ANNEXURE II – B

Department of Information Technology
Central University of Kashmir

B.Tech. CSE

Semester III			
S. No.	**Course Code**	**Course Title**	**Credits**
1	BT 301	Mathematics III (Differential Equation)	4
2	BTCS 302	Basic Electronics	4
3	BTCS 303	Data Structures	4
4	BTCS 308	Database Management Systems	4
5	BTCS 305 L	Basic Electronics Lab	2
6	BTCS 306 L	Data Structures Lab	2
7	BT 309 L	Database Management Systems Lab	2
8	BT 307	Environmental Studies	2
		Total	**24**

Central University of Kashmir				
Course Title	Mathematics III (Differential Equation)	**Course Code**	BT 301	
Degree	B.Tech.CSE	**Branch**	Computer Science &Engg.	
Course Type	Theory	**Department**	Information Technology	
Credits	04	**L**	**T**	**P**
Semester	3rd	04	0	0

Learning Outcomes

This course introduces different types of Differential Equations to the student. At the end of the course student will be able to translate real world problems in to Differential equation and thereafter solve the problem using various techniques learned in this course. The course has a wide application at local and global level.

	Course Outline / Content	
Unit	**Topics**	**Week**
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.	4
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.	4
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.	4
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.	4

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.

Central University of Kashmir				
Course Title	Basic Electronics	**Course Code**	BTCS302	
Degree	B.Tech.CSE	**Branch**	Computer Science &Engg.	
Course Type	Theory	**Department**	Information Technology	
Credits	4	**L**	**T**	**P**
Semester	3rd	4	0	0

Course Objectives

1. To understand the basic Electronic Engineering concepts required in analysis and design of electronic circuits and systems.
2. To identify various components and testing of active devices.
3. To operate various equipments like multimeters, function generators, regulated power supplies and CRO.
4. To know the characteristics of various active devices.

Learning Outcomes

1. Know broadly the concepts and functionalities of the electronic devices, tools and instruments.
2. Understand the general specifications and deployability of the electronic devices, and assemblies.
3. Analyze the diode and transistor characteristics.
4. Understand the principles of rectifier circuits using diodes and implement them using hardware.
5. Understand the importance of h-parameters of BJT using various configurations
6. Examine the characteristics of transistor as operated in different modes.
7. Confidence in handling and usage of electronic devices, tools and instruments in engineering applications.

Course Synopsis

1. Study about properties of semiconductors.
2. Study about the properties of diodes and their applications as rectifiers and clippers.
3. Study about transistors, types of configurations and their detailed applications and characteristic of each type.
4. Study about Drain and Transfer characteristics of JFET.
5. Study about the Voltage divider bias using BJT.
6. Detailed study of UJT characteristics.
7. Detailed study of SCR characteristics.
8. Detailed Study about amplifiers and Oscillators.

Course Outline / Content

Unit	Topics	Week
1.	SEMICONDUCTORS, DIODES AND DIODE CIRCUITS: Semiconductors- types & fabrication techniques, Mobility and	3

	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.	
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.	3
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.	3
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.	3
Text Books		
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	
References		
1.	Basic Electronics by Mitehel E Schultz McGraw Hill	
2.	Thomas L. Floyd, "Electronics Devices: Conventional Current Version", Pearson Education, 7 th Edition, 2008.	
3.	S Salivahanan and N Suresh Kumar, "Electronics Device and Circuits" Tata McGraw-Hill Education Private Limited, 2 nd Edition, 2008.	

Central University of Kashmir				
Course Title	Data Structures	**Course Code**	BTCS 303	
Degree	B.Tech.CSE	**Branch**	Computer Science &Engg.	
Course Type	Theory	**Department**	Information Technology	
Credits	04	**L**	**T**	**P**
Semester	3rd	4	0	0

Course Objectives

- To be familiar with fundamental data structures.
- To have a knowledge of complexity of basic operations like insert, delete, search on these data structures.
- Ability to choose a data structure to suitably model any data used in computer applications.

Learning Outcomes

- At the end of the course students will be able to design programs using various data structures including hash tables, binary and general search trees, heaps, graphs, etc.
- Able to assess efficiency trade-offs among different data structure implementations.
- Implement and know the applications of algorithms for sorting, pattern matching, etc.

Course Synopsis

- The course is divided into four units giving the insight of algorithms and data abstraction concepts.
- The course units explain stack operations and tree representation.
- Insight of graphs and sorting methods.

Course Outline / Content

Unit	Topics	Week
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.	6
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.	4
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.	6
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.	6

Text Books

1.	Tanenbaum A. S., Data Structure Using C, Dorling Kindersley Publisher.
2.	M. A. Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education

	Asia.
References	
1.	Ellis Horowitz and Satraj Sahni, An Introduction to Data Structures, Computer Science Press, Rockville MA 1984.
2.	Richard F. Gilberg, Behrouz A. Forouzan, Data Structures: A Pseudocode Approach with C, Thomson Cole, 1998.
3.	Hopcroft A. J. E. & Ullman J. D., Data Structures and Algorithms, Pearson Education Asia, 1983.

Central University of Kashmir				
Course Title	Database Management System	**Course Code**	BTCS308	
Degree	B.Tech.CSE	**Branch**	Computer Science &Eng.	
Course Type	Theory	**Department**	Information Technology	
Credits	4	**L**	**T**	**P**
Semester	3rd	4	0	0

Course Objectives

The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

Learning Outcomes

After successful completion of this course, students shall be able to;

- Define the terminology, features, classifications, and characteristics embodied in database systems.
- Convert any information model into a relational database schema and implement the same using SQL
- Formulate the data requirement in terms of Relational algebra operation
- Retrieve/update the data in database using query languages
- Apply the normalization theory to normalize the given Database schema
- Understand the requirement of ACID properties & their implementation

Course Synopsis

The course reviews topics such as conceptual data modelling, relational data model, relational query languages, relational database design and transaction processing. It exposes the student to the fundamental concepts and techniques in database use and development as well provides a foundation for research in databases. In the first half of the course the relational data model, relational query languages, relational database design and conceptual data modeling are reviewed.

Course Outline / Content

Unit	Topics	Week
1.	**Introductory Database Concepts** Introduction to data processing, overview of files and file systems, drawbacks of files systems, concept of a database, data abstraction and data independence, data models, database language, database users and administrators, transaction management, database system structure. ER Model: Basic concepts, constraints, design issues, entity relationship diagram, weak entity sets, extended ER features, design of ER database schema, reduction of ER schema to tables.	04
2.	**Relational Model and SQL** Concept of a relation, primary and secondary keys, foreign keys, structure of relational databases, the relational algebra and extended relational algebra operations, formulation of queries, modification of the database, views. SQL: Background, basic structure, set operations, aggregate functions, null values, nested queries, views, complex queries, database modification, DDL, embedded SQL,NoSQL, stored procedures and functions, dynamic SQL, other SQL features.	04

3.	**Integrity & Security** Domain constraints, referential integrity, assertions, triggers, triggers and assertions in SQL, security in authorization in SQL. Relational Database Design: First normal form, pitfalls in relational database design, functional dependencies, decomposition, desirable properties of decomposition, boycecodd normal form, third and fourth normal forms, other normal forms.	04
4.	**Transactions and concurrency control:** Transaction concept, transaction state, implementation of atomicity and durability, concurrent executions, Serializability, recoverability, implementation of isolation, transaction definition in SQL.Lock based protocols, timestamp based protocols, validation based protocols, multiple granularity, Multiversion schemes, deadlock handling.	04
Text Books/References		
1.	Principles of Database System, Ullman, Galgotia.	
2.	Database System Concepts, Silberschatz, Korth&Sudarshan, McGraw Hill.	
3.	Database Management Systems , Raghu Ramakrishnan, McGraw Hill	
4.	Fundamentals of Database Systems , Elmasri&Navathe Addison Wesley	

Central University of Kashmir				
Course Title	Basic Electronics Lab	**Course Code**	BTCS 305 L	
Degree	B.Tech.CSE	**Branch**	Computer Science &Engg.	
Course Type	Laboratory	**Department**	Information Technology	
Credits	2	**L**	**T**	**P**
Semester	3rd	0	0	2

Course Objectives

5. To understand the basic Electronic Engineering concepts required in analysis and design of electronic circuits and systems.
6. To operate various equipments like multimeters, function generators, regulated power supplies and CRO.
7. To identify various components and perform testing of active devices.
8. To know the characteristics of various active devices.

Learning Outcomes

1. Identify functions of digital multimeter, cathode ray oscilloscope for measurement of electrical quantities.
2. Understand the diode and transistor characteristics.
3. Verify the rectifier circuits using diodes and implement them using hardware.
4. Design various amplifiers like CE, CC, common source amplifiers and implement them using hardware and also observe their frequency responses.
5. Learn about the concepts of unipolar junction transistor and observe its characteristics.
6. Learn about the construction, operation and characteristics of JFET and SJT.

Course Synopsis

1. Forward and Reverse Bias Characteristics of PN junction diode.
2. V-I characteristics of Si and Ge diodes.
3. Zener Diode Characteristics and Zener diode as voltage regulator.
4. Half wave rectifier with and without filters.
5. Full wave rectifier with and without filters.
6. Input & output characteristics of transistor in CB configuration.
7. Input & output characteristics of transistor in CEconfiguration.
8. Input & output characteristics of transistor in CC configuration
9. Drain and Transfer characteristics of JFET.
10. Voltage divider bias using BJT.
11. UJT characteristics.
12. SCR characteristics.

Course Outline / Content	
List of Experiments	**Week**
1. Forward and Reverse Bias Characteristics of PN junction diode. 2. V-I characteristics of Si and Ge diodes. 3. Zener Diode Characteristics and Zener diode as voltage regulator. 4. Half wave rectifier with and without filters. 5. Full wave rectifier with and without filters. 6. Input & output characteristics of transistor in CB configuration. 7. Input & output characteristics of transistor in CEconfiguration. 8. Input & output characteristics of transistor in CC configuration 9. Drain and Transfer characteristics of JFET. 10. Voltage divider bias using BJT. 11. UJT characteristics. 12. SCR characteristics.	To be performed in accordance with BT 302.

Text Books	
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

References	
1.	Basic Electronics by Mitehel E Schultz McGraw Hill
2.	Thomas L. Floyd, “Electronics Devices: Conventional Current Version”, Pearson Education, 7 th Edition, 2008.
3.	S Salivahanan and N Suresh Kumar, “Electronics Device and Circuits” Tata McGraw-Hill Education Private Limited, 2 nd Edition, 2008.

Central University of Kashmir				
Course Title	Data Structures Lab	**Course Code**	BTCS 306 L	
Degree	B.Tech.CSE	**Branch**	Computer Science & Engg.	
Course Type	Laboratory	**Department**	Information Technology	
Credits	02	**L**	**T**	**P**
Semester	3rd	0	0	2

Course Objectives

- To learn how to apply their theoretical knowledge in practice.
- The student should be able to demonstrate the skills necessary to correctly compile, debug, and test programs in C.
- Ability to choose a data structure to suitably model any data used in computer applications.

Learning Outcomes

- At the end of the course students will be able to design programs using various data structures including hash tables, binary and general search trees, heaps, graphs, etc.
- Able to use elementary techniques to implement different data structures.
- To become accustomed to the description of algorithms in both functional and procedural styles.

Course Synopsis

- Implementation of linked list, doubly and circular linked list.
- Implementation of stackand operations.
- Implementation of queue and operations.
- Implementation of trees and tree traversals.
- Implementation of graphs and graph traversals.
- Implementation of searching and sorting.

Course Outline / Content

Unit	Topics	Week
1.	• Programs to perform basic operations like insert, delete, search on linked list. • Programs on PUSH, POP operations of stack using arrays. • Programs onPUSH,POP operations of stack using pointers. • Programs on add, delete operations of a queue using arrays. • Programs on add, delete operations of a queue using pointers. • Programs on conversions of infix to postfix using stack operations. • Programs on postfix expression evaluation. • Programs on addition of two polynomials using arrays. • Programs on additions of two polynomials • Programs on creation, insertion and deletion in doubly linked list. • Programs to implement trees. • Programs to heaps • Programs on in-order, pre-order and post-order (binary tree traversals) using recursion.	

	• Programs on DFS and BFS algorithm for a graph. • Program on shortest path algorithms-Djikstra's. • Program on Warshall's algorithm. • Program on Krushal's and Prim's algorithm • Program on linear and binary search • Program to implement hash function. • Program on bubble, selection, insertion, heap, merge sorting algorithms	
2.		
3.		
4.		
Text Books		
1.	Tanenbaum A. S., Data Structure Using C, Dorling Kindersley Publisher.	
2.	M. A. Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education Asia.	
References		
1.	Ellis Horowitz and Satraj Sahni, An Introduction to Data Structures, Computer Science Press, Rockville MA 1984.	
2.	Richard F. Gilberg, Behrouz A. Forouzan, Data Structures: A Pseudocode Approach with C, Thomson Cole, 1998.	
3.	Hopcroft A. J. E. & Ullman J. D., Data Structures and Algorithms, Pearson Education Asia, 1983.	

Central University of Kashmir				
Course Title	Database Management Systems Lab	**Course Code**	BTCS309L	
Degree	B.Tech.CSE	**Branch**	Computer Science &Eng.	
Course Type	Laboratory	**Department**	Information Technology	
Credits	02	**L**	**T**	**P**
Semester	3rd	0	0	2

Course Objectives

CO1: Transform an information model into a relational database schema and to use a data definition language and/or utilities to implement the schema using a DBMS.
CO2: Analyze the database using queries to retrieve records.
CO3: Formulate query, using SQL, solutions to a broad range of queries, and data update problems.
CO4: Applying PL/SQL for processing database.
CO5: Analyze front end tools and establish back-end connectivity
CO6: Develop solutions using database concepts for real-time requirements

List of Practical's

Unit	Topics	week
1.	Overview of RDBMS and Oracle: Primary introduction to DBA, Creating user, Gettingconnected, Granting privileges.	Inaccordance with the theory course of BTCS304
2.	Introduction to SQL: Basic DML, DDL, DTL commands& etc.	
3.	Table: Constraint definition, creating table.	
4.	Table handling: Alter, Drop Table, Insert Records& etc.	
5.	Record handling: Update, Delete, Select, Grouping, Ordering, & Logical, Arithmetic, Comparison operators.	
6.	Functions: Date, Numeric, Character, Aggregate &etc.	
7.	Set Operations: Union, Union All, Intersection, Minus.	
8.	Join Concept: Simple, Equi, Self, Outer.	
9.	Synonym Introduction: Creating object type, Aliasing and Sequence: alter, drop Sequence.	
10.	Introduction to View: create, update, drop and Index: Introduction, creation.	
11.	Introduction to PL/SQL: Advantages, Support, and Execution PL/SQL: Character set and datatypes.	
12.	PL/SQL Blocks : Attribute, Control Structure and Composite data types : Record, Table (count, delete, exists, first, last, next, prior)	
13.	Database Triggers: Definition, syntax, types, enabling and disabling triggers.	
14.	Sub programs : Definition, Features, Cursors and Procedures : Definition, creation, parameter	

Text Books/References

1.	Principles of Database System, Ullman ,Galgotia.
2.	Database System Concepts, Silberschatz, Korth&Sudarshan, McGraw Hill.
3.	Database Management Systems , Raghu Ramakrishnan, McGraw Hill
4.	Fundamentals of Database Systems , Elmasri&Navathe Addison Wesley

Central University of Kashmir				
Course Title	Environmental Studies	**Course Code**	BT 307	
Degree	B.Tech.CSE	**Branch**	Computer Science &Engg.	
Course Type	Theory	**Department**	Information Technology	
Credits	02	**L**	**T**	**P**
Semester	3rd	02	0	0

Course Outline / Content

Unit	Topics	Week
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	4
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.	4
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.	4

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.