

**Semester-IV**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2023)  
 Proposed TCET Autonomy Scheme (w.e.f. A.Y. 2023-24)**

<b>B.E. (Information Technology)</b>					<b>S.E. SEM: IV</b>					
<b>Course Name: Mathematics-IV</b>					<b>Course Code: BSC-IT401</b>					
<b>Teaching Scheme (Program Specific)</b>					<b>Examination Scheme (Academic)</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/ Presentation (25)</b>	<b>Term Work (25)</b>	<b>Total</b>	
					<b>40</b>	<b>60</b>				
<b>Theory</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Contact Hours</b>	<b>Credits</b>	<b>IA</b>		<b>ESE</b>	<b>PR/OR</b>	<b>TW</b>	
					<b>ISE</b>	<b>IE</b>				
3	1	-	4	4	20	20	60	-	25	<b>125</b>
<b>IA: In-Semester Assessment - Paper Duration – 1 Hour</b> <b>ESE: End Semester Examination - Paper Duration – 2 Hours</b> <b>The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance / Learning Attitude (20%)</b>										
<b>Prerequisite:</b> Basic Mathematics and statistics										

**Course Objective:** The course intends to apply the concept of probability, Correlation and Regression, Testing of hypothesis for large and small samples to engineering problems and to evaluate the optimization of two and three variables.

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

Sr. No.	Course Outcomes	Cognitive level of attainment as per Bloom's Taxonomy
1	Apply the concept of probability random variables, mathematical expectations and variance.	L1, L2, L3
2	Differentiate the discrete and continuous random variables.	L1, L3
3	Apply the concept of test of significance for large sample test.	L1, L2, L3
4	Apply the concept of test of significance for small sample test.	L1, L2, L3
5	Apply the concept of Correlation and Regression to the engineering problems.	L1, L2, L3
6	Evaluate the Maximization and minimization of two and three variables.	L1, L2, L3

**Detailed Syllabus:**

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	<b>Basic Probability</b>	6	L1, L2, L3
	Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, sums of independent random variables; Expectation of Discrete and Continuous Random Variables, Moments, Variance of a sum		
2	<b>Basic Statistics</b>	7	L1, L3
	Measures of Central tendency, Moments, skewness and Kurtosis, Binomial, Poisson and Normal distribution and evaluation of statistical parameters for these three distributions		
3	<b>Large Samples Test</b>	8	L1, L2
	Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.		
4	<b>Small Samples Test</b>	8	L1, L2
	Test for single mean, difference of means, test for ratio of variances -Chi-square test for goodness of fit and independence of attributes.		
5	<b>Applied Statistics</b>	8	L1, L2, L3
	Correlation and regression – Rank correlation, Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves		
6	<b>Linear Programming problems</b>	8	L1, L2, L3
	Types of solutions to linear programming problems, standard form of L.P.P. Simplex method, Big M method (Penalty method) to solve L.P.P, Duality, Dual simplex method and Revised simplex method to solve L.P.P.		
	<b>Total Hours</b>	<b>45</b>	

### Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Advanced Engineering Mathematics	Erwin kreyszig	John Wiley & Sons	Ninth Edition	2006
2	A text book of Engineering Mathematics	N.P. Bali and Manish Goyal	Laxmi Publications	Tenth Edition	2008
3	Engineering Mathematics	Veerarajan T	Tata McGraw-Hill, New Delhi	Third Edition	2008
4	Introduction to Probability Theory	P. G. Hoel, S. C. Port and C. J. Stone	Universal Bookstall	Reprint	2003
5	Operations Research	S.D. Sharma	S. Chand & CO.	-	-
6	A First Course in Probability	S. Ross	Pearson Education India	Sixth Edition	2002

### Online References:

S. No.	Website Name	URL	Modules Covered
1	www.statisticssolutions.com	<a href="https://www.statisticssolutions.com/continuous-probability-distribution/">https://www.statisticssolutions.com/continuous-probability-distribution/</a>	M1, M2, M3
2	nptel.ac.in	<a href="https://nptel.ac.in/courses/111105123/">https://nptel.ac.in/courses/111105123/</a>	M5, M4
3	www.analyticsvidhya.com	<a href="https://www.analyticsvidhya.com/blog/2017/02/introductory-guide-on-linear-programming-explained-in-simple-english/">https://www.analyticsvidhya.com/blog/2017/02/introductory-guide-on-linear-programming-explained-in-simple-english/</a>	M6

### List of Tutorials:

Sr. No	Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Tutorial on Conditional Probability and Bayes theorem	1	L1, L2, L3
2	Tutorial on discrete random variable	1	L1, L2
3	Tutorial on continuous random variable	1	L1, L2, L3
4	Tutorial on measure of Central Tendency and Dispersion	1	L1, L2, L3
5	Tutorial on Binomial and Poisson Distribution	1	L1, L2
6	Tutorial on Normal Distribution	1	L1, L2
7	Tutorial on large sample test for proportion and mean	1	L1, L2
8	Tutorial on large sample test for difference of standard deviations	1	L1, L2, L3
9	Tutorial on small sample test for proportion and mean	1	L1, L2
10	Tutorial on Chi-square test	1	L1, L2, L3
11	Tutorial on Correlation	1	L1, L2, L3
12	Tutorial on Regression	1	L1, L2, L3
13	Tutorial on Curve fitting	1	L1, L2, L3
14	Tutorial on Simplex method	1	L1, L2
15	Tutorial on Dual Simplex method	1	L1, L2, L3
	<b>Total Hours</b>	<b>15</b>	

**S.E. Semester –IV**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2023)  
 TCET Autonomy scheme with effect from 2023-24**

<b>B.E ( Information Technology )</b>					<b>SEM: IV</b>					
<b>Course Name : Computer Organization Architecture And Microprocessor</b>					<b>Course Code: ESC-IT-401</b>					
<b>Teaching Scheme (Program Specific)</b>					<b>Examination Scheme (Academic)</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/ Presentation (25)</b>	<b>Term Work (25)</b>	<b>Total</b>	
					<b>40</b>	<b>60</b>				
<b>Theory</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Contact Hours</b>	<b>Credits</b>	<b>IA</b>		<b>ESE</b>	<b>OR</b>	<b>TW</b>	
					<b>ISE</b>	<b>IE</b>				
3	-	2	5	4	20	20	60	25	25	<b>150</b>
<b>IA: In-Semester Assessment - Paper Duration – 1 Hour</b>										
<b>ESE: End Semester Examination - Paper Duration – 2 Hours</b>										
<b>The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance / Learning Attitude (20%)</b>										
<b>Prerequisite :</b> Computer Basics, Digital Logic										
<b>RBT:</b> Revised Bloom’s Taxonomy										

**Course Objective:** The course intends to deliver the fundamentals of organizational and architectural issues of a digital computer, apply and analyze processor performance, Instruction & Processor parallelism, various multiplication, and division algorithms of digital computer, memory hierarchy and various components of computer.

**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	PO Mapping (Write only Number/s)	PSO Mapping (Write only Number/s)
1	Describe basic organization and the architecture of computer	L1, L2	1, 2, 3	1
2	Describe the architecture of 8086 microprocessor and implement assembly language programming for 8086 microprocessors.	L1, L2, L3, L4	1,3, 3, 5	1
3	Demonstrate and apply computer arithmetic operations on integer and real numbers.	L1, L2	1, 2, 3	1
4	Understand control unit operation and the concept of parallelism	L1, L2	1, 2, 3	1
5	Understand Categorize memory organization and explain the function of each element of a memory hierarchy.	L1, L2, L3	1, 2, 3	1
6	Analyze, Identify and compare different methods for computer I/O mechanisms.	L1, L2, L3, L4	1, 2, 3	1

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

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
0	<b>Prerequisite</b>	01	L1, L2
	Basic combinational and sequential logic circuits, binary numbers and arithmetic, basic computer organizations		
1.	<b>Overview of Computer Architecture &amp; Organization</b>	06	L1, L2
	Introduction of Computer Organization and Evolution of Computers, Von Neumann model. Performance measure of Computer Architecture. System bus structure: Data, address and control buses. CPU Architecture, Register Organization, Instruction formats, basic instruction cycle. Overview of 80x86 families.		
2	<b>8086 Microprocessor Architecture</b>	08	L1, L2, L3,L4
	Architecture of 8086 Family, Register Organization, Instruction Set, Physical address generation mechanism, Segmentation, Addressing Modes, Minimum and Maximum Mode, Assembler Directives, Mixed-Language Programming, Stack, Procedure, Macro.		
3	<b>Data Representation and Arithmetic Algorithms</b>	07	L1, L2
	Number representation: Binary Data representation, two's complement representation and Floating-point representation. Multiplication: Unsigned & Signed multiplication-Add & Shift Method, Booth's algorithm. Division of integers: Restoring and non-restoring division, signed division, basics of floating pointer presentation IEEE754 floating point (Single & double precision) number representation.		
4	<b>Processor Organization and Pipeline Processing</b>	08	L1, L2
	Control Unit: Soft wired (Micro- programmed) and hardwired control unit. Complex Instruction Set Computer (CISC) Reduced Instruction Set Computer (RISC), CISC vs RISC. Introduction to parallel processing concepts, Flynn's classifications, Instruction Level parallelism, pipeline processing, instruction pipelining, pipeline stages, pipeline hazards.		
5	<b>Memory Organization &amp; Memory interfacing to 8086 Microprocessor</b>	08	L1, L2,L3
	Introduction to Memory and Memory parameters. Classifications of primary and secondary memories. Types of RAM and ROM, Allocation policies, Memory hierarchy and characteristics. Cache memory: Cache Coherency, Interleaved memory, virtual memory system. Interfacing of 8086 with Memory.		
6	<b>I/O Organization &amp; Peripheral Devices</b>	07	L1, L2,L3,L4
	Input/output systems, I/O module-need & functions and Types of data transfer techniques: Programmed I/O, Interrupt driven I/O and DMA. Peripherals: Keyboard, Mouse, Monitors, Disk drives, etc.		

**List of Practical:**

Sr. No.	List of Experiments	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1.	WAP to perform various arithmetic operation	4	L1,L2,L3
2.	WAP to find out number of Odd / Even value from block of data	2	L1,L2,L3,L4
3.	WAP to find out Largest / Smallest number from block of data	2	L1,L2,L3,L4
4.	WAP to exchange block of data	2	L1,L2,L3,L4
5.	WAP arrange number in ascending / descending order from block of data	4	L1,L2,L3,L4
6.	WAP using Procedure for function $X = (A + B) * (C + D)$	4	L1,L2,L3,L4
7.	WAP to Check whether a given string is a palindrome or not.	4	L1,L2,L3,L4
8.	WAP to Compute the factorial of a positive integer 'n' using recursive procedure	2	L1, L2, L3
9.	WAP to count number of 1's and 0;s in a given 8 bit number	2	L1, L2, L3
10.	Study of PC Motherboard Troubleshooting and Monitoring	4	LO4, LO6
<b>Total</b>			30

**Books and References:**

Sr. No.	Title	Authors	Publishers	Edition	Year
1	Computer Organization	Carl Hamacher, Zvonko Vranesic and Safwat Zaky	McGraw-Hill,	5 <sup>th</sup>	2002
2	Computer Organization and Architecture: Designing for Performance	William Stallings	Pearson Education	5 <sup>th</sup>	2010
3	Computer Architecture and Organization: Design Principles and Applications	Dr. M.Usha,T.S. Srikanth	Wiley	1 <sup>st</sup>	2012
4	Computer Architecture and Organization	JohnP.Hayes	McGraw Hill Education	3 <sup>rd</sup>	2017
5	8086/8088 family: Design Programming and Interfacing	John Uffenbeck	Pearson	2 <sup>nd</sup>	1994

**Online References:**

Sr. No	Website Name	URL	Modules Covered
1.	<a href="https://www.geeksforgeeks.org">https://www.geeksforgeeks.org</a>	<a href="https://www.geeksforgeeks.org/computer-organization-von-neumann-architecture/">https://www.geeksforgeeks.org/computer-organization-von-neumann-architecture/</a>	M1
2.	<a href="https://nptel.ac.in">https://nptel.ac.in</a>	<a href="https://nptel.ac.in/courses/108/103/108103157/">https://nptel.ac.in/courses/108/103/108103157/</a>	M2
3.	<a href="https://www.geeksforgeeks.org">https://www.geeksforgeeks.org</a>	<a href="https://www.geeksforgeeks.org/computer-organization-risc-and-cisc/">https://www.geeksforgeeks.org/computer-organization-risc-and-cisc/</a>	M3
4.	<a href="https://www.javatpoint.com">https://www.javatpoint.com</a>	<a href="https://www.javatpoint.com/flynn-classification-of-computers">https://www.javatpoint.com/flynn-classification-of-computers</a>	M4
5.	<a href="https://www.javatpoint.com">https://www.javatpoint.com</a>	<a href="https://www.javatpoint.com/classification-of-memory">https://www.javatpoint.com/classification-of-memory</a>	M5

6.	<a href="https://www.geeksforgeeks.org">https://www.geeksforgeeks.org</a>	<a href="https://www.geeksforgeeks.org/io-interface-interrupt-dma-mode/">https://www.geeksforgeeks.org/io-interface-interrupt-dma-mode/</a>	M6
----	---	---	----

**S.E. Semester –IV**  
**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2023)**  
**TCET Autonomy scheme with effect from 2023-24**

B.E ( Information Technology )						SEM: IV				
Course Name : NoSQL						Course Code: HME –PCC-IT 401				
Teaching Scheme (Program Specific)					Examination Scheme (Academic)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory (100)		Practical/Oral/ Presentation (25)	Term Work (25)	Total	
Theory	Tutorial	Practical	Contact Hours	Credits	40	60				
					IA		ESE	OR	TW	
					ISE	IE				
3	-	2	5	4	20	20	60	25	25	<b>150</b>
<b>IA: In-Semester Assessment - Paper Duration – 1 Hour</b> <b>ESE: End Semester Examination - Paper Duration – 2 Hours</b> <b>The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance / Learning Attitude (20%)</b>										
<b>Prerequisite</b> : Database management system, Data structures.										

**Course Objective:** The course intends to learn basics of NoSQL databases, architecture patterns, implementation of NoSQL database based on business requirements and also to Apply NoSQL data modeling from application specific queries, Use Atomic Aggregates and denormalization as data modeling techniques to optimize query processing.

**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	PO Mapping (Write only Number/s)	PSO Mapping (Write only Number/s)
1	Compare and Contrast NoSQL databases with each other and Relational Database Systems	L1,L2,L3, L4	1,2	1
2	Describe NoSQL data Architecture patterns and its types. Identify what type of NoSQL database to implement based on business requirements	L1,L2,L3, L4	1,4,5	1
3	Explain the detailed architecture; define objects, load data, query data and performance tune Column -oriented NoSQL databases.	L1,L2,L3, L4	1,2,4,5	1
4	Demonstrate an understanding of the detailed architecture; define objects, load data, query data and performance tune Key-Value Pair and Graph NoSQL databases.	L1,L2,L3, L4	2,4,5	1
5	Understand the concept and challenge of big data and how NoSQL provides different ways to handle it.	L1,L2,L3, L4	2,4,5	1
6	Develop web application with NoSQL & Perform basic database administration tasks.	L1,L2,L3, L4	1,2,4,5	3



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

Mod ule No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxono my
	<b>Prerequisites</b>	-	
	Data model, Database management system, Data structure concepts		
	<b>Introduction</b>		
1	Overview, Data base revolutions: First generation, second generation, third generation, and History of NoSQL Databases, Database Features of NoSQL, Difference Between RDBMS and NoSQL, Benefits of NoSQL Databases NoSQL business drivers, NoSQL case studies, Keeping components simple to promote reuse, Using application tiers to simplify design, Speeding performance by strategic use of RAM, SSD, and disk, Comparing ACID and BASE, How to minimize downtime with database sharding, Brewer's CAP theorem, NoSQL data Architecture patterns and its types: Key/Value stores, Graph stores, Column oriented stores and Document stores, Comparison of NoSQL databases w.r.t CAP theorem and ACID properties	8	L1, L2, L3, L4
	<b>NoSQL Document-oriented database</b>		
2	Document oriented database-MongoDB, Installation of MongoDB Software, Data modeling, CRUD operations, Queries against Varying Aggregate Structure, Administration commands, Complex Transactions Spanning Different Operations, MongoDB- Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Web Analytics or Real-Time Analytics, E-Commerce Applications, When Not to Use, Connectivity of mongoDB with python	8	L1, L2, L3, L4
	<b>NoSQL Column-oriented database</b>		

3	Data warehousing schemas: Comparison of columnar and row-oriented storage, What Is a Column-Family Data Store? Features, Column-oriented NoSQL databases using Apache HBASE, Column-oriented NoSQL databases using Apache Cassandra, Architecture of HBASE, When Not to Use, Adaptive Indexing and Database Cracking. Advanced techniques: Vectorized Processing, Compression	7	L1,L2,L3, L4
4	<b>NoSQL Key-Value database</b>	7	L1,L2,L3, L4
	NoSQL Key/Value databases using Riak, Key-Value Databases, What Is a Key-Value Store, Key-Value Store Features, Consistency, Transactions, Query Features, Structure of Data, Scaling, Suitable Use Cases, Storing Session Information, User Profiles, Preferences, Shopping Cart Data, When Not to Use, Relationships among Data, Multi Operation Transactions, Query by Data, Operations by Sets. Case Study: Key-Value Databases for Mobile Application Configuration		
5	<b>NoSQL Graph databases</b>	8	L1,L2,L3 , L4,L5,L6
	Comparison of Relational and Graph Modeling, Graph NoSQL databases using Neo4j, Introduction to Cypher, What is a Graph Database? Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Connected Data, Routing, Dispatch, and Location-Based Services, Recommendation Engines, When Not to Use, case study: Building a Graph Database Application- community detection		
6	<b>Using NoSQL to manage big data</b>	7	L1,L2,L3 , L4,L5,L6
	Big data NoSQL solution, relationship between scalability and expressivity, Types of big data problems, Analyzing big data with a shared-nothing architecture, master-slave versus peer-to-peer models, Using MapReduce to transform your data over distributed systems, Different ways that NoSQL systems handle big data problems, Case study: event log processing with Apache Flume, Case Study on NoSQL implementation for Big Data Management (LinkedIn, Twitter)		
<b>Total Hours</b>		<b>45</b>	

**List of Practical/Experiment:**

Practical No.	Practical/Experiment topic	Hrs.	RBT Levels
1.	Introduction to MongoDB and its Installation on Windows/Linux, Basic MongoDB CRUD operations	4	L1,L2,L3,L4
2.	Implement aggregation and indexing with suitable examples using MongoDB.	2	L1,L2,L3,L4
3.	Implement Replication and Sharding with suitable example using MongoDB	2	L1,L2,L3,L4

4.	Introduction to Cassandra and its Installation on Windows/Linux, Cassandra Data Model with Simple Example	4	L1,L2,L3,L4
5.	Implement Cassandra Basic CRUD operations.	2	L1,L2,L3,L4
6.	Installation of Redis- Key-Value database on Windows/Linux, Demonstrate the Redis databases	2	L1,L2,L3,L4
7.	Install Neo4j graph database and Specify the queries in Cypher and execute them in Neo4j.	2	L1,L2,L3,L4
8.	Implement Map reduce operation with suitable examples using MongoDB.	2	L1,L2,L3,L4
9.	Demonstrate NoSQL technologies to extract and manipulate web-based data	2	L1,L2,L3,L4
10.	Design and Implement any Database Application using PHP/python/Java and any NoSQL database	8	L1,L2,L3,L4,
	Total Hours	30	

**Books and References:**

Sr. No	Title	Authors	Publisher	Edition	Year
1.	Making sense of NOSQL	Daniel G. McCreary and Ann M. Kelly	Manning	1st	2013
2.	NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence	Sadalage, P. & Fowler	Pearson Education	1st	2012
3.	A Guide to Modern Databases and the NoSQL Movement Edition	Redmond, E. & Wilson	MIT Press	1st	2014
4.	NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence	Sadalage, P. & Fowler	Pearson Education	1st	2012
5.	MongoDB and PHP	Steve Francia	O'Reilly Media	1st	2012
6.	Neo4j in Action	Aleksa Vukotic and Nicki Watt	Manning	1st	2012

7.	NoSQL with MongoDB in 24 Hours	Sams	Pearson Education	1st	2014
----	--------------------------------	------	-------------------	-----	------

**Online References:**

Sr. No.	Website Name	URL	Modules Covered
1.	<a href="https://nptel.ac.in">https://nptel.ac.in</a>	<a href="https://www.digimat.in/nptel/courses/video/106106156/L23.html">https://www.digimat.in/nptel/courses/video/106106156/L23.html</a>	M1 to M6
2.	<a href="https://www.tutorialspoint.com">https://www.tutorialspoint.com</a>	<a href="https://www.tutorialspoint.com/mongodb/index.htm">https://www.tutorialspoint.com/mongodb/index.htm</a>	M2
3.	<a href="https://www.tutorialspoint.com">https://www.tutorialspoint.com</a>	<a href="https://www.tutorialspoint.com/cassandra/cassandra_introduction.htm">https://www.tutorialspoint.com/cassandra/cassandra_introduction.htm</a>	M3
4.	<a href="https://riak.com/">https://riak.com/</a>	<a href="https://www.monitis.com/blog/an-overview-of-riak-an-open-source-nosql-database/">https://www.monitis.com/blog/an-overview-of-riak-an-open-source-nosql-database/</a>	M4
5.	<a href="https://www.tutorialspoint.com">https://www.tutorialspoint.com</a>	<a href="https://www.tutorialspoint.com/neo4j/index.htm">https://www.tutorialspoint.com/neo4j/index.htm</a>	M4
6.	<a href="https://livebook.manning.com">https://livebook.manning.com</a>	<a href="https://livebook.manning.com/book/making-sense-of-nosql/chapter-6/">https://livebook.manning.com/book/making-sense-of-nosql/chapter-6/</a>  <a href="https://medium.com/cracking-the-data-science-interview/an-introduction-to-big-data-nosql-96b882f35e50">https://medium.com/cracking-the-data-science-interview/an-introduction-to-big-data-nosql-96b882f35e50</a>	M5
7.	<a href="https://www.javatpoint.com">https://www.javatpoint.com</a>	<a href="https://www.javatpoint.com/nosql-databases">https://www.javatpoint.com/nosql-databases</a>  <a href="https://www.simplilearn.com/introduction-to-nosql-databases-tutorial-video">https://www.simplilearn.com/introduction-to-nosql-databases-tutorial-video</a>	M1 to M6
8.	<a href="https://opensourceforu.com">https://opensourceforu.com</a>  <a href="https://blog.trigent.com/">https://blog.trigent.com/</a>  <a href="https://subscription.packtpub.com/">https://subscription.packtpub.com/</a>	<a href="https://opensourceforu.com/2015/01/developing-applications-using-nosql-databases/">https://opensourceforu.com/2015/01/developing-applications-using-nosql-databases/</a>  <a href="https://blog.trigent.com/managing-documents-in-java-web-application-using-nosql-database-and-http-apis">https://blog.trigent.com/managing-documents-in-java-web-application-using-nosql-database-and-http-apis</a>  <a href="https://subscription.packtpub.com/book/web_development/9781849513623">https://subscription.packtpub.com/book/web_development/9781849513623</a>	M6

**S.E. Semester –IV**  
**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2023)**  
**TCET Autonomy scheme with effect from 2023-24**

<b>B.E (Information Technology)</b>					<b>SEM: IV</b>					
<b>Course Name: Computer Network</b>					<b>Course Code: PCC-IT 402</b>					
<b>Teaching Scheme (Program Specific)</b>					<b>Examination Scheme (Academic)</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/ Presentation (25)</b>	<b>Term Work (25)</b>	<b>Total</b>	
					<b>40</b>	<b>60</b>				
<b>Theory</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Contact Hours</b>	<b>Credits</b>	<b>IA</b>		<b>ESE</b>	<b>PR</b>	<b>TW</b>	
					<b>ISE</b>	<b>IE</b>				
3	-	2	5	4	20	20	60	25	25	<b>150</b>
<b>IA: In-Semester Assessment - Paper Duration – 1 Hour</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> Concept of Basic Communication and Network										
<b>RBT:</b> Revised Bloom's Taxonomy										

**Course Objective:** The course intends to deliver the fundamentals of computer networking and apply the knowledge of computer networks for analyzing various algorithms spread over various layer of OSI reference model.

**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	Describe the functions of each layer in OSI and TCP/IP model.	L1, L2
2	Understand the types of transmission media with real time applications.	L1, L2, L3
3	Describe the functions of data link layer and explain the protocol	L1, L2, L3
4	Classify the routing protocols and analyze how to assign the IP addresses for the given network.	L1, L2, L3, L4
5	Describe and analyze the Session layer design issues and Transport layer services.	L1, L2, L3, L4
6	Explain and analyze the functions of Application layer and Presentation layer paradigms and Protocols.	L1, L2, L3,L4

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

Module No.	Topics	Hrs.	Cognitive level of attainment as per Bloom's Taxonomy
1	<b>Introduction</b>	<b>04</b>	L1, L2
	Network Criteria, Peer to peer network, Client server network, Physical Structures and Network Types: LAN, MAN, WAN, Switching, protocol implementation issues - Quantitative performance metrics OSI Reference model, TCP/IP suite, Comparison of OSI and TCP/IP, Network devices. Network Applications.		
2	<b>The Physical Layer</b>	<b>06</b>	L1, L2, L3
	Bandwidth Utilization: Multiplexing, Transmission Media: Guided Media and Unguided Media, Introduction of 1G, 2G & 3G systems. Physical layer overview, Latency, Bandwidth, Delay		
3	<b>The Data Link Layer</b>	<b>12</b>	L1, L2, L3
	Wired Networks; Introduction: Nodes and Links, Two Types of Links, Two Sublayers, HDLC protocol: bit stuffing, byte stuffing and character stuffing Data Link Control: Flow Control and Error control protocols - Stop and Wait, Go-back-N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols - Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA		
4	<b>The Network Layer</b>	<b>10</b>	L1, L2, L3, L4
	Introduction: Network-Layer Services, Switching Techniques, Network Layer Protocols: IPv4 Datagram Format, IPv4 Addresses, Forwarding of IP Packets, ICMPv4 Address mapping – ARP, RARP, BOOTP and DHCP-Delivery, Forwarding and Unicast Routing protocols. Multicast Routing: Introduction, Multicasting Basics, Intra domain Routing Protocols, Inter domain Routing Protocols, Next generation IP: Packet Format, IPv6 Addressing, Transition from IPv4 to IPv6, Network Address Translation		
5	<b>The Transport Layer</b>	<b>08</b>	L1, L2, L3, L4
	Stop-and-Wait protocol, Go-Back-N protocol, Selective repeat protocol, Piggybacking. User Datagram Protocol: UDP Services, UDP Applications, UDP segment, Transmission Control Protocol: TCP Services, TCP Features, Segment, Three way hand shaking in TCP, TCP Timers. Quality of Service (QoS), QoS improving techniques - Leaky Bucket and Token Bucket algorithms.		
6	<b>Application layer</b>	<b>05</b>	L1, L2, L3, L4
	Introduction: Providing Services, Application layer Paradigms, Standard Client Server applications: World Wide Web (WWW) and HTTP, FTP, Domain Name System (DNS), SNMP, TELNET		

**List of Practical's/ 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>	Study & demonstration of basic networking commands.	2	L1, L2
2		Network System Administration: Understanding working of various networking devices using packet tracer software	2	L1, L2, L3
3	<b>Design Based Experiments</b>	Implementation of LAN topologies using Packet tracer	2	L1, L2, L3
4		Implementation of CRC technique using Scilab software	2	L1, L2, L3
5		Implementation of IP addressing ( first IP address and last IP address of a given Subnet)	2	L1, L2, L3, L4
6		Implementation of OSPF protocol using packet tracer	2	L1, L2, L3
7		Implementation of Network Address translation on packet tracer software	2	L1, L2, L3
8	<b>Advance Experiments (Based on Volumetric Analysis)</b>	Study & Analysis of TCP/IP header using Wireshark.	2	L1, L2, L3
9		Implement connection-oriented client server socket programming using TCP/IP.	4	L1, L2, L3, L4
10		Implementation of connectionless client server socket using UDP.	4	L1, L2, L3, L4
11	<b>Project Based Experiments- Group Activity)</b> (Students should complete any one project Based experiment from the list or any other project in discussion with Faculty in-Charge)	Case study to design and configure college network.	6	L1, L2, L3, L4, L5
<b>Total</b>			<b>30</b>	

**S.E. Semester –III**  
**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2023)**  
**TCET Autonomy scheme with effect from 2023-24**

<b>B.E (Information Technology)</b>					<b>SEM: IV</b>						
<b>Course Name : Environment Studies</b>					<b>Course Code: MC-401</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>OR/ PR</b>		<b>TW</b>	<b>25</b>
1	-	-	1	-	-	-	-	-		25	
<b>The weightage of marks for continuous evaluation of Term work/ Report:</b> Formative (40%), Timely completion of assignments (40%) and Attendance/Learning Attitude (20%)											
<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:**

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom’s Taxonomy
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		
	<b>Natural Resources</b>	3	L2,L3



2	<p>Renewable and non-renewable resources; Natural resources &amp; associated problem</p> <p>a. Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, case studies.</p> <p>b. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems.</p> <p>c. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.</p> <p>d. Food resources: World food problems overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.</p> <p>e. Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, case studies.</p> <p>f. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.</p> <p>Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.</p>		
3	<p><b>Ecosystems</b></p>	3	L3,L4
3	<p>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:</p> <p>a. Forest ecosystem</p> <p>b. Grassland ecosystem</p> <p>c. Desert ecosystem</p> <p>d. Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).</p>		
4	<p><b>Biodiversity and its conservation</b></p>	3	L3,L4
4	<p>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.</p>		
5	<p><b>Environmental Pollution</b></p>	2	L3,L4

6	<p>Causes, effects and control measures of:</p> <p>a. Air pollution</p> <p>b. Water pollution</p> <p>c. Soil pollution</p> <p>d. Marine pollution</p> <p>e. Noise pollution</p> <p>f. Thermal pollution</p> <p>g. Nuclear Hazards;</p> <p>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</p>		
6	<p><b>Social issues and environment</b></p>	2	L3,L4

	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		
--	--	--	--

**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.	NPTEL	<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 - IV**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2023)**  
**TCET Autonomy scheme with effect from 2023-24**

B. E. Information Technology					S.E. SEM: IV		
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	
-	-	-	120*	3	-	-	50
<b>AC- Activity evaluation TW – Term Work Examination</b> <b>* This is part of Summer Internship but can start in winter. Students may go up to 120 hrs. to acquire maximum 3 credits in Semester 4.</b>  <b>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.</b>							
<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 developed 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	
	<b>Inter disciplinary Internship</b>	L1, L2, L3

2	<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>	
3	<b>Industry Specific Internship</b>	L1, L2, L3
	<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 –IV**  
**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2023)**  
**Proposed TCET Autonomy Syllabus (w.e.f. A.Y. 2023-2024)**

<b>B.E. (Information Technology)</b>					<b>S.E. SEM : IV</b>			
<b>Course Name :</b> Professional Skills III(Dept Specific Skill - Cloud Infrastructure Analysis II)					<b>Course Code : HME –ITPS401</b>			
<b>Teaching Scheme (Program Specific)</b>					<b>Examination Scheme (Academic)</b>			
<b>Modes of Teaching / Learning / Weightage</b>					<b>Modes of Continuous Assessment / Evaluation</b>			
Theory	Tutorial	Practical	Contact Hours	Credits	Presentation	Report	TW	25
					AC	AC		
-	-	2	2	1	15	10	25	
<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: Computer Basics, Procedural Programming Languages, Infrastructure Security</b>								

**Course Objective**

The course aims to equip students with the skills and knowledge required to analyze, design, and manage scalable and secure cloud infrastructures, focusing on optimization, high availability, cost-efficiency, and the implementation of best practices across varied cloud environments.

**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	PO Mapping (Write only Number/s)	PSO Mapping (Write only Number/s)
1	Setting up the cloud Infrastructure Design Proficiency	L1-L6	1,2,3 8,9,10	2
2	Containerize and Orchestration Mastery	L1-L6	1,3,4,6-12	1,2
3	Create Infrastructure as Code Expertise	L1-L6	1-6, 8-12	2
4	Implement Cloud Security and Compliance Acumen	L1-L6	1-5, 9-12	2,3
5	Manage Performance Optimization and Cost Management Skills	L1-L6	1-7, 9-12	1,2
6	Implement Real-time Application Analysis and Cloud Solution Evaluation	L1-L6	1-5, 7-12	2

**List of Experiments:**

Sr. No.	Practical/Experiment topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1.	Creating and deploying a simple web application and Implementing auto-scaling policies for handling increased load	2	L1,L2.L3,L4,L5
2.	Setting up Virtual Private Cloud (VPC) or equivalent	2	L1,L2.L3,L4,L5,L6
3.	Creating subnets, route tables, and security groups.	2	L1,L4,L5,L6

4.	Configuring network access control lists (NACLs).	2	L1,L2.L3,L4,L5,L6
5.	Implement containerization on local environment	2	L1,L2.L3,L4,L5,L6
6.	Implement orchestration and automation container using Kubernetes container on local environment	2	L1,L2.L3,L4,L5,L6
7.	Develop a containerized application and deploy it on a cloud platform.	2	L1,L2.L3,L4,L5,L6
8.	IaC Tools: Terraform and CloudFormation, Creating and Managing Infrastructure with Terraform	2	L1,L2.L3,L4,L5,L6
9.	Cloud Monitoring and Performance Optimization, Logging and Tracing in Cloud Environments	2	L1,L2.L3,L4,L5,L6
10.	Managing Cloud Costs and Budgeting, Cloud Cost Optimization Strategies	2	L1,L2.L3,L5,L6
11.	Cloud Security Best Practices, Implementing Security Measures in Cloud	2	L1,L2.L3,L4,L5,L6
12.	Design and implement a multi-region, highly available cloud architecture using load balancing solutions (e.g., AWS Elastic Load Balancer).	2	L1,L2.L3,L4,L5,L6
13.	Create a Simple Chatbot using Lex service.	2	L1,L2.L3,L4,L5,L6
14.	Study and analysis cloud-based solution for any real time application (e.g., Finance, Healthcare etc )	2	L1,L2.L3,L4
	Mini Project	2	L1,L2.L3,L4,L5,L6
<b>Total Hrs.</b>		30	

**Online References:**

Sr. No.	Website Name	URL	Practicals
1	www.aws.amazon.com	<a href="https://docs.aws.amazon.com/">https://docs.aws.amazon.com/</a>	1-15
2	<a href="https://www.geeksforgeeks.org">https://www.geeksforgeeks.org</a>	<a href="https://www.geeksforgeeks.org/cloud-computing-infrastructure/">https://www.geeksforgeeks.org/cloud-computing-infrastructure/</a>	1-15
3	<a href="https://www.javatpoint.com">https://www.javatpoint.com</a>	<a href="https://www.javatpoint.com/cloud-service-models">https://www.javatpoint.com/cloud-service-models</a>	1-15

**S.E. Semester –IV**

**Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2023)  
 Proposed TCET Autonomy Syllabus (w.e.f. A.Y. 2023-2024)**

<b>B.E. (Information Technology)</b>					<b>S.E. SEM: IV</b>			
<b>Course Name: Industry Practice-II (Employability Skills)</b> (JavaScript/React)					<b>Course Code: HME -IP401</b>			
<b>Teaching Scheme (Program Specific)</b>					<b>Examination Scheme (Academic)</b>			
<b>Modes of Teaching / Learning / Weightage</b>					<b>Modes of Continuous Assessment / Evaluation</b>			
Theory	Tutorial	Practical	Contact Hours	Credits	Presentation	Report	T W	25
					AC	AC		
-	-	2	2	1	15	10	25	
<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: Computer Basics, Procedural Programming Languages</b>								

**Note:-** IP Syllabus is designed looking into the current market scenario & industry trends. In future contents may be revised based on industry requirements.

**Course Objective:** The course intends to make students learn how to make applications in Procedural & Object-Oriented Programming (OOP) in JavaScript. The course intends to develop expert level skills necessary for becoming technically skilled personnel.

**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	PO Mapping (Write only Number/s)	PSO Mapping (Write only Number/s)
1	Understand JavaScript variables and datatypes.	L1, L2	1-6,8-12	1,2
2	Use the concept of JavaScript Functions, DOM	L1, L2, L3	1-6,8-12	1,2,3
3	Implement JavaScript in Browser, Event/ Exception	L1, L2, L3	1-6,8-12	1,2,3
4	Comprehend concepts related to Create-React-App/npm	L1, L2	1-6,8-12	1,2
5	Apply the concepts of React Components, Virtual DOM	L1, L2, L3	1-6,8-12	1,2,3
6	Illustrate the concepts of Usestates, Rendering, Hooks	L1, L2, L3, L4	1-6,8-12	1,2,3,4

**Detailed Syllabus:**

Module No.	Topics	Hrs.	Self Study	Cognitive level of attainment as per Bloom's Taxonomy
1	<b>JS variables and datatypes</b>	05	2	L1, L2
	Introduction to Variables: Declaration and Naming Conventions. Data Types: Primitive Types, Objects, Type Coercion, Variable Scope. Working with Numbers and Boolean			
2	<b>JS Functions, DOM</b>	05	3	L1, L2, L3
	Introduction to Functions: Declaration, Expressions, Parameters, Arguments, Scope, Closures, Anonymous and Arrow Functions, Invocation and Execution. HTML DOM Revision, Accessing and Manipulating DOM Elements, Event Handling, Browser Compatibility and Cross-Browser Considerations.			
3	<b>JS in Browser, Event/Exception</b>	05	2	L1, L2, L3
	The Window Object, Working with the Document Object, Events in JavaScript, Event Object, Event Propagation and Event Delegation, Exception Handling and Error Types, Throwing and Catching Exceptions, Error Handling Best Practices, Debugging Tools, Asynchronous JavaScript			
4	<b>Create-React-App/npm</b>	05	2	L1, L2
	Setting up Create-React-App, Project Structure and Configuration, Development Workflow, package.json, npm Scripts, Adding and Using Third-Party Packages, Environment Variables, Updating Create-React-App			
5	<b>React Components, Virtual DOM</b>	05	3	L1, L2, L3
	React Components, Functional Components, Class Components, Props, State, Component Lifecycle, Handling Events, Conditional Rendering, Lists and Keys, Component Composition, React Fragments, Introduction to the Virtual DOM, Virtual DOM Reconciliation, Benefits of the Virtual DOM, Component Lifecycle and the Virtual DOM			
6	<b>Usestates, Rendering, Hooks</b>	05	3	L1, L2, L3
	Introduction to React Hooks, use State Hook, Rendering in React, Conditional Rendering with use State, Effect Hook, Managing Side Effects, Custom Hooks, Performance Optimization, Rules of Hooks, React DevTools			
	<b>Total Hours</b>	<b>30</b>	<b>15</b>	



**Text /Reference Books:**

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Eloquent JavaScript	Marijn Haverbeke	No Starch Press	Third	2018
2	JavaScript: The Good Parts"	Douglas Crockford	O'Reilly Media	First	2009
3	"You Don't Know JS" (series)	Kyle Simpson	O'Reilly Media	(multiple books with different years)	2014-15
4	"JavaScript: The Definitive Guide"	David Flanagan	O'Reilly Media	Seventh	2020
5	JavaScript and JQuery: Interactive Front-End Web Development"	Jon Ducket	Wiley	First	2014

**Online References:**

Sr. No.	Website Name	URL	ModulesCovered
1	www.w3schools.com	<a href="https://www.w3schools.com/js/DEFAULT.asp">https://www.w3schools.com/js/DEFAULT.asp</a>	M1-M5
2	www.w3schools.com	<a href="https://www.w3schools.com/html/default.asp">https://www.w3schools.com/html/default.asp</a>	M6
3	www.javatpoint.com	<a href="https://www.javatpoint.com/javascript-tutorial">https://www.javatpoint.com/javascript-tutorial</a>	M1-M5
4	www.geeksforgeeks.org/	<a href="https://www.geeksforgeeks.org/javascript/">https://www.geeksforgeeks.org/javascript/</a>	M1-M5

**S.E. Semester –IV**

Choice Based Credit Grading Scheme with Holistic Student Development (CBCGS-H 2020)

Proposed Syllabus under Autonomy Scheme based on Life skill topic : “Leadership and Excellence”.

<b>B.E. (Information Technology)</b>					<b>SEM: IV</b>					
<b>Course Name: Activity Based Learning</b>					<b>Course Code:HME-ABL401</b>					
<b>Contact Hours Per Week: 02</b>					<b>Credits: 01</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( 25)</b>	<b>Presentations (25)</b>		<b>Reports (25)</b>	<b>Total</b>	
<b>Theory</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Contact Hours</b>	<b>Credits</b>	<b>IA</b>	<b>ESE</b>	<b>(AC)</b>	<b>(AC)</b>	<b>50</b>	
-	-	2	2	1	-	-	25	25		
IA-In Semester Assessment -Paper Duration -1.5 Hours. ESC- End Semester Exam- Duration - 3 Hours. AC: Activity The weightage of marks for continuous evaluation of Term work : Formative (40%), Timely completion of practical ( 40%), and Attendance / Learning Attitude (20%).										
<b>Prerequisite:</b> 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..
- 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 society future in the area of work.

**Course Outcomes:**

SN	Course Outcome	Cognitive level attainment as per revised Bloom Taxonomy
1.	Students will be able to understand The Thematic Apperception Test, or TAT, a type of <u>projective test</u> that involves describing ambiguous scenes to learn more about a person's emotions, motivations, and personality.	L1, L2, L3
2.	Student will be able to learn on multidisciplinary subjects with an essence of team spirit. This will bring out the excellence attribute in students with updated awareness in technical topics listed in <b>Technology Vision -2035</b> related to their domains. They will explore of a real issue within a defined context, using a variety of data sources and present Case Study . They will be able to analyse a defined problem consisting in a real situation and use a real information as methodological tool.	L1, L2, L3
3.	Students will be able to outline the procedures for Brainstorming and demonstrate Technical discussion styles.	L1, L2, L3

4.	Student will in the process figure out the various benefits of Survey and also Work as a team and think in higher order which facilitate the creative problem-solving acumen in students to develop realistic solutions to complex problems in Technology vision -2035.	L1, L2, L3
5.	Students will be able to know the strengths of Drama/Skit understanding its effectiveness, generalizability, reliability, and versatility. Students will be able to make the awareness about various social issues.	L1, L2, L3
6.	Students will be able to communicate ideas and render and information to a group. A presentation carries the speaker's personality better and allows immediate interaction between all the participants.	L1, L2, L3

### Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive level attainment as per revised Bloom Taxonomy
1	<p><b>Personality Development &amp; Team Building ( a part of Student Leadership program)</b></p> <p><b>I. Word association (Test Sentence Building)</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</p> <p><b>II. Thematic Apperception Test (Short Story Writing)</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>Students are introduced to team concepts with four major insights: Setting goals, Role clarification, Problem solving and Interpersonal- relations. Students will be exposed via Team Rapport, to align the team members with the goal, to break the communication barriers.</p> <p><b>III.</b>To understand what team building is, team formation activities will be carried out with domain related topics distribution under Theme Technology Vision -2035.  <b>Evaluation by faculty as per format .</b></p>	4	L1, L2, L3
2	<p><b>Case Study or Story Writing</b></p> <p><b>I. Introduction Case study and Story weaving .</b> Types of case studies .            In the process of writing a case study paper, one need to have a least four sections in case study. These are the introduction, background information with reasons as to why the case study was formulated, presentation of findings and a conclusion. Problem identification; Domain linked problems that makes our Nation self reliant and sustainable can be chosen from listed topics and offer a suggestive solutions to it.</p> <p><b>II.Presentation:</b> Showcase the Problems You identified.            Tell the Story of your research Experience of topic chosen related to your domain..</p> <p><b>III. Topic: TECHNOLOGY VISION -2035</b>  <b>Introduction: “Technology Vision 2035,”</b> developed by the Technology Information, Forecasting and Assessment Council, claims to identify key challenges and needs of India and describe its technology capability landscape in 2035. It is important to understand the backstage process of participation in the development of this vision document, and bring forth the imagination of the citizen underlining the vision’s horizon. In the context of its “diversity” claims, it is essential to ask if one vision is really possible for such a huge and diverse country, or should we be talking, instead, of many visions, and a diversity of visions?</p> <p><b>II Domain wise distribution:</b>            The different branches can plan as per their domain knowledge or can be worked in multidisciplinary way in the form of case study .            Each Dept will pick domain wise topics listed in Technology vision 2035 booklet.</p>	6	L1, L2, L3

	<b>Evaluation by faculty as per format</b>		
3	<p><b>Brainstorming</b></p> <p><b>I. Introduction</b> to Brainstorming, Definition and types of Brainstorming          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 and the team for /against topic for 3 minute.</p> <p><b>II. Paraphrasing/summarizing.</b> Evaluation will be based on Creativity skills supported by listening and participating proactively by presentation of teams. Brain storming among the teams members sequentially, other teams will be audience to discussing team and vice versa. It's a team task .</p> <p><b>Evaluation by faculty as per format</b></p>	4	L1, L2, L3
4	<p><b>Survey Designing</b></p> <p><b>Introduction and Orientation</b> to research methodology emphasizing on survey designing. Surveys can be administered in many modes, including: online surveys, email surveys, social media surveys, paper surveys, mobile surveys, telephone surveys, and face-to-face interview surveys.          Select the topic of survey topic with feasible insight either from choice or in consultation with teacher. Discussion forum or Use of internet is allowed for the same. Its a team task.</p> <p><b>Structuring and Designing the Questionnaire</b>          Create the sample questionnaires(max 10) mapping with goal established          Interview the peer team members for data (all students should be asked.) Field survey topics can also be collected.</p> <p><b>II. Collection of the data</b> and use the tools for analyses of the survey incorporated if any. Finalizing the results          Data analyses in the form of written article and graphs projection for the same.          Presentation of survey results by teams          (a) Demonstration by students 4 teams          b) Presentation of another 4 teams          Submission of projects as hard copy          Evaluation by faculties</p>	6	L1, L2, L3
5	<p><b>Drama / Skit (with a connect to society )</b></p> <p><b>I. Introduction:</b> Drama/Learning Program contains three categories of drama objectives: <b>Self-Management, Collaborative, and Discipline-based Art Objectives.</b> Self-Management or Intrapersonal Objectives: in order to participate in drama, which feels like and looks like play, participants must also achieve self-discipline.          Drama enhances verbal and nonverbal expression of ideas. It improves voice projection, articulation of words, fluency with language, and persuasive speech. Listening and observation skills develop by playing drama games, being an audience, rehearsing, and performing.</p> <p><b>Evaluation by faculty as per format</b>          Based on video/types of video captured by students.</p>	6	L1,L2,L3
6	<p><b>Presentation and Report</b></p> <p><b>I.</b> Presentation will be a amalgamation of four modules, Case study , Brainstorming understanding , Survey and Drama/skit on the topic to connect to society .</p> <p><b>II.</b> Report writing in format.</p> <p><b>Evaluation by faculty as per format</b>          Based on Presentation and report written by students</p>	4	L1, L2, L3
	<b>Total Hours (15 hrs. conduct in class in 15 week semester +Self learning 15 hours )</b>	<b>30</b>	

### **Books and References:**

1. ADAIR. J., 1986. *Effective Teambuilding*. Aldershot: GowerCase study research book by Yin (1994).
2. Aronow, E., Weiss, K. A., & Rezinkoff, M. (2001). *A Practical Guide to the Thematic Apperception Test*. Philadelphia: Brunner Routledge.
3. Territorial Army Officers Exams eBook – [3000+ Questions ...books.google.co.in > books SSB Crack
4. A standard text for anyone wanting to do case study research is the book by Yin (1994). Two important methodological articles on the case study method in the IS field are those by Benbasat et al. (1987) and Lee (1989). One of the most cited empirical examples of case study research in Information Systems is the article by Markus (1983).
5. Gerring, John (2007). *Case Study Research: Principles and Practices*. Cambridge University Press. pp. 1, 19–20. ISBN 978-0-521-85928-8.
6. Nijstad, B. A., Stroebe, W., & Lodewijkx, H. F. (2006). The illusion of group productivity: A reduction of failures explanation. *European Journal of Social Psychology*, 36(1), 31-48.
7. Agboola Sogunro, O. (2004). Efficacy of role-playing pedagogy in training leaders: some reflections. *Journal of Management Development*, 23(4), 355–371. <https://doi.org/10.1108/02621710410529802>
8. Cambridge Guide to Theatre. PN2035 .C27 1995 | 2nd floor Reference.