabulation of univariate data, graphical representation, Frequency curves. Descriptive measures - central tendency and dispersion. Bivariate data. Summarization, marginal and conditional frequency distribution. Scatter diagram. Linear regression and correlation. Least squares method. Rank correlation.

Sampling Techniques: Random sampling. Sampling from finite and infinite populations. Estimates and standard error (sampling with replacement and sampling without replacement), Sampling distribution of sample mean, stratified random sampling

Text Books:

1. S. M. Ross, “Introduction of Probability Models”, Academic Press, N.Y.
2. A. Goon, M. Gupta and B. Dasgupta, “Fundamentals of Statistics”, vol. I & II, World Press.

Reference Books:

1. S. M. Ross, “A first course in Probability”, Prentice Hall.
2. I. R. Miller, J.E. Freund and R. Johnson, “Probability and Statistics for Engineers”. Fourth Edition, PHI.
3. A. M. Mood, F.A. Graybill and D.C. Boes, “Introduction to the Theory of Statistics”, McGraw Hill Education.

CB130 FUNDAMENTALS OF COMPUTER SCIENCE

Total Teaching hours: 50 **No. of credits: 05**

Course Outcomes:

After the completion of this course students should be able to:

CO1: Analyze a problem and develop an algorithm to solve it.
CO2: Apply decision structures, loops to solve a problem
CO3: Design programs employing arrays, and functions
CO4: Apply the concepts of derived data types and pointers to solve a problem
CO5: Create basic data files and apply file manipulation functions.

Introduction: **10 Hours**

General problem Solving concepts: Algorithm, and Flowchart for problem solving with Sequential Logic Structure, Decisions and Loops. Variable Names, proper variable naming and Hungarian Notation, Data Type and Sizes (Little Endian and Big Endian), Constants, Declarations, Standard I/O, Formatted Output – printf, Formated Input – scanf, Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation.

Control statements **10 Hours**

Control Flow with discussion on structured and unstructured programming: Statements and Blocks, If-Else-If, Switch, Loops – while, do, for, break and continue, goto labels, structured and un- structured programming.

Arrays and Functions **10 Hours**

Arrays declaration, initialization, application of one-dimensional and two-dimensional arrays. Strings declaration, initialization and basic I/O operations on strings, string-handling functions. Basics of functions, parameter passing and returning type, C main return as integer, External, Auto, Local, Static, Register Variables, Scope Rules, Block structure, Initialisation, Recursion, Pre-processor, Standard Library Functions and return types.

Structures, Unions and Pointers **10 Hours**

Structures: Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Self-referral structures, Table look up, typedef, unions, Bit-fields .Pointers and address, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Multi-dimensional array and Row/column major formats, Initialisation of Pointer Arrays, Command line arguments, Pointer to functions, complicated declarations and how they are evaluated.

File management and Unix system Interface **10 Hours**

File access including FILE structure, fopen, stdin, sdtout and stderr, Error Handling. Unix system Interface: File Descriptor, Low level I/O – read and write, open, create, close and unlink, Random access – lseek, Discussions on Listing Directory, Storage allocator.

Laboratory

Algorithm and flowcharts of small problems like GCD, Concepts of structured programming (statements, selection and lopping), Applications of arrays and functions, User defined data types, pointers and file manipulation.

Text Books:

1. *The C Programming Language*, (Second Edition) B. W. Kernighan and D. M. Ritchi, PHI.
2. *Programming in C*, (Second Edition) B. Gottfried, Schaum Outline Series.

Reference Books:

1. *C: The Complete Reference*,(Fourth Edition), Herbert Schildt, McGraw Hill.
2. *Let Us C*,Yashavant Kanetkar, BPB Publications.

Online Courses:

Problem Solving through Programming in C. https://swayam.gov.in/nd1_noc19_cs43/preview

CB140 PRINCIPLES OF ELECTRICAL ENGINEERING

Total Teaching Hours: 42 **No. of Credits : 04**

Course Outcomes

After completing this course, the student should be able to

CO-1: Define, understand, and explain the basics of DC/AC Systems, network theorems, Electro-mechanics, working and characteristics of AC/DC machines, transformers, transducers and sensors.

CO-2: Analyze and obtain the steady-state response of the circuit with DC/AC excitation and network theorems. Analyze the ratings and specifications the type of electrical machines, transducers and sensors used for practical application

CO-3: Apply the concepts of Electrostatics and Electro mechanics for energy conversions

CO-4: Identify the materials required for domestic wiring and design a typical house wiring system.

CO-5: Measure electrical quantities in AC DC systems and Conduct experiments on network theorems, transducers and AC circuits(using Simulation tools).

Introduction: **6 hrs**

Concept of Potential difference, voltage, current, Fundamental linear passive and active elements to their functional current-voltage relation, Terminology and symbols in order to describe electric networks, voltage source and current sources, ideal and practical sources, concept of dependent and independent sources, Kirchhoff-s laws and applications to network solutions using mesh and nodal analysis, Concept of work, power, energy, and conversion of energy.

DC Circuits: **10 hrs**

Current-voltage relations of the electric network by mathematical equations to analyze the network (Thevenin’s theorem, Norton's Theorem, Maximum Power Transfer theorem) Simplifications of networks using series-parallel, Star/Delta transformation. Superposition theorem.

AC Circuits: **8 hrs**

AC waveform definitions, form factor, peak factor, study of R-L, R-C,RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance,

admittance, active, reactive, apparent and complex power, power factor, 3 phase Balanced AC Circuits (Y-Δ & Δ-Y).

Electrostatics and Electro-Mechanics: 10 hrs

Electrostatic field, electric field strength, concept of permittivity in dielectrics, capacitor composite, dielectric capacitors, capacitors in series and parallel, energy stored in capacitors, charging and discharging of capacitors, Electricity and Magnetism, magnetic field and Faraday's law, self and mutual inductance, Ampere's law, Magnetic circuit, Single phase transformer, principle of operation, EMF equation, voltage ratio, current ratio, KVA rating, efficiency and regulation, Electromechanical energy conversion.

Measurements and Sensors: 8 hrs

Introduction to measuring devices/sensors and transducers (Piezoelectric and thermo-couple) related to electrical signals, Elementary methods for the measurement of electrical quantities in DC and AC systems(Current & Single-phase power). Electrical Wiring and Illumination system: Basic layout of the distribution system, Types of Wiring System &Wiring Accessories, Necessity of earthing, Types of earthing, Safety devices & system.

For Further Reading - Principle of batteries, types, construction and application, Magnetic material and B-H Curve, Basic concept of indicating and integrating instruments.

PRINCIPLES OF ELECTRICAL ENGINEERING LAB

Laboratory

1. Familiarization of electrical Elements, sources, measuring devices and transducers related to electrical circuits
2. Determination of resistance temperature coefficient
3. Verification of Network Theorem (Superposition, Thevenin, Norton, Maximum Power
4. Transfer theorem)
5. Simulation of R-L-C series circuits for XL>XC , XL< XC
6. Simulation of Time response of RC circuit
7. Verification of relation in between voltage and current in three phase balanced star and delta connected loads.
8. Demonstration of measurement of electrical quantities in DC and AC systems.

Text Books:

1. *Electric Machinery*,(Sixth Edition) A.E. Fitzgerald, Kingsely Jr Charles, D. Umans Stephen, Tata McGraw Hill.
2. *A Textbook of Electrical Technology*,(vol. I),B. L. Theraja, Chand and Company Ltd., New Delhi.
3. *Basic Electrical Engineering*, V. K. Mehta, S. Chand and Company Ltd., New Delhi.

4. *Theory and problems of Basic Electrical Engineering*, (SecondEdition), J. Nagrath and Kothari, Prentice Hall of India Pvt. Ltd.

Reference Books:

1. *Basic of Electrical Engineering*, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press. T. K. Nagsarkar and M. S. Sukhija, Basic of Electrical Engineering, Oxford University Press, 2011.
2. *Introduction to Electrodynamics*, D. J. Griffiths, (Fourth Edition), Cambridge University Press.
3. *Engineering Circuit Analysis,* William H. Hayt& Jack E. Kemmerly, McGraw-Hill Book Company Inc.
4. *Fundamentals of Electrical and Electronics Engineering,*Smarjith Ghosh, Prentice Hall (India) Pvt. Ltd.

CB150 PHYSICS FOR COMPUTING SCIENCE

Total Teaching Hours: 52 **No. of Credits : 04**

Oscillation and fundamental of wave optics

Periodic motion-simple harmonic motion-characteristics of simpleharmonic motion-vibration of simple springs mass system. Resonance-definition., dampedharmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonicoscillator, quality factor, forced mechanical and electrical oscillators.

Interference-principle of superposition-young's experiment

Theory of interference fringes-types of interference-Fresnel's prism-Newton's rings, Diffraction-Two kinds of diffraction-Difference between interference and diffraction-Fresnel's half period zone and zone plate-Fraunhofer diffraction at single slit-plane diffraction grating.Temporal and Spatial Coherence.

Basic Idea of Electromagnetisms, Maxwell's Equations

Polarization - Concept of production of polarized beam of light from two SHM acting at right angle; plane, elliptical and circularly polarized light, Brewster's law, double refraction.

Quantum Mechanics and Crystallography:

Introduction - Planck's quantum theory- Matter waves, de-Broglie wavelength, Heisenberg's Uncertainty principle, time independent and time dependent Schrödinger's wave equation, Physical significance of wave function, Particle in a one dimensional potential box, Heisenberg Picture.

Crystallography - Basic terms-types of crystal systems, Bravais lattices, miller indices, d spacing, Debye Scherrer powder method, laue method- Atomic packing factor for SC, BCC, FCC and HCP structures.

Semiconductor Physics - conductor, semiconductor and Insulator; Basic concept of Band theory

Laser and Fiber optics:

Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: Ruby Laser, CO2 and Neodymium lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in engineering.

Fiber optics and Applications, Types of optical fibers

Thermodynamics

Zeroth law of thermodynamics, first law of thermodynamics, brief discussion on application of 1st law, second law of thermodynamics and concept of Engine, entropy, change in entropy in reversible and irreversible processes, third law of thermodynamics.

Laboratory

1) Magnetic field along the axis of current carrying coil – Stewart and Gee
2) Determination of Hall coefficient of semi conductor
3) Determination of Plank constant
4) Determination of wave length of light by Laser diffraction method
5) Determination of wave length of light by Newton's Ring method
6) Determination of laser and optical fiber parameters
7) Determination of Stefan's Constant.

Text Books:

1. Beiser A, "Concepts of Modern Physics", Fifth Edition, McGraw Hill International.
2. David Halliday, Robert Resnick, Jearl Walker, "Fundamentals of Physics", Wileyplus.

Reference Books:

1. Ajoy Ghatak, "Optics" Fifth Edition, Tata McGraw Hill.
2. Sears &Zemansky, "University Physics", Addison-Wesley.
3. Jenkins and White, "Fundamentals of Optics", Third Edition, McGraw-Hill.

CB160 BUSINESS COMMUNICATION & VALUE SCIENCE – I

Total Teaching Hours: 52 **No. of Credits : 04**

Semester – II

CB210 LINEAR ALGEBRA

Total Teaching Hours: 52 **No. of Credits : 04**

Introduction to Matrices and Determinants; Solution of Linear Equations; Cramer's rule; Inverse of a Matrix.

Vectors and linear combinations; Rank of a matrix; Gaussian elimination; LU Decomposition; Solving Systems of Linear Equations using the tools of Matrices.

Vector space; Dimension; Basis; Orthogonality; Projections; Gram-Schmidt orthogonalization and QR decomposition.

Eigenvalues and Eigenvectors; Positive definite matrices; Linear transformations; Hermitian and unitary matrices;

Singular value decomposition and Principal component analysis; Introduction to their applications in Image Processing and Machine Learning.

Note:
Assignments & tutorials covering the following: Vectors and linear combinations, Matrices, Linear transformations, Complete solution to Ax = b, Determinants, Eigenvalues and Eigenvectors

Text Books:

1. *Higher Engineering Mathematics*, B. S. Grewal.

Reference Books:

1. *Advanced Engineering Mathematics*, 7th Edition, Peter V. O'Neil.
2. *Advanced Engineering Mathematics*, 2nd Edition, Michael. D. Greenberg.
3. *Introduction to linear algebra*, 5th Edition, Gilbert Strang.
4. *Applied Mathematics* (Vol. I & II) , by P. N. Wartikar& J. N. Wartikar.
5. *Digital Image Processing*, R C Gonzalez and R E Woods
6. https://machinelearningmastery.com/introduction-matrices-machine-learning/

CB220 STATISTICAL MODELLING

Total Teaching Hours: 52 No. of Credits : 04

Linear Statistical Models: Simple linear regression & correlation, multiple regression & multiple correlation, Analysis of variance (one way, two way with as well as without interaction)

Estimation: Point estimation, criteria for good estimates (un-biasedness, consistency), Methods of estimation including maximum likelihood estimation.

Sufficient Statistic: Concept & examples, complete sufficiency, their application in estimation

Test of hypothesis: Concept & formulation, Type I and Type II errors, Neyman Pearson lemma, Procedures of testing

Non-parametric Inference: Comparison with parametric inference, Use of order statistics. Sign test, Wilcoxon signed rank test, Mann-Whitney test, Run test, Kolmogorov-Smirnov test. Spearman's and Kendall's test. Tolerance region

Basics of Time Series Analysis & Forecasting: Stationary, ARIMA Models: Identification, Estimation and Forecasting.

R statistical programming language: Introduction to R, Functions, Control flow and Loops, Working with Vectors and Matrices, Reading in Data, Writing Data, Working with Data, Manipulating Data, Simulation, Linear model, Data Frame, Graphics in R

Text Books:

3. *Probability and Statistics for Engineers* (4th Edition), I.R. Miller, J.E. Freund and R. Johnson.
4. *Fundamentals of Statistics* (Vol. I & Vol. II), A. Goon, M. Gupta and B.Dasgupta.
5. *The Analysis of Time Series: An Introduction,* Chris Chatfield.

Reference Books:

4. *Introduction to Linear Regression Analysis,* D.C. Montgomery &E.Peck
5. *Introduction to the Theory of Statistics*, A.M. Mood, F.A. Graybill& D.C. Boes.
6. *Applied Regression Analysis*, N. Draper & H. Smith
7. *Hands-on Programming with R,*- Garrett Grolemund
8. *R for Everyone: Advanced Analytics and Graphics,* Jared P. Lander

Data Source:

www.rbi.org.in

CB230 DATA STRUCTURES & ALGORITHMS

Total Teaching Hours: 52 No. of Credits : 04

Basic Terminologies & Introduction to Algorithm and Data Organisation: Algorithm specification, Recursion, Performance analysis, Asymptotic Notation - The Big-O, Omega and Theta notation, Programming Style, Refinement of Coding - Time-Space Trade Off, Testing, Data Abstraction

Linear Data Structure: Array, Stack, Queue, Linked-list and its types, Various Representations, Operations & Applications of Linear Data Structures

Non-linear Data Structure: Trees (Binary Tree, Threaded Binary Tree, Binary Search Tree, B & B+ Tree, AVL Tree, Splay Tree) and Graphs (Directed, Undirected), Various Representations, Operations (search and traversal algorithms and complexity analysis) & Applications of Non-Linear Data Structures

Searching and Sorting on Various Data Structures: Sequential Search, Binary Search, Breadth First Search, Depth First Search, Insertion Sort, Selection Sort, Shell Sort, Divide and Conquer Sort, Merge Sort, Quick Sort, Heap Sort, Introduction to Hashing

File: Organisation (Sequential, Direct, Indexed Sequential, Hashed) and various types of accessing schemes.

Laboratory

1. Towers of Hanoi using user defined stacks.
2. Reading, writing, and addition of polynomials.
3. Line editors with line count, word count showing on the screen.
4. Trees with all operations.
5. All graph algorithms.
6. Saving / retrieving non-linear data structure in/from a file

Text Books:

1. *Fundamentals of Data Structures*, E. Horowitz and S. Sahni, 1977.
2. *Data Structures and Algorithms,* Alfred V. Aho, John E. Hopperoft, Jeffrey D. UIlman.

Reference Books:

1. *The Art of Computer Programming: Volume 1: Fundamental Algorithms*, Donald E. Knuth
2. *Introduction to Algorithms, Thomas*, H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein.
3. *Open Data Structures: An Introduction (Open Paths to Enriched Learning)*, 31st ed. Edition , Pat Morin

CB240 PRINCIPLES OF ELECTRONICS ENGINEERING

Total Teaching Hours: 52 **No. of Credits : 04**

Semiconductors: Crystalline material: Mechanical properties, Energy band theory, Fermi levels; Conductors, Semiconductors & Insulators: electrical properties, band diagrams. Semiconductors: intrinsic & extrinsic, energy band diagram, P&N-type semiconductors, drift & diffusion carriers.

Diodes and Diode Circuits: Formation of P-N junction, energy band diagram, built-in-potential, forward and reverse biased P-N junction, formation of depletion zone, V-I characteristics, Zener breakdown, Avalanche breakdown and its reverse characteristics; Junction capacitance. Linear piecewise model; Rectifier circuits: half wave, full wave, PIV, DC voltage and current, ripple factor, efficiency, idea of regulation.

Bipolar Junction Transistors: Formation of PNP / NPN junctions; transistor mechanism and principle of transistors, CE, CB, CC configuration, transistor characteristics: cut-off active and saturation mode, transistor action, injection efficiency, base transport factor and current amplification factors for CB and CE modes. Biasing and Bias stability: calculation of stability factor

Field Effect Transistors: Concept of Field Effect Transistors (channel width modulation), Gate isolation types, JFET Structure and characteristics, MOSFET Structure and characteristics, depletion and enhancement type; CS, CG, CD configurations; CMOS: Basic Principles

Feed Back Amplifier, and Operational Amplifiers: Concept (Block diagram), properties, positive and negative feedback, loop gain, open loop gain, feedback factors; topologies of feedback amplifier; effect of feedback on gain, output impedance, input impedance, sensitivities (qualitative), bandwidth stability. Introduction to integrated circuits, operational amplified and its terminal properties; Application of operational amplifier; inverting and non-inverting mode of operation, Adders, Subtractors, Constant-gain multiplier, Voltage follower, Comparator, Integrator, Differentiator

Digital Electronics Fundamentals: Difference between analog and digital signals, Boolean algebra, Basic and Universal Gates, Symbols, Truth tables, logic expressions, Logic simplification using K- map, Logic ICs, half and full adder/subtractor, multiplexers, demultiplexers, flip-flops, shift registers, counters.

Laboratory

8) *Semiconductor Diodes and application,*
9) *Transistor circuits,*
10) *JFET and amplifiers.*
11) *Digital Logic Gates.*

PRINCIPLES OF ELECTRONICS ENGINEERING (continued)

Text Books:

3. *Microelectronics Circuits*, Adel S. Sedra and Kenneth Carless Smith
4. *Millman's Integrated Electronics*, Jacob Millman, Christos Halkias, Chetan Parikh.
5. *Digital Logic & Computer Design*, M. Morris Mano

Reference Books:

4. *Electronic Devices and Circuit Theory*, Robert L. Boylestad, Louis Nashelsky.
5. *Solid State Electronic Devices*, 6th Edition, Ben Streetman, Sanjay Banerjee
6. *Electronic Principle*, Albert Paul Malvino.
7. *Electronics Circuits: Discrete & Integrated*, D Schilling, C Belove, T Apelewicz, R Saccardi.
8. *Microelectronics*, Jacob Millman, Arvin Grabel.
9. *Electronics Devices & Circuits*, S. Salivahanan, N. Suresh Kumar, A. Vallavaraj
10. *Electronic Devices & Circuit Theory*, 11th Edition, Robert L. Boylestad, Louis Nashelsky.

CB250 FUNDAMENTALS OF ECONOMICS

Total Teaching Hours: 26 **No. of Credits : 02**

Microeconomics: *Principles of Demand and Supply* — Supply Curves of Firms — Elasticity of Supply; *Demand Curves of Households* — Elasticity of Demand; Equilibrium and Comparative Statics (Shift of a Curve and Movement along the Curve); *Welfare Analysis* — Consumers' and Producers' Surplus — Price Ceilings and Price Floors; *Consumer Behaviour* — Axioms of Choice — Budget Constraints and Indifference Curves; *Consumer's Equilibrium* — Effects of a Price Change, Income and Substitution Effects —Derivation of a Demand Curve; *Applications* — Tax and Subsidies — Intertemporal Consumption — Suppliers' Income Effect; *Theory of Production* — Production Function and Iso-quants — Cost Minimization; *Cost Curves* — Total, Average and Marginal Costs — Long Run and Short Run Costs; *Equilibrium of a Firm Under Perfect Competition*; *Monopoly and Monopolistic Competition*

Macroeconomics: *National Income and its Components* — GNP, NNP, GDP, NDP; Consumption Function; Investment; *Simple Keynesian Model of Income Determination and the Keynesian Multiplier*; *Government Sector* — Taxes and Subsidies; *External Sector* — Exports and Imports; *Money* — Definitions; *Demand for Money* —Transactionary and Speculative Demand; *Supply of Money* — Bank's Credit Creation Multiplier; *Integrating Money and Commodity Markets* — IS, LM Model; *Business Cycles and Stabilization* — Monetary and Fiscal Policy — Central Bank and the Government; *The Classical Paradigm* — Price and Wage Rigidities — Voluntary and Involuntary Unemployment

Text Books:

1. *Microeconomics*, Pindyck, Robert S., and Daniel L. Rubinfeld.
2. *Macroeconomics*, Dornbusch, Fischer and Startz.
3. *Economics*, Paul Anthony Samuelson, William D. Nordhaus.

Reference Books:

1. *Intermediate Microeconomics: A Modern Approach*, Hal R, Varian.
2. ***Principles of Macroeconomics*, N. Gregory Mankiw.**

CB260 BUSINESS COMMUNICATION & VALUE SCIENCE – II

Total Teaching Hours: 52 **No. of Credits : 04**