



**Department of Information Technology**  
**Central University of Kashmir**  
**Nowgam Campus III, Srinagar**

**Syllabus for B. Tech. CSE 3<sup>rd</sup> Semester**

S. No	Course Code	Course Title	Credits	Evaluation		
				CIA	ESE	Total
1.	BT-301	Mathematics III (Differential Eq.)	4	40	60	100
2.	BTCS-302	Basic Electronics	4	40	60	100
3.	BTCS-303	Data Structure	4	40	60	100
4.	BTCS-304	Operating Systems	4	40	60	100
5.	BTCS-305	Electronics Laboratory	2	40	60	100
6.	BTCS-306	Data Structure Laboratory	2	40	60	100
7.	BT- 307	Environmental Studies	2	40	60	100
		Total	22			

## **BT 301: Mathematics III (Differential Eq.)**

### **Unit 1**

Ordinary differential equations: Exact ordinary differential Equations and Ordinary differential equations reducible to exact differential equations. Linear differential equations and equations reducible to linear form. Applications of Ordinary Differential Equations.

### **Unit 2**

Linear Differential Equations: Linear differential equations with constant and variable coefficients, Cauchy's homogeneous linear equations, Legendre's linear equations, Simultaneous linear equations with constant coefficients.

### **Unit 3**

Partial Differential Equations: Formulation of PDE's by eliminating arbitrary constants and functions, Solution of first order linear equations, Four standard forms of non-linear equations, Separation of variable method for solution of heat, wave and Laplace equation.

### **Unit 4**

Fourier series and Fourier Transformation: Determination of Fourier coefficients – Fourier series. Even and odd function. Fourier series in an arbitrary interval. Half-range Fourier sine and cosine expansions.

### **References:**

1. Kreyszig E, "Advanced Engineering Mathematics", 8th Ed. John Wiley.
2. H.K.Das and Rajnish Verma, "Higher Engineering Mathematics", S.Chand.
3. Jain R K and Iyengar, S R K., "Advanced Engineering Mathematics", 2nd Ed, Narosa.
4. M.D.Raisingania "Ordinary and partial Differential equation", S.Chand.
5. Hoffmann&Kunze "Linear Algebra", Prentice-Hall.

# **BTCS 302: Basic Electronics**

## **Unit 1**

### **SEMICONDUCTORS, DIODES AND DIODE CIRCUITS:**

Semiconductors- types & fabrication techniques, Mobility and conductivity, electric properties, continuity equation, Hall effect, Current components in p-n junction, characteristics-piece wise linear approximation, temperature dependence, Diode capacitance, and switching times, diode circuits half wave, full wave rectifiers, clipping circuits.

## **Unit 2**

TRANSISTORS: Construction and characteristics of bipolar junction transistors (BJT's)- Common (Base, Emitter, Collector) configuration. Transistor at low frequencies – small signal low frequency transistor model (h-parameters). Analysis of transistor amplifier circuit using h-parameters. Transistor Biasing and Bias Stabilization: - the operating point, stability factor, analysis of fixed Base bias, Collector to Base bias, Emitter resistance bias circuit and self-bias circuit.

## **Unit 3**

FIELD EFFECT TRANSISTOR: JFET and MOSFET-fabrication techniques & characteristics. FET biasing and application as an amplifier. Volt-ampere characteristics: SCR, TRIAC, DIAC, UJT, Introduction to IC technology.

## **Unit 4**

AMPLIFIERS - Classification of amplifiers, concept of feedback, general characteristics of feedback amplifiers, Single stage RC coupled amplifier.

OSCILLATORS – Criterion for Oscillation, type of oscillators: Hartley oscillator, Colpitt Oscillator & RC Phase shift oscillator, Cathode Ray Oscilloscope, Basic operation and measurement applications.

### **References:**

1. Integrated Electronics: Analog and Digital Circuits and Systems by J.Millman and C. Halkias, McGraw Hill.
2. Electronic circuits by D Schelling & C Belove
3. Basic Electronics by Mithel E Schultz McGraw Hill

# **BTCS 303: Data structure**

## **Unit 1**

**Review of Data Types and Concepts:** Review of data types. Definition of a Data structure, Linear Data structures. **Stack:** Operations, Applications, implementation using linked list as well as arrays, Expressions and their conversions, Infix, Postfix & Prefix.

**Queue:** Types, Operations, Applications, implementation using linked list as well as arrays. **Linked List:** Types, Operations, Applications, Implementation.

## **Unit 2**

**Trees:** Preliminaries, Trees, Forest, Binary Trees, Binary Search Tree ADT, Binary Search Trees, Conversion of Forest to Binary Tree, Binary Search Tree, AVL Trees, Tree Traversals, Priority Queues (Heaps), Model, Simple implementations, Binary Heap.

## **Unit 3**

**Graphs:** Definitions, Representation of Graphs, Adjacency Matrix, Path Matrix, Operations on Graphs, Traversing a graph: BFS and DFS, Shortest Path Algorithms:

Dijkstra's Algorithm and Warshall's Algorithm, Minimum Spanning Tree, Kruskal's Algorithm and Prim's Algorithm.

## **Unit 4**

**Searching and Sorting:** Searching: Sequential search, Binary search, Hashing, General Idea, Hash Function, Separate Chaining, Open Addressing, Linear Probing.

Sorting: Bubble sort, Insertion Sort, Selection sort, Heap sort, Merge sort, Quick sort, External Sorting.

### **References:**

1. **Tanenbaum A. S.**, Data Structure Using C, Dorling Kindersley Publisher.
2. **Ellis Horowitz and Satraj Sahni**, An Introduction to Data Structures, Computer Science Press, Rockville MA 1984.
3. **M. A. Weiss**, "Data Structures and Algorithm Analysis in C", 2nd ed, Pearson Education Asia.
4. **E. Horowitz & S. Shani** Fundamentals of Data Structures in C, Galgotia Pub. 1999.
5. **Richard F. Gilberg, Behrouz A. Forouzan**, Data Structures: A Pseudocode Approach with C, Thomson Cole, 1998.
6. **Hopcroft A. J. E. & Ullman J. D.**, Data Structures and Algorithms, Pearson Education Asia, 1983.

# **BTCS 304: Operating Systems**

## **Unit 1**

Computer System Overview-Basic Elements, Instruction Execution, Operating system functions and structure, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization. Operating system overview-objectives and functions, Evolution of Operating System, Distributed OS.

## **Unit 2**

Process concept, Process States, Process Description and Process Control, Interprocess Communication, Processes and Threads, Types of Threads, Multicore and Multithreading, Principles of Concurrency - Mutual Exclusion, Semaphores, Monitors, Readers/Writers problem.

Deadlocks – prevention- avoidance – detection.

## **Unit 3**

Memory management requirements, Partitioning, Paging and Segmentation, Virtual memory Hardware and control structures, operating system software, Linux memory management, Windows memory management. Virtual memory management.

## **Unit 4**

Scheduling- Types of Scheduling – Scheduling algorithms. I/O management and disk scheduling – I/O devices, organization of I/O functions; OS design issues, I/O buffering, disk scheduling, RAID, Disk cache. File management – Organization, Directories, File sharing, and Record blocking, secondary storage management.

## **References:**

1. Silberschatz, Peter Galvin, Greg Gagne “Operating System Principles”.
2. Andrew S. Tannenbaum & Albert S. Woodhull, “Operating System Design and Implementation”, Prentice Hall.
3. William Stallings, “Operating Systems – internals and design principles”, Prentice Hall.
4. Andrew S. Tannenbaum, “Modern Operating Systems”, Prentice Hall.
5. Gary J.Nutt, “Operating Systems”, Pearson/Addison Wesley.
5. Pramod Chandra P.Bhatt, “An Introduction to Operating Systems Concepts and Practice”.

## **BT 307: Environmental Studies**

**Unit 1:** Introduction and Natural Resources: Multidisciplinary nature and public awareness, Renewable and nonrenewal resources and associated problems, Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources, Conservation of natural resources and human role. Ecosystems: Concept, Structure and function, Producers composers and decomposers, Energy flow, Ecological succession, Food chains webs and ecological pyramids, Characteristics structures and functions of ecosystems such as Forest, Grassland, Desert, Aquatic ecosystems, Biodiversity and Conservation

**Unit 2:** Environmental Pollution- Definition, Causes, effects and control of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards, human role in prevention of pollution, Solid waste management, Disaster management, floods, earthquake, cyclone and landslides.

**Unit 3:** Social issues and Environment- Unsustainable to sustainable development, Urban problems related to energy, Water conservation and watershed management, Resettlement and re-habitation, Ethics, Climate change, Global warming, Acid rain, Ozone layer depletion, Nuclear accidents, Waste land reclamation, Consumerism and waste products, Environment protection act, Wildlife protection act, Forest conservation act, Environmental issues in legislation, population explosion and family welfare program, Environment and human health, Role of information technology in environment and human health.

### **References:**

1. Agarwal, K.C., Environmental Biology, Nidi Publication Ltd., Bikaner, 2001.
2. Bharucha Erach, Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmadabad, 2002.
3. Clark, R.S., Marine Pollution, Clanderson Press, Oxford, 2002.
4. Cunningham, W.P., et al. , Environmental Encyclopedia, Jaico Publishing House, Mumbai, 2003.