

# S.E. Semester-III Syllabus

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)  
TCET Autonomy Scheme (w.e.f. A.Y. 2022-23)

### S.E. Semester –III

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)  
 TCET Autonomy Scheme (w.e.f. A.Y. 2022-23)

BE (Information Technology)					S.E (SEM: III)					
Course Name: Applied Mathematics -III					Course Code: BSC –IT 301					
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory (100)			Practical/Oral (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE		TW	
3	1	-	4	4	20	20	60	-	25	125
<b>IA: In-Semester Assessment - Paper Duration – 1 Hours</b> <b>ESE: End Semester Examination - Paper Duration - 2 Hours</b> <b>Total weightage of marks for continuous evaluation of Term work/Report:</b> Formative (40%), Timely completion of Tutorial (40%) and Attendance (20%).										
<b>Prerequisite:</b> Basic Mathematics, Mathematics-I &II.										

### Course Objectives:

The course intends to deliver the fundamental knowledge of set theory, function, relation, pigeonhole principle, recurrence relation, generating function, partially order set, Lattice. To prepare the students to understand various concepts in graph theory, Laplace and inverse Laplace transforms.

### Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Understand the basic concepts of set theory and able to apply basic set operations in problem solving.	L1, L2, L3
2	Understand relation and function and their properties and also able to understand their use in programming applications.	L2, L3
3	Able to apply PO set and Boolean lattice concepts in various applications.	L1, L2, L3
4	Able to apply graph theory in various fields.	L1, L2, L3
5	Apply the Laplace Transform, Inverse Laplace Transform and its properties to solve ODE.	L1, L2, L3
6	Apply the concept of Fourier Transform and Inverse Fourier transform through properties.	L1, L3

### Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive levels as per blooms Taxonomy
1	<b>Set Theory and Proofing Techniques</b>	7	L1, L2, L3
	Basic operations on sets, Cartesian products, disjoint union (sum), complements, power sets and Products Partitions of sets. Counting principle, cardinality and countability (Countable and Uncountable sets) The Principle of Inclusion and Exclusion Pigeonhole Principle, Mathematical Induction.		
2	<b>Relation and Functions</b>	7	L2, L3
	<b>Relation:</b> Definition, types of relation, composition of relations, pictorial representation of relation (Digraphs), properties of relation, partial ordering relation. Operations on relations, Closures, Warshall's algorithm. <b>Function:</b> Definition and types of function, composition and inverse of functions, Generating Functions.		
3	<b>Partially ordered sets</b>	6	L1, L2, L3
	Complete partial ordering (Hasse Diagram), chain, lattice, complete, distributive, modular and complemented lattices. Boolean and pseudo-Boolean lattices.		
4	<b>Graph theory</b>	9	L1, L2, L3
	Definitions: graphs, digraphs, Multigraphs, Paths and cycles (Hamiltonian and Eulerian), Shortest path problems, Subgraphs, Isomorphism, Special kinds of graphs: trees, bipartite graphs, planer graphs, Graph colouring.		
5	<b>Transform Calculus-I</b>	8	L1, L2, L3
	Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions, Evaluation of integrals by Laplace transform, finding inverse Laplace transform by first shifting, partial fraction and differentiation method		
6	<b>Transform Calculus-II</b>	8	L1, L3
	Convolution theorem, second shifting property, Solving ODEs by Laplace Transform method, Fourier Transform and Inverse Fourier transform of constant and exponential function, Properties of Fourier Transform (Change of scale, first shifting, multiplication and convolution theorem)		
	<b>Total hrs</b>	<b>45</b>	

### List of Tutorials:

Sr. No	Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Tutorial on Set theory	1	L1, L2
2	Tutorial on Principle of Inclusion and Exclusion	1	L1, L2, L3
3	Tutorial on Pigeonhole Principle	1	L1, L2, L3
4	Tutorial on Relation	1	L1, L2
5	Tutorial on Warshall's Algorithm	1	L1, L2, L3
6	Tutorial on Functions	1	L1, L2
7	Tutorial on isomorphism	1	L1, L2, L3

8	Tutorial on poset, Hasse diagram	1	L1, L2
9	Tutorial on Lattice, Sublattice	1	L1, L2, L3
10	Tutorial on types of lattice	1	L1, L2, L3
11	Tutorial on planar graphs	1	L1, L2
12	Tutorial on Eulerian and Hamiltonian Graphs	1	L1, L2, L3
13	Tutorial on Laplace Transform	1	L1, L2
14	Tutorial on Inverse Laplace Transform	1	L1, L2, L3
15	Tutorial on Fourier Transform	1	L1, L2, L3
<b>Total Hours</b>		<b>15</b>	

### **Books and References:**

SN	Title	Authors	Publisher	Edition	Year
1	Introductory methods of numerical analysis	S.S. Sastry	PHI	4th Edition	2005
2	Advanced Engineering Mathematics	Erwin kreyszig	John Wiley & Sons	9th Edition	2006
3	Engineering Mathematics for first year	Veerarajan T	Tata McGraw-Hill, New Delhi	3rd Edition	2008
4	Higher Engineering Mathematics	Ramana B.V	Tata McGraw Hill, New Delhi	11th Edition	2010
5	Higher Engineering Mathematics	B.S. Grewal	Khanna Publishers	36th Edition	2010
6	A text book of Engineering Mathematics	N.P. Bali and Manish Goyal	Laxmi Publications	9th Edition	2008
7	Elements of Discrete Mathematics	C. L. Liu	Tata McGraw-Hill	2nd Edition	2000
8	Discrete Mathematics: Proof Techniques and Mathematical Structures	R. C. Penner	World Scientific	-	1999
9	Discrete Mathematics and its Applications	K. H. Rosen	Tata McGraw-Hill	6th Edition	2007

### **Online References:**

S. No.	Website Name	URL	Modules Covered
1.	<a href="https://www.nptel.ac.in">https://www.nptel.ac.in</a>	<a href="https://nptel.ac.in/content/storage2/courses/111106086/Lecture2.pdf">https://nptel.ac.in/content/storage2/courses/111106086/Lecture2.pdf</a>	M1
2.	<a href="https://www.nptel.ac.in">https://www.nptel.ac.in</a>	<a href="https://nptel.ac.in/courses/106/106/106106183/">https://nptel.ac.in/courses/106/106/106106183/</a>	M2
3.	<a href="https://www.nptel.ac.in">https://www.nptel.ac.in</a>	<a href="https://www.youtube.com/watch?v=qPtGlrbsXg">https://www.youtube.com/watch?v=qPtGlrbsXg</a>	M3
4.	<a href="https://www.nptel.ac.in">https://www.nptel.ac.in</a>	<a href="https://nptel.ac.in/courses/106/106/106106183/">https://nptel.ac.in/courses/106/106/106106183/</a>	M4
5.	<a href="https://www.nptel.ac.in">https://www.nptel.ac.in</a>	<a href="https://nptel.ac.in/courses/111105123/">https://nptel.ac.in/courses/111105123/</a>	M5
6.	<a href="https://www.nptel.ac.in">https://www.nptel.ac.in</a>	<a href="https://nptel.ac.in/courses/111105123/">https://nptel.ac.in/courses/111105123/</a>	M6

**S.E. Semester –III**

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)  
 TCET Autonomy scheme with effect from 2022-23

B.E (Information Technology)					SEM : III				
Course Name: Data Structures and Algorithms					Course Code :PCC-IT 301				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)		Practical/Or al (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	IA		ESE	PR	TW
					ISE	IE			
3	--	2	5	4	20	20	60	25	25
<b>ISE: In-Semester Examination - Paper Duration – 1 Hours</b> <b>IE: Innovative Examination</b> <b>ESE: End Semester Examination - Paper Duration - 2 Hours</b> <b>The weightage of marks for continuous evaluation of Term work/ Report:</b> Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
<b>Prerequisite:</b> C Programming Language									
<b>RBT:</b> Revised Bloom's Taxonomy									

**Course Objective:** The course intends to deliver the fundamentals of data structures and analysis of various algorithms by providing a platform to learn, compare and apply different data structures in real world scenario.

**Course Outcomes:** Upon completion of the course students will be able to:

S. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Evaluate and analyse algorithms and data structures in terms of time and memory complexity of basic operations.	L1, L2, L3,L4,L5
2	Apply Appropriate sorting and searching technique to specified problem definition.	L1, L2, L3
3	Implement various linked operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures to solve problems	L1, L2, L3, L4, L5
4	Develop the stack and queue based programs to understand working principles of compiler and Operating system	L1, L2, L3, L4, L5
5	Solve problems computationally through the application of Trees and graph	L1, L2, L3
6	Formulate new solutions for programming problems or improve existing code using various optimization algorithms and data structures,	L1, L2, L3

**Detailed Syllabus (Total No. of Hours: 45):**

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
01	<b>Introduction to Data Structure and Algorithms</b>	4	L1, L2, L3, L4, L5
	Introduction to Data Structures, Need of Data structures, ADT, ADT structure, Linear and Nonlinear Data structure, Introduction to Analysis of Algorithms: Properties of an Algorithm, Complexity analysis techniques, Asymptotic Notations, Recursion		
02	<b>Sorting and Searching Techniques</b>	8	L1, L2, L3
	Introduction to Sorting: Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort. Comparisons of time complexities. Introduction to Searching: Linear search, Binary search, Hash functions and Collision resolution techniques		
03	<b>Linked List</b>	10	L1, L2, L3, L4, L5
	Linked List as an ADT, Difference between Linked list & Arrays, Memory Allocation & De-allocation of Linked list, Singly Linked list, Doubly Linked list, Circular linked list, Application of linked list.		
04	<b>Stack and Queue</b>	10	L1, L2, L3, L4, L5
	Introduction to Stack, Stack as ADT, Stack implementation using array and Linked List, Operations on stack – PUSH, POP, traversing, Polish notations, Applications of stack- Arithmetic expression evaluation, Infix, prefix, Postfix notations and conversions.  Introduction to Queue, Queue as ADT, Operations on Queue, Queue implementation using array and Linked List, Linear Queue and Circular queue, Priority Queue, De-queue, Application of Queues		
05	<b>Tree</b>	08	L1, L2, L3
	Tree: Introduction to Trees, Tree terminology, Types of Trees, Binary tree representation, Operations on binary tree, Traversal of binary tree, Binary search tree, Expression tree, Threaded Binary Tree. Application of Trees, Introduction to informed and uninformed search techniques		
06	<b>Graph</b>	05	L1, L2, L3
	Graph: Introduction to Graph, Graph terminology, Graph Representation, Graph traversal: Depth first search(DFS) and Breadth First search(BFS), Minimum Spanning Tree: Prim's & Kruskal's, Application of Graphs, Case study on data structures in social media		
<b>Total Hrs.</b>		<b>45</b>	

**List of Practicals / Experiments:**

Experiment No.	Category of Experiment	Practical/ Experiment Topic	Hrs.	RBT Levels Cognitive levels of attainment as per Bloom's Taxonomy
1	Basic Experiments (Based on measurements of properties)	Implement Selection and insertion sort.	2	L1, L2, L3
2		Implement Merge sort	2	L1, L2, L3
3		Implement Quick Sort	2	L1, L2, L3
4		Implement Linear and Binary Search Techniques	2	L1, L2, L3
5	Advance Experiments (Based on Volumetric Analysis)	Implement Singly Linked List and different Operations on it	2	L1, L2, L3
6		Implementation of Doubly Linked list and different Operations on it	2	L1, L2, L3,L4
7		Implementation of Stack using array and Linked List.	2	L1, L2, L3,L4
8		Implementation of Linear Queue using array and Linked List.	2	L1, L2, L3,L4
9		Implementation of Circular and Priority Queue.	2	L1, L2, L3,L4
10	Design Based Experiments	Implementation of Binary Search Tree with insertion, deletion and Traversal operations.	2	L1, L2, L3,L4
11		Implementation of Graph Traversal Techniques: DFS & BFS	2	L1, L2, L3,L4
12	Project Based Experiments-Group Activity) (Students should complete any one project Based experiment from the list or any other project in discussion with Faculty in-Charge)	Mini Project: Develop the code of syntax analyzer for C programming language using stack based Operation	3	L1, L2, L3,L4
13		Mini Project: Develop the code for job scheduling using Queue based operation	3	
14		Case study: Research project on k-d trees, Fast data structures in non-C systems languages, Search engine for data structures, Spatial indexing with quadtrees etc.	2	
Total			30	

### **Books and References:**

S. No	Title	Authors	Publisher	Edition	Year
1	Data structures using C	Tenenbaum, Langsam, Augenstein	Pearson	Second	2015
2	Data Structures using C	Reema Thareja	Oxford	Second	2015
3	C and Data structures	P. S. Deshpande , O. G. Kakde	Dreamtech Press.	Third	2010
4	ALGORITHMS Design and Analysis	Harsh Bhasin	OXFORD	First	2015
5	Computer Algorithms	Ellis Horowitz and Sartaj Sahni,	Universities Press	First	2008
6	Data Structures and Algorithms in C++	Roberto Tamassia, Michael T. Goodrich	Wiley	Second	2011

### **Online References:**

S. No.	Website Name	URL	Modules Covered
1.	<a href="https://www.tutorialspoint.com/">https://www.tutorialspoint.com/</a>	<a href="https://www.tutorialspoint.com/data_structures_algorithms/index.htm">https://www.tutorialspoint.com/data_structures_algorithms/index.htm</a>	M1
2.	<a href="https://www.javatpoint.com">https://www.javatpoint.com</a>	<a href="https://www.javatpoint.com/bubble-sort">https://www.javatpoint.com/bubble-sort</a>	M2
3.	<a href="https://www.geeksforgeeks.org/">https://www.geeksforgeeks.org/</a>	<a href="https://www.geeksforgeeks.org/linked-list-set-1-introduction/">https://www.geeksforgeeks.org/linked-list-set-1-introduction/</a>	M3
4.	<a href="https://www.geeksforgeeks.org/">https://www.geeksforgeeks.org/</a>	<a href="https://www.geeksforgeeks.org/stack-data-structure-introduction-program/">https://www.geeksforgeeks.org/stack-data-structure-introduction-program/</a>	M4
5.	<a href="https://www.geeksforgeeks.org/">https://www.geeksforgeeks.org/</a>	<a href="https://www.geeksforgeeks.org/binary-tree-set-1-introduction/">https://www.geeksforgeeks.org/binary-tree-set-1-introduction/</a>	M5
6.	<a href="https://www.tutorialspoint.com/">https://www.tutorialspoint.com/</a>	<a href="https://www.tutorialspoint.com/design_and_analysis_of_algorithms/design_and_analysis_of_algorithms_p_np_class.htm">https://www.tutorialspoint.com/design_and_analysis_of_algorithms/design_and_analysis_of_algorithms_p_np_class.htm</a>	M6



**S.E. Semester –III**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME2020)**

**TCET Autonomy scheme with effect from 2022-23**

B.E (Information Technology)								SEM: III		
Course Name :Database Management System								Course Code: PCC-IT 302		
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory (100)			Practical/Oral (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW	150
3	-	2	5	4	20	20	60	25	25	
ISE: In-Semester Examination - Paper Duration – 1 Hours IE: Innovative Examination ESE: End Semester Examination - Paper Duration - 2 Hours The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)										
Prerequisite : Fundamentals of computer programming										
RBT: Revised Bloom’s Taxonomy										

**Course Objective:** The course intends to deliver the fundamental knowledge of Database & Database Management System. To provide good formal foundation on the Entity Relationship Model, the relational model of data and usage of Relational Algebra and basic SQL as a universal Database language. To demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization and to introduce advanced concepts of transaction management and recovery techniques and query tuning.

**Course Outcomes:** Upon completion of the course students will be able to:

S. No	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Define & Explain the features & functions of Database Management Systems and Relational Database	L1,L2
2	Analyse database models & entity relationship models.	L1,L2,L3,L4,L5, L6
3	Construct queries in Relational Algebra and create a RDBMS for a real life application, with constraints and keys, using SQL.	L1,L2,L3
4	Analyse the existing design of a database schema and apply concepts of normalization to design an optimal database.	L1,L2,L3,L4
5	Explain and understand the concept of a transaction and how ACID properties are maintained when concurrent transaction occurs in a database	L1,L2,L3
6	Analyze the performance of sql queries and can able to identify optimum query.	L2,L3,L4

**Detailed Syllabus (Total No. of Hours: 45):**

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
0	<b>Prerequisite</b>	02	L1,L2
	Basic knowledge of operating systems and file systems, Any programming Language		
01	<b>Introduction to Database Concepts</b>	06	L1, L2,
	Introduction, Purpose of Database System- Database System Terminologies, Database characteristics ,File system V/s Database system, Users of a Database System, Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence, Database Administrator (DBA), Role of a DBA.		
02	<b>Entity– Relationship Data Model</b>	07	L1, L2, L3, L4,L5,L6
	Conceptual Modelling of a database, The Entity-Relationship (ER) Model, Components of E-R Model , Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Weak Entity Types Generalization, Specialization and Aggregation, Extended Entity Relationship (EER) Model. converting E-R diagram into tables		
03	<b>Relational Model And SQL Overview</b>	08	L1, L2, L3
	<b>Relational model</b> concepts, Constraints , <b>Relational Algebra:</b> Basic Operations, Selection, projection, joining, outer join, union, difference, intersection, Cartesian product, division operations <b>SQL:</b> Characteristics of SQL, advantage of SQL. SQL data type and literals, Data Definition Language, Data Manipulation Language, Data Control Language, Transaction Control Language, SQL Constraints, Aggregate Functions, Group by, Order by, Nested sub queries, complex queries, Views, Stored procedures and triggers		
04	<b>Relational Database Design</b>	07	L1, L2, L3,L4
	Design guidelines for relational schema, Functional Dependencies, Definition of Normal Forms- 1NF, 2NF, 3NF, BCNF, Converting Relational Schema to higher normal forms.		
05	<b>Transactions Management Concurrency and Recovery</b>	07	L1, L2,L3
	Transaction Concepts, Transaction state, ACID properties, Testing of serializability, serializability of schedules, conflict & view serializable schedule, Recovery system: recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling. Concurrency control: Lock based , Timestamp based, validation based protocol, Deadlock Handling,		
06	<b>Query Processing, Optimization and Database Automation Administrative Task</b>	08	L1, L2, L3,L4
	Query processing: Steps involved in query processing, measures of query cost, Query Optimization: Overview, Transformation of relational expressions, Estimating statistics, Choice of evaluation plan Working with database Mail: Mail Architecture, Configuring profiles and Account, Sending mails .Monitoring and tuning SQL Server: Performance counter setup, Measuring performance of SQL Server,		
	<b>Total Hrs.</b>	<b>45</b>	

**List of Practicals/Experiments:**

S.No.	Type of Experiment	Title of Experiment	Total Hours	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>Basic Experiments</b>	Study of Query Processing and Optimization.	2	L1,L2
2		Questions to be solved on functional dependency& Normalization.	2	L1,L2
3	<b>Design Experiments</b>	Construct an ER and EER diagram for given case study	2	L1,L2,L3
4		Implementation of Data Definition Commands with Constraints.	2	L1,L2,L3
5		Implementation of Data Manipulation Commands.	2	L1,L2,L3
6		Implementation of DCL.	2	L1,L2,L3
8		Implementation of Nested Queries & Join Queries	2	L1,L2,L3
9		Implementation of Views	2	L1,L2,L3
10	<b>Advanced Experiments</b>	Implementation of Stored Procedure	4	L1, L2, L3, L4
12	<b>Mini/Minor Projects/ Seminar/ Case Studies</b>	Mini Project Design a Mini Project	10	L1,L2,L3,L4
<b>Total Hrs.</b>			30	

**Books and References:**

S.NO.	Title	Authors	Publishers	Edition	Year
1	Database System Concepts	Korth, Silberchatz, Sudarshan	McGraw – Hill	6th Edition	2012
2	Fundamentals of Database Systems	Elmasri and Navathe	Pearson Education	6th Edition	2014
3	Database Management Systems	G. K. Gupta	McGraw – Hill	6th Edition	2011
4	An Introduction To Database Systems	C. J. Date, A. Kannan, S. Swamynathan	Pearson Education	8th Edition	2007
5	Database System Concepts	Korth, Silberchatz, Sudarshan	McGraw – Hill	6th Edition	2012

**Online References:**

S. No.	Website Name	URL	Modules Covered
1	<a href="https://www.tutorialspoint.com/">https://www.tutorialspoint.com/</a>	<a href="https://www.tutorialspoint.com/dbms/dbms_overview.htm">https://www.tutorialspoint.com/dbms/dbms_overview.htm</a> , <a href="https://www.tutorialspoint.com/dbms/dbms_architecture.htm">https://www.tutorialspoint.com/dbms/dbms_architecture.htm</a> <a href="https://www.tutorialspoint.com/dbms/dbms_data_models.htm">https://www.tutorialspoint.com/dbms/dbms_data_models.htm</a>	M1
2	<a href="https://www.tutorialspoint.com/">https://www.tutorialspoint.com/</a>	<a href="https://www.tutorialspoint.com/dbms/er_model_basic_concepts.htm">https://www.tutorialspoint.com/dbms/er_model_basic_concepts.htm</a> <a href="https://www.tutorialspoint.com/dbms/dbms_generalization_aggregation.htm">https://www.tutorialspoint.com/dbms/dbms_generalization_aggregation.htm</a>	M2
3	<a href="https://www.tutorialspoint.com/">https://www.tutorialspoint.com/</a>	<a href="https://www.tutorialspoint.com/dbms/relational_data_model.htm">https://www.tutorialspoint.com/dbms/relational_data_model.htm</a> <a href="https://www.tutorialspoint.com/dbms/sql_overview.htm">https://www.tutorialspoint.com/dbms/sql_overview.htm</a>	M3
4	<a href="https://www.tutorialspoint.com/">https://www.tutorialspoint.com/</a>	<a href="https://www.tutorialspoint.com/dbms/database_normalization.htm">https://www.tutorialspoint.com/dbms/database_normalization.htm</a>	M4
5	<a href="https://www.tutorialspoint.com/">https://www.tutorialspoint.com/</a>	<a href="https://www.tutorialspoint.com/dbms/dbms_transaction.htm">https://www.tutorialspoint.com/dbms/dbms_transaction.htm</a> <a href="https://www.tutorialspoint.com/dbms/dbms_concurrency_control.htm">https://www.tutorialspoint.com/dbms/dbms_concurrency_control.htm</a>	M5
6	<a href="https://www.tutorialspoint.com/">https://www.tutorialspoint.com/</a> <a href="https://www.udemy.com/">https://www.udemy.com/</a>	<a href="https://docs.microsoft.com/en-us/sql/relational-databases/database-mail/create-a-database-mail-profile?view=sql-server-ver16">https://docs.microsoft.com/en-us/sql/relational-databases/database-mail/create-a-database-mail-profile?view=sql-server-ver16</a> <a href="https://www.udemy.com/course/introduction-to-databases-and-sql-querying/">https://www.udemy.com/course/introduction-to-databases-and-sql-querying/</a>	M6

**S.E. Semester –III**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**  
**TCET Autonomy scheme with effect from 2022-23**

B.E. ( Information Technology )					SEM: III				
Course Name : Programming Skill I(Java)					Course Code: PCC- IT 303				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)		Practical/Oral (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW
3	-	2	5	4	20	20	60	25	25
<b>ISE: In-Semester Examination - Paper Duration – 1 Hours</b> <b>IE: Innovative Examination</b> <b>ESE: End Semester Examination - Paper Duration - 2 Hours</b> <b>The weightage of marks for continuous evaluation of Term work/ Report:</b> Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
<b>Prerequisite :</b> Computer Basics, Problem Solving and Logic building skills using any programming language									
<b>RBT:</b> Revised Bloom's Taxonomy									

**Course Objective:** The course intends to deliver the fundamentals of object oriented programming features, building blocks along with constructors, and to learn the principles of inheritance, interface and exception handling Mechanisms, multithreading and GUI Programming.

**Course Outcomes:** Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Identify & understand basics of Object oriented programming features	L1,L2,L3
2	Discuss & illustrate the different programming constructs to solve the complex problems.	L1, L2 ,L3
3	Discuss Inheritance and interface concepts and develop the programs to solve real world problems.	L1, L2, L3
4	Apply & analyze Exception handling mechanism for object oriented applications.	L1, L2, L3 ,L4 ,L5,L6
5	Develop the multithreading applications. Understand the performance of various collections in Java.	L1, L2, L3 ,L4 ,L5,L6
6	Discuss & create AWT & Swing concepts to design GUI applications	L1, L2, L3 ,L4 ,L5,L6

**Detailed Syllabus (Total No. of Hours: 45):**

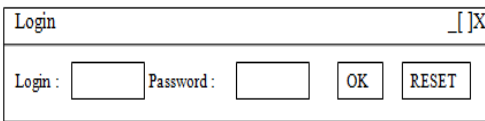
Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>Fundamentals of Object-Oriented features</b>  Difference between procedures oriented & object-oriented programming. Features of Java programming. Introduction to Class, Objects, Abstraction, Encapsulation, Inheritance and Polymorphism. Keywords, Data types, Variables, Operators, Expressions, Types of variables and methods. Control Statements: If Statement, If-else, Nested if, switch Statement, break, continue. Iteration Statements: for loop, while loop, and do-while loop.	6	L1, L2, L3
2	<b>Constructor, Arrays, String and String Buffer, Vector</b>  Constructor, Parameterized constructor, Constructor overloading Defining an Array, Initializing & Accessing Array, Multi – Dimensional Array, String basics, Mutable & Immutable String, Operation on string and StringBuffer, Vector class and operations.	8	L1, L2, L3
3	<b>Inheritance and Interface</b>  Use and Benefits of Inheritance in OOP, Types of Inheritance in Java, Inheriting Data members and Methods, Role of Constructors in inheritance, Overriding Super Class Methods, Use of “super”, Polymorphism in inheritance, Type Compatibility and Conversion. Inner classes. Implementing interfaces.	8	L1, L2, L3
4	<b>Packages and Exception Handling</b>  Organizing Classes and Interfaces in Packages, Package as Access Protection, Defining Package, Import and Static Import Naming Convention for Packages Exception Handling: The Idea behind Exception, Exceptions & Errors, Types of Exception, Control Flow In Exceptions, JVM reaction to Exceptions, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User Defined Exceptions, Checked and Un-Checked Exceptions.	6	L1, L2, L3, L4, L5, L6
5	<b>Multithreading and Collection Framework</b>  Understanding Threads, Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, daemon threads, thread groups, Synchronizing Threads, Inter Communication of Threads. Introduction to Collection Framework, Hierarchy of Collection Framework, Methods of Collection interface in Java, Non-Generic Vs Generic Collection, ArrayList class, Java LinkedList class, Java List Interface, Difference between ArrayList and LinkedList, HashSet class, Java TreeSet class, Java HashSet and HashMap.	9	L1, L2, L3, L4, L5, L6

6	<b>GUI programming (AWT, Event Handling, Swing)</b>	8	L1, L2, L3 , L4,L5, L6
	<p><b>Designing Graphical User Interfaces in Java:</b>            Components and Containers, Basics of Components, Using Containers, Layout Managers, AWT Components, adding a Menu to Window, Extending GUI Features</p> <p><b>Event-Driven Programming in Java:</b>            Event-Handling Process, Event-Handling Mechanism, Delegation Model of Event Handling, Event Classes, Event Sources, Event Listeners, Adapter Classes as Helper Classes in Event Handling.</p>		

### List of Practicals/ Tutorials:

Experiment No.	Category of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>Basic Experiments (Based on measurements of properties)</b>	A) Write a Java program to display the default value of all primitive data types in Java. B) Write a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c = 0$ . Read in a, b, c and use the quadratic formula. If the discriminate $b^2-4ac$ is negative, display a message stating that there are no real solutions.	2	L1,L2,L3
2		A) Write a java program to demonstrate String Functions B) Write a java program to count number of alphabets, digits, special symbols, blank spaces and words from the given sentence.	2	L1,L2,L3
3		A) Design following methods to implement menu driven for following tasks. a) To find Factorial of a number b) To find XY c) To print n Fibonacci numbers d) To find reverse of number	2	L1,L2,L3
4		A)Write a java program to demonstrate Constructors, Parameterized Constructors and Constructor Overloading.	2	L1, L2, L3 ,L4
5	<b>Advance Experiments (Based on Volumetric Analysis)</b>	Design and implement Java Program for bank application using interface and inheritance.	2	L1, L2, L3,L4
6		Write java program to create a user defined Exception class known as PayOutOfBounds Exception. Organization does not offer basic salary less than 8000. If entered salary is less than 8000 then program should create an Exception of Type Pay Out Of Bounds Exception. Program should calculate gross salary by considering salary parameters such as DA, HRA, CA, TA, Professional tax, TDS, PF..etc	2	L1, L2, L3 ,L4
7		Write a java program to print first 20 prime numbers and 15 Fibonacci numbers by creating two child threads and also print the total time taken by each thread for the execution.	2	L1, L2, L3, ,L4



8		Write java program to implement the concept of Thread Synchronization	2	L1, L2, L3, ,L4
9	<b>Design Based Experiments</b>	Write a program to create login form. 	2	L1, L2, L3, ,L4
10		Write a program to implement Java JMenuBar, JMenu and JMenuItem.	2	L1, L2, L3,L4
11	<b>Project Based Experiments-Group Activity)</b>	Mini Project (Students should complete any one project Based experiment from the list or any other project in discussion with Faculty in-Charge)	10	L1, L2, L3 ,L4.L5,L6
<b>Total</b>			<b>30</b>	

### **Books and References:**

Sr. No	Title	Authors	Publisher	Edition
1	Programming with java A primer	E. Balgurusamy	TMH Publication	Fifth edition
2	Computer Programming in Java	Dr.G.T.Thampi, JunaidKhateeb	Wiley Publication.	First Edition
3	Java-The Complete Reference	Herbert Schildt	TMH Publication	Seventh Edition
4	Head First Java	Bert Bates, Kathy Sierra	Sierra Publisher: O'Reilly Media	Second Edition

### **Online References:**

Sr. No.	Website Name	URL	Modules Covered
1.	<a href="https://www.programiz.com">https://www.programiz.com</a> <a href="https://www.javatpoint.com">https://www.javatpoint.com</a>	<a href="https://www.programiz.com/java-programming">https://www.programiz.com/java-programming</a> <a href="https://www.javatpoint.com/java-programs">https://www.javatpoint.com/java-programs</a> <a href="https://www.javatpoint.com/java-oops-concepts">https://www.javatpoint.com/java-oops-concepts</a>	M1
2.	<a href="https://www.javatpoint.com">https://www.javatpoint.com</a>	<a href="https://www.javatpoint.com/java-constructor">https://www.javatpoint.com/java-constructor</a> <a href="https://www.javatpoint.com/array-in-java">https://www.javatpoint.com/array-in-java</a> <a href="https://www.javatpoint.com/java-string">https://www.javatpoint.com/java-string</a>	M2
3.	<a href="https://www.javatpoint.com">https://www.javatpoint.com</a>	<a href="https://www.javatpoint.com/inheritance-in-java">https://www.javatpoint.com/inheritance-in-java</a> <a href="https://www.javatpoint.com/interface-in-java">https://www.javatpoint.com/interface-in-java</a>	M3
4.	<a href="https://www.javatpoint.com">https://www.javatpoint.com</a>	<a href="https://www.javatpoint.com/exception-handling-in-java">https://www.javatpoint.com/exception-handling-in-java</a>	M4
5.	<a href="https://www.javatpoint.com">https://www.javatpoint.com</a>	<a href="https://www.javatpoint.com/multithreading-in-java">https://www.javatpoint.com/multithreading-in-java</a> <a href="https://www.javatpoint.com/java-applet">https://www.javatpoint.com/java-applet</a>	M5
6.	<a href="https://www.javatpoint.com">https://www.javatpoint.com</a>	<a href="https://www.javatpoint.com/java-awt">https://www.javatpoint.com/java-awt</a> <a href="https://www.javatpoint.com/java-swing">https://www.javatpoint.com/java-swing</a> <a href="https://www.javatpoint.com/java-networkin">https://www.javatpoint.com/java-networkin</a>	M6



**S.E. Semester –III**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**  
**TCET Autonomy scheme with effect from 2022-23**

B.E. ( Information Technology )					SEM: III				
Course Name :Digital Circuit Design					Course Code : ESC-IT 301				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)		Practical/Oral (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW
3	-	2	5	4	20	20	60	25	25
150									
<b>ISE: In-Semester Examination - Paper Duration – 1 Hours</b> <b>IE: Innovative Examination</b> <b>ESE: End Semester Examination - Paper Duration - 2 Hours</b>									
<b>The weightage of marks for continuous evaluation of Term work/ Report:</b> Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
<b>Prerequisite :</b> Computer Basics, Problem Solving and Logic building skills using any programming language									
<b>RBT:</b> Revised Bloom's Taxonomy									

**Course Objective:** The course intends to deliver the fundamental knowledge of Digital logic, number system, conversions and Boolean algebra, apply and analyze the concept to create and troubleshoot a broad range of combinational circuits using digital ICs, flip-flops, counters, and registers. To prepare students to perform the analysis and design of various digital electronic circuits. To prepare students to design and implement logic circuits in VHDL.

**Course Outcomes:** Upon completion of the course students will be able to:

S. No	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Understand and develop a digital logic and apply it to solve real life problems.	L1,L2,L3,L4
2	Understand and apply of K-Map and Tabular method for simplification of logical expression.	L1, L2, L3
3	Using several methods to minimize the Boolean expression using Boolean algebra and design it using logic gates.	L1, L2, L3
4	Analysis and design of combinational and sequential circuit.	L1, L2, L3,L4
5	Understand and analyse the different shift register	L1, L2, L3,L4
6	Understand concept in designing of the counter	L1, L2

### Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
0	<b>Prerequisite</b>	02	L1,L2
	Introduction to bipolar junction transistor and configurations, Representation of analog signal level in to digital signals through basic TTL circuits.		
01	<b>Number Systems and codes</b>	06	L1, L2, L3,L4
	Representation of signed numbers: fixed and floating point numbers, Introduction to Number systems, Binary Number systems, Signed, Binary Numbers, Binary, Octal, Decimal and Hexadecimal number, Systems and their conversion, Binary arithmetic using compliments, Gray Code, BCD Code, Excess-3 code, ASCII Code. inter-conversion of codes		
02	<b>Logic Design and Minimization Techniques</b>	07	L1, L2, L3
	Introduction to basic logic gates, Operations on NAND and NOR gates, XOR and X-NOR operations, understanding Boolean Algebra and its Standard representation of logic functions- SOP and POS forms. Min term and Max term. Don't care conditions. Simplification of logic functions-using Karnaugh Map (K-Map) for 2, 3 and 4 variables. Quine-McClusky Method, NAND,NOR Realization		
03	<b>Combinational logic Circuit and design</b>	06	L1, L2, L3
	Half- Adder, Full Adder, Half Subtractor or Full Sub tractor, BCD adder using and subtractor using IC 7483, Multiplexers (MUX): Working of MUX, Implementation of expression using MUX (IC 74153, Demultiplexers IC 74151). Demultiplexers (DEMUX):- Implementation of expression using DEMUX, Decoder (IC 74138)		
04	<b>Latches and Flip-Flop</b>	09	L1, L2, L3,L4
	Introduction: SR latch, Concepts of Flip Flops: SR, D, J-K, T, Truth Tables and Excitation Tables of all types, Race around condition, Master Slave JK Flip Flops, Timing Diagram, Flip-flop conversion		
05	<b>Shift Register</b>	06	L1, L2,L3,L4
	Registers-SISO, SIPO, PISO AND PIPO 4 –BIT REGISTER. Shift Register-Right shift, left shift and Bidirectional Register. Application of shift Register-Ring and Twisted Ring Counter.		
06	<b>Counter</b>	09	L1, L2
	Counters : Types of counters- Asynchronous and Synchronous .Up, Down and Up-Down Counters Asynchronous Counter-2,3 and 4 Bit Up ,down and Up/Down Counters. Synchronous Counter-2, 3 and 4 Bit Up, down and Up-Down Counters.		
<b>Total Hrs.</b>		<b>45</b>	

### Books and References:

Title	Authors	Publishers	Edition	Year
Modern Digital Electronics	R. P. Jain	Tata McGraw Hill	4 <sup>th</sup>	2009
Digital Logic and computer Design	M. Morris Mano	Pearson education India	4 <sup>th</sup>	2016
Fundamentals of Digital Circuits	A Anand Kumar	Prentice Hall India	2 <sup>nd</sup>	2009
Digital Electronics	Subrata Ghosal	Cengage Learning	1 <sup>st</sup>	2012
Digital Electronics Principles and Integrated Circuits	Anil K. Maini	Wiley India	1 <sup>st</sup>	2007

**Online References:**

S. No.	Website Name	URL	Modules Covered
1.	<a href="https://www.tutorialspoint.com/">https://www.tutorialspoint.com/</a>	<a href="https://www.tutorialspoint.com/computer_logical_organization/digital_number_system">https://www.tutorialspoint.com/computer_logical_organization/digital_number_system</a>	M1
2.	<a href="https://www.tutorialspoint.com/">https://www.tutorialspoint.com/</a>	<a href="https://www.tutorialspoint.com/digital_circuits/digital_circuits_k_map_method">https://www.tutorialspoint.com/digital_circuits/digital_circuits_k_map_method</a>	M2
3.	<a href="https://www.tutorialspoint.com/">https://www.tutorialspoint.com/</a>	<a href="https://www.tutorialspoint.com/computer_logical_organization/combinational_circuits.htm">https://www.tutorialspoint.com/computer_logical_organization/combinational_circuits.htm</a>	M3
4.	<a href="https://www.tutorialspoint.com/">https://www.tutorialspoint.com/</a>	<a href="https://www.tutorialspoint.com/computer_logical_organization/sequential_circuits.htm">https://www.tutorialspoint.com/computer_logical_organization/sequential_circuits.htm</a>	M4
5.	<a href="https://www.electronicstutorial.net">https://www.electronicstutorial.net</a>	<a href="https://www.tutorialspoint.com/digital_circuits/digital_circuits_programmable_logic_devices.htm">https://www.tutorialspoint.com/digital_circuits/digital_circuits_programmable_logic_devices.htm</a>	M5
6.	<a href="https://www.tutorialspoint.com">https://www.tutorialspoint.com</a>	<a href="https://www.tutorialspoint.com/vlsi_design/vlsi_design_vhdl_introduction.htm">https://www.tutorialspoint.com/vlsi_design/vlsi_design_vhdl_introduction.htm</a>	M6

**List of Practicals/Experiments:**

S.No.	Type of Experiment	Title of Experiment	Total Hours	Cognitive levels of attainment as per Bloom's Taxonomy
1	Basic Experiments	Verify the truth table of logic gates (Basic and Universal Gates)	2	L1, L2
2		Realization of Boolean algebra using gates	2	L1, L2, L3
3	Design Experiments	Design (truth table, K map) and implement 4 bit Code converter. Binary to gray and vice versa. ii. BCD to Excess-3 and vice versa	2	L1, L2, L3
4		Design of Half Adder and Subtractor.	2	L1, L2, L3,L4
5		Realization of Boolean expression using multiplexer IC 4151/74153.	2	L1, L2, L3
6		To verify and observe the operation of JK and T flip-flops	2	L1, L2, L3
7		Implementation of Encoder and Decoder using Gates	2	L1, L2, L3,L4
8		Verify the operation of 4- bit magnitude comparator	2	L1, L2, L3
9	Advanced Experiments	To design SISO or SIPO shift registers	2	L1, L2, L3,L4
10		Design and implement 2-bit up counter.	2	
11		Design and implement 3-bit down counter.	2	L1, L2, L3,L4
12	Mini/Minor Projects/ Seminar/ Case Studies	Case study: To study Programmable logic devices (PLD)	2	L1, L2, L3,L4
13		Case study: Evaluating and observing Boolean expression using PALs and PLAs.	2	
14		Project: 1. To design automated system for washing machine. 2. To design control system for lift	4	
Total Hrs.			30	

### S.E. Semester –III

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**  
**TCET Autonomy scheme with effect from 2022-23**

<b>B.E (Information Technology)</b>					<b>SEM: III</b>				
<b>Course Name : Environment Studies</b>					<b>Course Code: MC-IT 301</b>				
<b>Teaching Scheme (Program Specific)</b>					<b>Examination Scheme (Formative/ Summative)</b>				
<b>Modes of Teaching / Learning / Weightage</b>					<b>Modes of Continuous Assessment / Evaluation</b>				
<b>Hours Per Week</b>					<b>Theory (100)</b>	<b>Practical/Oral (25)</b>	<b>Term Work (25)</b>	<b>Total</b>	
<b>Theory</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Contact Hours</b>	<b>Credits</b>	<b>ISE</b>	<b>IE</b>	<b>ESE</b>	<b>PR</b>	<b>TW</b>
1	-	-	1	-	-	-	-	-	25
<b>The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of assignments (40%) and Attendance/Learning Attitude (20%)</b>									
<b>Prerequisite : General Science and Ethics.</b>									
<b>RBT: Revised Bloom's Taxonomy</b>									

#### **Course Objective:**

The course intends to deliver the fundamentals of multidisciplinary nature of environmental studies, importance and usage of natural resources, ecosystem, Bio-diversity at global, national, local levels. Also to analyze the causes, effects and control measures in environmental pollution, correlation between Social issues and environment.

#### **Course Outcomes: Upon completion of the course students will be able to:**

<b>Sr. No.</b>	<b>Course Outcomes</b>	<b>Cognitive levels of attainment as per Bloom's Taxonomy</b>
1	Define the scope and importance of environment studies	L1, L2
2	Identify the natural resources and how to conserve them	L2,L3
3	Learn Ecosystems and their various types	L3,L4
4	Differentiate biodiversity and how to conserve it	L3,L4
5	Learn about the types of pollution and how to prevent it	L3,L4
6	Compare the social issues and its impact on the environment	L3,L4

**Detailed Syllabus (Total No. of Hours: 15):**

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>The Multidisciplinary Nature of Environmental Studies</b>	2	L1,L2
	Definition, scope and importance, Need for public awareness		
2	<b>Natural Resources</b>	3	L2,L3
	Renewable and non-renewable resources; Natural resources & associated problem a. Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, case studies. b. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems. c. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d. Food resources: World food problems overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e. Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, case studies. f. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.		
3	<b>Ecosystems</b>	3	L3,L4
	Concepts of an ecosystem, Structure and function of an ecosystem; Producers, consumers and decomposers, Energy flow in the ecosystem; Ecological succession; Food chains, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).		
4	<b>Biodiversity and its conservation</b>	3	L3,L4
	Introduction definition: genetic species and ecosystem diversity; Bio geographical classification of India; Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values; Bio diversity at global, national, local levels; India as a mega diversity nation; Hot spots of bio diversity; Threats to bio diversity: Habitat loss, poaching of wild life, man wildlife conflicts; Endangered and endemic specific of India; Conservation of biodiversity: In situ and ex situ conservation.		
5	<b>Environmental Pollution</b>	2	L3,L4

	Causes, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear Hazards; Solid waste management: Causes, effect and control measures of urban and industrial wastes; Role of an individual in prevention of pollution; Pollution case studies; Disaster management: floods, earthquake, cyclone and land slides		
<b>6</b>	<b>Social issues and environment</b> From unsustainable to sustainable development; Urban problems related to energy; Water conservation, rain water harvesting, watershed management; Re-settlement and rehabilitation of people: Its problems and concerns, case studies; Environmental ethics: issues and possible solution; Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies; Wasteland reclamation; Consumerism and waste products; Environment protection act; Air (Prevention and control of pollution) act; Water (Prevention and control of pollution) act; Wildlife protection act; Forest conservation act; Issues involved in enforcement of environmental legislation; Public awareness	2	L3,L4

### **Books and References:**

Sr. No.	Name of Book	Author Name	Edition
1	Textbook of Environmental Studies for Undergraduate Courses	Erach Bharucha	2005
2	Environment Studies	Anindita Basak	2009
3	Environment Studies	S. N. Pandey	2006

### **Online References:**

Sr. No	Website Name	URL	Modules Covered
1.	NPTTEL	<a href="https://nptel.ac.in/courses/120/108/120108004/">https://nptel.ac.in/courses/120/108/120108004/</a>	M1 to M6
2.	Coursera	<a href="https://www.coursera.org/browse/physical-science-and-engineering/environmental-science-and-sustainability">https://www.coursera.org/browse/physical-science-and-engineering/environmental-science-and-sustainability</a>	M1 to M6
3.	Ed-Ex	<a href="https://www.edx.org/course/subject/environmental-studies">https://www.edx.org/course/subject/environmental-studies</a>	M1 to M6

**S.E. Semester - III**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**  
**TCET Autonomy scheme with effect from 2022-23**

B. E. Information Technology					S.E. SEM: III		
Course Name: Summer Internship					Course Code: SI-IT301		
Contact Hrs. during Weekend / Semester Break/ End of Semester (Between 21st and 25th Week)					Assessment/Evaluation Scheme		
					Presentation	Report	TW
Theory	AC	Practical	Contact Hours	Credits	AC	AC	
-	-	-	160*	-	-	-	-
<p style="text-align: center;"><b>AC- Activity evaluation TW – Term Work Examination</b></p> <p>* This is part of Summer Internship but can start in winter. Students may go up to 160 hrs. to acquire maximum 4 credits in Semester 4.</p> <p>Total hrs. mentioned should be completed till end of Semester 4. Credits will be awarded at the end of 4th Semester and will be reflected in the Grade Card of 4th Semester.</p>							
<b>Prerequisite: Fundamental knowledge of Information Technology related tools</b>							

**Course Objectives:**

To get industry like exposure in the college laboratories by carrying out projects using subject studied till 4<sup>th</sup> semester. Also design innovative techniques / methods to develop the products. To gain knowledge of marketing and publicizing products developed.

**Course Outcomes: Upon completion of the course students will be able to:**

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	To apply subject's knowledge in the college laboratories for carrying out projects	L1, L2, L3
2	Able to develop innovative techniques / methods to develop the products	L1, L2, L3
3	Able to do marketing and publicity of products developed	L1, L2, L3

**Detailed Syllabus:**

Module No.	Topics	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>Program Specific Internship</b>	L1, L2, L3
	Training and certification on emerging technologies in domains offered by Department of Computer Engineering Applying classroom and laboratory knowledge to design, develop and deploy the products	
2	<b>Inter disciplinary Internship</b>	L1, L2, L3
	<ul style="list-style-type: none"> <li>To explore and understand issues and challenges in the other disciplines (E&amp;TC, ELEX, MECH and CIVIL)</li> <li>Design, develop and deploy cost effective products using multidisciplinary approach</li> </ul>	
	<b>Industry Specific Internship</b>	L1, L2, L3

3	<ul style="list-style-type: none"> <li>To explore and understand issues and challenges in industry</li> <li>Developing solutions for industry specific problems</li> <li>Design , develop and deploy products for startup and SMEs</li> </ul>	
4	<b>Interpersonal Internship</b>	L1, L2, L3
	<ul style="list-style-type: none"> <li>To develop interpersonal skills such as leadership, marketing, publicity and corporate ethics and communication</li> <li>To get competence in problem solving , presentation , negotiation skills</li> </ul>	
5	<b>Social Internship</b>	L1, L2, L3
	<ul style="list-style-type: none"> <li>Identify and study different real life issues in the society</li> <li>Identify societal problems and provide engineering solutions to solve these problems</li> </ul>	
6	<b>Academic Internship</b>	L1, L2, L3
	<ul style="list-style-type: none"> <li>Study report preparation, preparation of presentations, copy table book preparation , business proposal and IPR</li> <li>Capture aspirations &amp; expectations through interviews of students.</li> <li>Ways to connect research in technical institutes with industry.</li> <li>Taking inputs from self, local stakeholders and global stake holders which will help to develop process with comparative and competitive study.</li> </ul>	

### Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	The Ultimate Guide to Internships: 100 Steps to Get a Great Internship and Thrive in It (Ultimate Guides)	Eric Woodard	Allworth	First	2015

### Online References:

Sr. No.	Website Name	URL	Modules Covered
1	<a href="https://www.letsintern.com/">https://www.letsintern.com/</a>	<a href="https://www.letsintern.com/internships/summer-internships">https://www.letsintern.com/internships/summer-internships</a>	M1-M6
2	<a href="https://codegnan.com">https://codegnan.com</a>	<a href="https://codegnan.com/blog/benefits-of-internships-and-importance">https://codegnan.com/blog/benefits-of-internships-and-importance</a>	M1-M6
3	<a href="https://www.honorsociety.org">https://www.honorsociety.org</a>	<a href="https://www.honorsociety.org/articles?category=internships">https://www.honorsociety.org/articles?category=internships</a>	M1-M6



**S.E. Semester –III**  
**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**  
**TCET Autonomy Scheme (w.e.f. A.Y. 2022-23)**

B.E ( Information Technology )					S.E. (SEM: III)		
Course Name : Professional Skills III(Linux)					Course Code: HME-ITPS301		
Contact Hours Per Week: 1					Credits: 2		
Teaching scheme (Holistic and Multidisciplinary Education)					Examination Scheme (Formative/ Summative)		
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation		
Hours Per Week					Presentation (50)	Report (25)	Term Work
Theory	Tutorial	Practical	Contact Hours	Credits	AC	AC	
15	--	30	45	2	50	25	75
<p style="text-align: center;"><b>AC- Activity Evaluation</b>  <b>Total weightage of marks for continuous evaluation of Term work/Report:</b> Formative (40%), Timely Completion of Practical (40%) and Attendance/Learning Attitude (20%).</p>							
<b>Prerequisite:</b> Database and Programming Language							

**Course Objective:** The course intends to deliver the fundamentals of Linux file system, command for various operation, to learn OS installation. It also focus on the Linux administrative and networking task, securing the server by designing firewall. It also covers shell programming.

**Course Outcomes:** Upon completion of the course students will be able to:

Sr.No.	Course Outcome	Cognitive levels of attainment as per Bloom's Taxonomy
1	Compare open source with closed source& installation process of linux	L1,L2
2	Use command file system commands for operations like making new directory , copy , remove etc	L1, L2, L3,L4
3	Preform process management and other administrative task of linux and use of Simple Filters	L1, L2, L3
4	Provide solution by using networking command, Configuring files(FTP, ,SSH)	L1, L2, L3,L4
5	Understand Secure server using IP tables	L1, L2
6	Develop program in shell script	L1, L2, L3,L4

### Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1.0	<b>Over View of Open Source Software &amp; Linux</b>	02	L1, L2
	Introduction to open source software, Key Features of Linux, Linux vs Windows, Linux file structure, installation of linux, Basic Linux commands: echo, printf, ls, who, tput, tty, uname, system date, cal, date, passwd, cal commands.		
2.0	<b>Basic File handling in Linux</b>	02	L1, L2, L3, L4
	File handling commands: ls: listing directory contents, the UNIX file system, ls -l, -d option, file ownership, file permissions, directory permissions, changing file ownership Working with Vi editor		
3.0	<b>File Attribute &amp; Simple Filters</b>	03	L1, L2, L3
	File System, Inode, Hard Links, Symbolic Link, The Directory, touch, Find, Path list Simple filters: pr, head, tail, cut, paste, sort, uniq, tr. Filters using regular expressions – grep and sed: grep,		
4.0	<b>Linux Network configuration</b>	03	L1, L2, L3, L4
	Basic networking commands: ifconfig, ping, ip, whois, SSH, FTP, TELNET		
5.0	<b>Security Administration</b>	03	L1, L2
	Introduction to SSL, SSH, Securing Servers with IP tables- Firewall.		
6.0	<b>Shell Programming</b>	02	L1, L2, L3, L4
	Bash Shell Scripting, Executing Script, Working with Variables and Input, Using Control Structures, Script control, Creating functions.		
<b>Total Hrs.</b>		<b>15</b>	

### List of Practical / Experiments:

S. No.	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>Basic Experiments</b>	Installation of Linux in multiboot environment. & use of Vi-editor	2	L1, L2, L3
2		Demonstrate Commands	2	L1, L2, L3
3		Performing Basic file system commands in Linux	4	L1, L2, L3
4		Demonstration of types of ps command	4	L1, L2, L3
5		Performing Simple Filters, Demonstration of sed and grep commands	4	L1, L2, L3

6	Advanced Experiments	Demonstration of basic networking command	4	L1, L2, L3
7	Design Experiments	Design and implement firewall setup using IP table for the lab	2	L1, L2, L3
8		Implement shell script and demonstrate arithmetic operations on Shell	2	L1, L2, L3
9		Design and implement “java”, “python”, “c++”, “javascript” on the screen with each appearing on a separate line. Try to do this in as few lines as possible.	2	L1, L2, L3
10	Mini/Minor Projects/ Seminar/ Case Studies	Design a Mini Project / Case Study	4	L1, L2, L3, L4
<b>Total Hours</b>			<b>30</b>	

### Books and References:

Sr. No	Title	Authors	Publisher	Edition	Year
1	Your Unix/Linux – The ultimate guide	Sumitabha Das	Mcgraw-Hill Education	5 <sup>th</sup>	2012
2	Linux Labs and Open Source Technologies	Dr. Deven Shah & Prof. Dayanand Ambawade,	Dreamtech Press	1 <sup>st</sup>	2016

### Online References:

S. No.	Website Name	URL	Modules Covered
1	<a href="https://nptel.ac.in">https://nptel.ac.in</a>	<a href="https://nptel.ac.in/courses/117106113/">https://nptel.ac.in/courses/117106113/</a>	M1, M2, M3
2	<a href="https://nptel.ac.in">https://nptel.ac.in</a>	<a href="https://nptel.ac.in/courses/117106113/">https://nptel.ac.in/courses/117106113/</a>	M4, M5
3	<a href="http://www.tcetminit">www.tcetminit</a>	<a href="https://www.tecmint.com/linux-iptables-firewall-rules-examples-commands/">https://www.tecmint.com/linux-iptables-firewall-rules-examples-commands/</a> <a href="https://www.javatpoint.com/iptables-commands">https://www.javatpoint.com/iptables-commands</a>	M5
4	<a href="https://www.tutorialspoint.com">https://www.tutorialspoint.com</a>	<a href="https://www.tutorialspoint.com/unix/shell_scripting.htm">https://www.tutorialspoint.com/unix/shell_scripting.htm</a>	M6

### S.E. Semester –III

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**  
**TCET Autonomy scheme with effect from 2022-23**

B.E ( Information Technology )					S.E. (SEM : III)		
Course Name :Project Based Learning-I					Course Code :HME-ITPBL301		
Teaching scheme (Holistic and Multidisciplinary Education - HME)					Examination Scheme (Formative/ Summative)		
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation		
Hours					Presentation (50)	Report (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	AC	AC	
-	-	30	30	1	25	-	25
AC- Activity Evaluation							
Total weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely Completion of Practical (40%) and Attendance/Learning Attitude (20%).							
Prerequisite: Computer Fundamentals & knowledge of Programming Languages							

### Course Objectives:

This course is intended to develop projects thereby identifying & analyzing the basic real time problems and study existing solutions and prepare literature survey. To apply the basic computing & mathematics fundamentals to solve problems and to apply fundamental concepts of Programming such as C/C++ and Java to solve Basic real time problems.

### Course Outcomes:

SN	Course Objectives	Cognitive levels of attainment as per Bloom's Taxonomy
1	To identify & analyze the basic real time problems and prepare literature survey.	L1,L2,L3
2	Identify & apply appropriate technologies & programming constructs to solve problems.	L1,L2,L3
3	Presenting & Documenting results obtained.	L1,L2,L3,L4

### Suggested Projects List:

Sr. No.	Project Titles for PBL
1	Multiple contingency services application
2	GST calculating website
3	Book Benchers website
4	Prediction of lifestyle disease
5	Automated Canteen web application
6	Healthcare Application
7	E-Ticketing App
8	Food Donation App
9	Human Safety Application

10	Medical help website
11	Job Finder Application
12	Book review website
13	Traffic and Accident Management
14	Medical Emergency App
15	Platform that Lists All Startup Related Events
16	Citizen Feedback on Maintenance of Road
17	Group messaging solution
18	Online personal diary
19	Drive mode app for road safety
20	Paperless office
21	Accident prevention.
22	Android app for university helpline,
23	Community based Web application
24	Virtual Assistant
25	Student Monitoring System
26	Personal management assistant
27	Common mobility application
28	Mobile app for Sansad adarsh gram yojna
29	To design dynamic website using advanced web technologies
30	Sustainable tourism management
31	Efficient, easy and integrated billing system
32	Identifying accident prone area for roads
33	Yoga healthcare management system
34	IOT in agriculture
35	Games on Road Safety
36	App development using IOT
37	Indian Railways on Google Earth
38	Google Ad Grants online marketing challenge

**Note:** Project topic can be selected as per the Domain and current Trends in the Technology.

### S.E. Semester –III

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)**  
**TCET Autonomy scheme with effect from 2022-23**

B.E. ( Information Technology )					S.E. (SEM : III)			
Course Name :Activity Based Learning III					Course Code: HME-ITABL301			
Teaching scheme (Holistic and Multidisciplinary Education - HME)					Examination Scheme (Formative/ Summative)			
Modes of Teaching / Learning / Weightage					Assessment / Evaluation Scheme			
Hours					Presentation		Report	Total
Theory	Tutorial	Practical	Contact Hours	Credits	AC		AC	50
-	-	30	30	1	25		25	
AC- Activity Evaluation								
To be taken as either lab or tutorial based on subject requirement								
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)								
Prerequisite: Basics of Computer Programming, General knowledge, Social awareness,								

#### Course Objectives:

- The larger objective of the course is to prepare students for Leadership and Excellence in their life roles by continually engaging students in both individual and team activities that explore important issues or phenomena, use multiple media and technologies, create products that embody the results of the students explorations, and call the students to explain their work and products to adult and student audience.
- Further the course also aims to develop the Society Sensitive Citizens by creating awareness among students and take up the initiatives in the Activity mode for the needy.
- The course intends to deliver the understanding of the concepts of critical thinking, encourage the students to look beyond their textual knowledge, establish the relationship between theory and the applications of the learned concepts.
- It also intends to address the social issues and help the society in the area of work.

#### Course Outcomes:

S .No	Course Outcome	Cognitive level attainment as per revised Bloom Taxonomy
1	Student will be able to outline the procedures for debate and demonstrate parliamentary debate and policy debate styles Learn on multidisciplinary subjects.This brings out the excellence attribute in students with updated awareness in either topics technical or current affairs.	L1,L2,L3
2	Student will in the process figure out the various benefits of quiz competitions, also Work as a team.	L1,L2, L3
3	Students will be to make the society awareness about various social issues which teaches them a overall team spirit with decisive acumen qualities for excellence.	L1,L2,L3

**Detailed Syllabus :**

Module No.	Topics	Hrs.	Cognitive level attainment as per revised Bloom Taxonomy
1	<b>Extempore/Debate</b> <b>I. Introduction to debate</b> , Definition and types of Debate Brainstorming session among students on various topics floated for debate. Topics can be Academic or Parliamentary, Financial, International affairs, technology trends, Technical or philosophical. Expressing views by each student for /against topic for 1 minute. <b>II. Debate competition</b> . Formation of four teams for two topics. Two teams (For and against) for topic I will debate first and the other two team will be audience and for topic II vice-versa. <b>Evaluation by faculty as per format.</b>	4	L1, L2, L3
2	<b>General Knowledge (Technical and Current Affairs)</b> <b>I. Introduction to Quiz</b> , Definition, Types of quiz, Rules of quiz, quiz rounds. Quiz competition on Technical topic with 50 MCQ. <b>II. Quiz competition on current affairs</b> with 50 MCQ. <b>Evaluation by faculty as per format.</b>	2	L1,L2,L3
3	<b>Personality Development</b> <b>I. Word association (Test Sentence Building) (2 Hrs.)</b> Students are shown 60 English words one after other and a short sentence using the words shown are to be written. Each word will appear for 15 seconds and sentence is to be written within this period only. At least 45 words are to be attempted to get good marks <b>II. Thematic Apperception Test (Short Story Writing)(2 Hrs.)</b> 12 Slides will be projected, and stories are to be written in 03 Minutes. Discussions on Stories written by students <b>Evaluation by faculty as per format.</b>	2 2	L1,L2, L3
4.	<b>TURNING A WASTE INTO USEFUL PRODUCTS/ RENEWABLE ENERGY</b> I Introduction: Minimize the generation of wastes and to reuse and recycle them. This activity brings out the excellence in critical thinking and application in team. This is to be practised for designing the flow chart for application and not to develop product. II Domain wise distribution: The different branches can plan as per their domain knowledge or can be worked in disciplinary way. Domain wise ideas. <b>E&amp;TC and ELEX can work on themes like electronic wastes collection as dc motor etc , to create some power generating model.</b> <b>For CIVIL</b> 1. <b>WasteWater Treatment Plant Design</b> 2. One can reduce waste and improve resulting brick properties by using waste contents.. 3. Creation of smart city by urban modelling <b>Computer and IT</b>	2 2	L1, L2,L3

	<p><b>1. E-waste Management</b></p> <p><b>2. SOld computer peripherals if of some use. Learn the hardware from e waste.</b></p> <p><b>Mechanical</b></p> <ol style="list-style-type: none"> <li>1. A physical beneficiation of automobile, electrical and electronic waste.</li> <li>2. Reduction of automobile emission is an important aspect of Mechanical Engineering.</li> <li>3. Another area one can look into is power generation and biogas production using waste produced in institute.</li> <li>4. Designing of plants also welcome with unique ideas. Example A captive <b>power plant</b>, also called auto producer or embedded <b>generation</b>, is an <b>electricity generation</b> facility <b>used</b> and managed by an industrial or commercial . A design can be worked out at initial stage for college self sustaining electric power generation with the resources like solar energy etc.</li> </ol>		
5.	<p><b>Game Based Learning</b></p> <p>I Introduction :Games provide a different pedagogical perspective within a higher education context. They provide an stimulating environment with an learning outcome in fun style.. Different Games viz. Puzzle, Sccriblenaut , computer aided design assembly delivery using the game in mechanical engineering branch ,can be played in class with a game concept document as a learning outcome.</p>	2	L1,L2,L3
6	<p><b>Extended Work</b></p> <p><b>I. Introduction to Role play)(4 Hrs.),</b> types of Role play. Writing and demonstration of street Play on social Issues          Water conservation          Waste Management          Plastic Ban etc.</p> <p><b>II. Education for needy</b>          Education on social Issues like social media, youth related issues etc.          Education on health issues          Education on issues related to senior citizen etc.</p> <p><b>III. The education/awareness</b> needs to be conducted in campus through presentation(placards,posters etc.),survey's, data analysis and evaluation</p> <p><b>Evaluation by faculty as per format</b></p> <p><b>Total Hours</b></p>	<p>2</p> <p>6</p> <p>6</p> <p><b>30</b></p>	L1,L2,L3

### Books and References:

Sr.No.	Title	Author
1	Competitive Debate	Richard Earl.
2	Times Quiz book by Times Mind Games	OLovBjortomt
3	Renewable: The World-Changing Power of Alternative Energy	St. Martin's Press

### Online References:

Sr.No.	Website Name	URL
1.	<a href="https://www.thebetterindia.com">https://www.thebetterindia.com</a>	<a href="https://www.thebetterindia.com/111/teaching-street-children-a-thing-or-two/">https://www.thebetterindia.com/111/teaching-street-children-a-thing-or-two/</a>