Vidyalankar Institute of Technology

An Autonomous Institute affiliated to University of Mumbai

Bachelor of Technology

in

Computer Engineering

Second Year Scheme & Syllabus

(As per NEP 2020, with effect from the Academic Year 2024-25)

Preamble

The National Education Policy 2020 compliant VIT-2023 curriculum envisions an education system rooted in India's rich heritage, fostering creativity, critical thinking, and holistic development in learners. Guided by the principles of equity, inclusion, and excellence, this curriculum is designed to empower students with the knowledge, skills, values, and attitudes necessary for the 21st century.

This curriculum aims to create a robust, flexible, and multidisciplinary educational experience that nurtures the intellectual, emotional, social, and ethical dimensions of learners. By fostering curiosity and a lifelong love for learning, it seeks to prepare students to thrive in a dynamic and interconnected world, contribute meaningfully to society, and achieve their full potential.

Grounded in the values of respect, empathy, and responsibility, this curriculum supports the development of learners who are not only academically proficient but also socially aware and culturally rooted. It emphasizes the importance of environmental sustainability, digital literacy, and global citizenship, ensuring that students are equipped to navigate the challenges and opportunities of the future.

The multidisciplinary approach will encourage learners to follow their passion and inherent interests. The learner is free to learn at a pace that he is comfortable with, and this enables lifelong learning. It also enhances the scope for holistic personality development.

This premise is truly reflected in preamble of the NEP document, "The future of nation is decided in the classrooms of the schools and colleges today".
This curriculum consists of vertical Program Courses which includes core courses (PCC) of branch of engineering positioned and sequenced to achieve sequential and integral learning of the entire breadth of the specific branch. This vertical also includes Professional elective courses (PEC) which offer flexibility and diversity to learners to choose specialization from a basket of recent developments in their field of technology. The selection of unique professional elective courses based on industrial requirements and organizing them into tracks is a special feature of this curricula ensuring employability. The vertical Multidisciplinary Courses consists of Open Elective (OE) courses and multidisciplinary minor (MD M) courses. Special vocational and skill development courses are included as a part of Skill courses vertical that make student capable to work in industrial environment.

The student is expected to demonstrate their ability through courses in Experiential Learning Courses vertical like internships/On Job Training, Community Engagement Project, Real Industry Project/ research problem. Our curriculum also introduces Social Service Internship and Internship with institutes abroad along with courses like Design Thinking. This will lead to the creation of products and/ or patents through this program. For holistic development of students, apart from technical courses, Ability Enhancement Courses, Entrepreneurship/Economics/Management Courses, Indian Knowledge System and Value Education courses from vertical Humanities and Social Science and Management develop the required soft- skills and attitude amongst learners.

In Liberal Learning vertical courses like Various Dance Forms, Global citizenship Education, Facets of Astronomy etc. aim to create balance in brain hemispheres and hence improve learners' clarity in thoughts and responses.

Additionally, curriculum provides add-on Honors/Minor degree that involves field/ domain study. Learner can avail this degree by completing requirement of additional 18 credits.
Thus, the academic plan of VIT envisages a shift from summative to formative and competency-based learning system which will enhance learner's ability towards higher education, employability and entrepreneurship.

Chairman, Board of Studies
Department of Computer Engineering
Vidyalankar Institute of Technology

Chairman, Academic Council
Vidyalankar Institute of Technology

Second Year B. Tech. Computer Engineering **Preferred Semester: III**

Course Structure and Assessment Guidelines

NEP-Vertical	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
BSC	BS41	Engineering Mathematics-III	Theory	3	20	30	50	100
PC_PCC	CE02T	Microprocessor	Theory	2	15	20	40	075
PC_PCC	CE02P	Microprocessor Lab	Practical	1	25	-	25	050
PC_PCC	CE04T	Analysis of Algorithms	Theory	2	15	20	40	075
PC_PCC	CE04P	Analysis of Algorithms Lab	Practical	1	25	-	25	050
PC_PCC	CE05T	Database Management Systems	Theory	2	15	20	40	075
PC_PCC	CE05P	Database Management Systems Lab	Practical	1	25	-	25	050
CEP/FP	GESB01	Social Service Internship/ Project	Practical	3	As per course			
MDM	XX*	Multidisciplinary Elective 1	Theory	2	As per course			
HSSM_AEC	HS04	Presentation Skills	Practical	1	50	-	-	050
HSSM_IKS	GEXXX*	Any HSSM_IKS course	Theory	2	25	-	50	075
Total Credits				**20**				

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESE= End Semester Examination

*Selection based on the subset of courses made available by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Elective Courses (XX) under Multidisciplinary Minor

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	BS17	Biology	2	-	-	2	3
2	BS19	Chemistry	2	-	-	2	3
3	GESB07	Psychology	2	-	-	2	Any
4	GENS02	Modern Farming	2	-	-	2	Any

Elective Courses (GEXXX) under HSSM_IKS

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GEA03	Exploring Indian Art	2	-	-	2	Any
2	GESB03	Indian Traditional Knowledge System	2	-	-	2	Any
3	GEPS01	Indian Constitution	2	-	-	2	Any

Second Year B. Tech. Computer Engineering **Preferred Semester: IV**

Course Structure and Assessment Guidelines

NEP-Vertical	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing @40% of total marks)
	Code	Name			ISA	MSE	ESE	
BSC	BS42	Engineering Mathematics-IV	Theory	3	20	30	50	100
PC_PCC	CE06T	Computer Graphics	Theory	2	15	20	40	075
PC_PCC	CE06P	Computer Graphics Lab	Practical	1	25	-	25	050
PC_PCC	CE07T	Operating Systems	Theory	2	15	20	40	075
PC_PCC	CE07P	Operating Systems Lab	Practical	1	25	-	25	050
PC_PCC	CE09	Theory of Computer Science	Theory+ Tutorial	3	40	20	40	100
PC_PCC	CE11T	Computer Networks	Theory	2	15	20	40	075
PC_PCC	CE11P	Computer Networks Lab	Practical	1	25	-	25	050
SC_VSEC	ES11	Python Programming	Practical	2	50	-	25	075
HSSM_VEC	HS02T	Professional Skill	Theory	2	15	20	40	075
HSSM_VEC	HS02P	Professional Skill Lab	Practical	1	25		25	050
Total Credits				**20**				

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESE= End Semester Examination

*Selection based on the subset of courses made available by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed syllabus of Second Year Semester-III

Course Name: Engineering Mathematics-III (Discrete Mathematics)

Course Code: BS41

Category: Basic Science (BS)

Preamble:

This course introduces students to various discrete structures concepts that is helpful for understanding many fundamental topics in computer science.

Pre-requisites:

Nil

Course Objectives:

- Understand the notion of mathematical thinking, mathematical proofs and to apply them in problem solving.
- Students will acquire a comprehensive understanding of relations and functions which play crucial roles in computer science across various domains.
- Understand the use of graph theory in programming applications.
- Understand the concept of groups and cyclic group.
- Understand the concept codes in Encoding-Decoding function.
- Apply the Number Theory to different applications using theorem

Course Outcomes:

Student will be able to:

CO1: Use the basic principles of sets and operations in sets and apply counting principles to determine probabilities

CO2: Apply relations and to determine their properties

. CO3: Interpret different traversal methods for trees and graphs. Model problems in Computer Science using graphs and trees.

CO4: Use the properties of algebraic structures

CO5: Understand the concept codes in Encoding-Decoding function.

CO6: Apply the Number Theory to different applications using theorem

Course Scheme:

Contact Hours		**Credits Assigned**	
Theory	Practical	Theory	Practical
3	0	3	0

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	20	30	50	100

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Set Theory and Counting Techniques	• Definition and Representation of Sets • Types of sets, Operations on Sets • Laws of Set • Principle of Inclusion & Exclusion (3 sets) • Partition of set, Counting Principle • Pigeonhole Principle • Mathematical Induction	6
2	Relations and Functions	• Definition of Relation • Representation & Properties of Relation • Closure properties of Relation (Reflexive, Symmetric and Transitive) • Partial Order and Equivalence Relation. • Composite and Circular Relation. • Definition of Function, Types of Function • Inverse Function, Composite Functions.	8
3	Graph Theory	• Definition of Graph • Types of Graphs, Graph Representation Techniques • Sub Graphs, Operations on Graphs • Walk, Path and Circuit • Connected and Disconnected Graph • Homomorphism and Isomorphism of Graphs • Euler and Hamiltonian Graphs • Planar Graph • Cut Set, Cut Vertex	8
4	Algebraic Structures	• Algebraic structures with one binary operation • Groupoid- Closure Axiom property, • Semigroup- Groupoid with Associative Property • Monoid- Semigroup with identity element property • Group- Monoid with Inverse Element Property • Abelian Group- Commutative Group • Cyclic groups- Group with Generator Element • Order and subgroup • Group Homomorphism, Isomorphism and Automorphism.	8

5	Coding and Decoding theory	• Coding theory: Definition of encoding function, weight, Hamming Distance, Error Detection and Correction • Group codes, with Composition Table • Minimum distance, error detection and correction • Parity Check Matrix to Encoding Function Generation • Maximum Like hood Decoding Technique to Decode give codeword using Encoding Function	6
6	Number Theory	• Modular Arithmetic, Divisibility Arithmetic • Euclid Algorithm • Prime Number Theorem • Euler's Theorem • Fermat's Little Theorems • Congruences in Number Theory • Computing Inverse in Congruences • Chinese Remainder Theorem	9
Total			**45**

Text Books:

1. C. L. Liu, "Elements of Discrete Mathematics", TMH, ISBN 10:0-07-066913-9.
2. N. Biggs, "Discrete Mathematics", 3rd Ed, Oxford University Press, ISBN 0 –19-850717–8.
3. Kenneth H. Rosen, "Discrete Mathematics and its Applications", Tata McGraw-Hill, ISBN 978- 0-07-288008-3
4. Cryptograph and Network Security by B. A. Forouzan & D. Mukhopadhyay, 11th edition, McGraw Hill Publication.
5. K.C. Chaudhary, A First Course in Number Theory, Asian Books Private Limited

Reference Books:

1. Bernard Kolman, Robert C. Busby and Sharon Ross, "Discrete Mathematical Structures", Prentice-Hall of India /Pearson, ISBN: 0132078457, 9780132078450.
2. Narsingh Deo, "Graph with application to Engineering and Computer Science", Prentice Hall of India, 1990, 0 – 87692 – 145 – 4.
3. Eric Gossett, "Discrete Mathematical Structures with Proofs", Wiley India Ltd, ISBN:978-81- 265-2758-8.
4. Sriram P. And Steven S., "Computational Discrete Mathematics", Cambridge University Press, ISBN 13: 978-0-521-73311-3.
5. Elementary Number Theory and its applications by Kenneth H. Rosen, 5th edition, Addison Wesley Publication.

Course Name: Microprocessor

Course Code: CE02T

Category: Core

Preamble:

This course is an introductory course to understand the working of the microprocessor. To introduce students to assembly language programming and to explain how the peripherals are connected to the processor. This will serve as a foundation for advanced studies in Hardware design and Embedded System Design.

Course Pre-requisite:

1. ES06T (Fundamentals of Computer Hardware and Networking)
2. ES07T (Fundamentals of Logic Circuits)

Course Objectives:

- To develop background knowledge and core expertise in Microprocessor
- To study the concepts and basic architecture of 8086 microprocessor
- To know the importance of different peripheral devices and their interfacing with 8086
- To appreciate the architecture of advanced microprocessors

Course Outcomes:

After successful completion of the course students will be able to:

CO1: Understand the basics of RISC & CISC architecture and 8086 microprocessor.

CO2: Apply concept of assembly language programming to develop simple application programs.

CO3: Analyze and understand the necessity of the peripheral chips.

CO4: Design simple microprocessor-based system with memory & I/O devices.

CO5: Appreciate and understand the advantages of advanced microprocessors.

Course Scheme:

Contact Hours		**Credits Assigned**	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	**ISA**	**MSE**	**ESE**	**Total**
Theory	15	20	40	75

Detailed Syllabus:

Module No.	Module Name	Contents	Hours
1	Introduction to Microprocessor	Fundamental Units of a Computer	04
		Introduction to Buses	
		Compare RISC & CISC architecture	
		Basic concept of – Clock cycle, Machine cycle, Instruction cycle	
2	8086 Architecture and PIN configuration	8086 - Bus Interface Unit, Control unit, Programmers Model	06
		Concept of Segmentation, Physical Address, Logical Address	
		8086 – Pin description, Power on and manual Reset ckt., Minimum and Maximum Modes,	
3	8086 Addressing Modes & Instruction set	8086- Addressing Modes	06
		8086 - Instruction set	
		Assembler directives and assembly language programming with 8086	
4	Peripheral Chips	Concept of parrel peripheral interface and study of 8255 (PPI)	06
		Interrupt structure of 8086 and study of 8259 (PIC)	
		Concept of DMA and study of 8237 (DMAC)	
5	8086 Based System Design	Address decoders for memory interfacing	04
		Interfacing of RAM, EPROM, and I/O chips with 8086	
6	Advanced Microprocessors	Introduction to the architecture of Pentium Processor and concept of Superscalar Architecture	04
		Comparative study of salient features of 8086, 80186, 80286, 80386, 80486 and Pentium processor.	
		Total	**30**

Text Books:

1. Douglas Hall, 'Microprocessors and Interfacing', TMH 2005
2. John Uffenbeck, '8086 Family: Design, programming and interfacing', PH, 2001
3. Barry Brey, 'The intel microprocessor 8086/8088,80186/8088,80286,80386,80486, Pentium and Pentium Pro Processor architecture, programming and interfacing', PHI1997

Course Name: Microprocessor Lab

Course Code: CE02P

Category: Core

Preamble:

A professional in any field of computing should not regard the computer as just a black box that executes programs by magic. All students of computing should acquire some understanding and appreciation of a computer system's functional components, their characteristics, their performance, and their interactions. Students need to understand the addressing modes, instruction set of a microprocessor and should be able to develop simple application programs.

Course Pre-requisite:

1. ES06P (Fundamentals of Computer Hardware and Networking Lab)
2. ES07P (Fundamentals of Logic Circuits Lab)

Course Objectives:

- To introduce learners with instruction set of a microprocessor.
- To introduce learners with enough assembly language to enhance their knowledge on today's most widely used microcomputer family.
- To Improving learners systems programming skills through programming exercises carried out by students.
- Learners are expected to implement solutions to problems using the concepts they will take through the course.

Course Outcomes:

After successful completion of the course students will be able to:
CO1: Understand instruction set/format of a microprocessor.
CO2: Understand concept of assembly language programming.
CO3: Develop assembly language program for simple applications.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

Suggested list of Practicals:

Sr. No.	Practicals

1	Introduction to assembler directives
2	Introduction to assembler like TASM, MASM etc.
3	ALP using ADD, SUB, MUL, DIV instructions
4	ALP using AND, OR, XOR instructions
5	ALP for BCD to ASCII & ASCII to BCD conversion
6	ALP for HEX to ASCII & ASCII to HEX conversion
7	ALP to find out smallest & largest of the array
8	ALP to sort the array in ascending & descending order
9	ALP using BIOS routine for keyboard interface
10	ALP using BIOS routine for display interface

Reference Books:

1. Douglas Hall, 'Microprocessors and Interfacing', TMH 2005

2. John Uffenbeck, '8086 Family: Design, programming and interfacing', PH, 2001

3. Barry Brey, 'The intel microprocessor 8086/8088,80186/8088,80286,80386,80486, Pentium and Pentium Pro Processor architecture , programming and interfacing', PHI1997

Course Name: Analysis of Algorithms

Course Code: CE04T

Category: Core

Preamble:
The course covers the fundamental principles and techniques used in designing and analyzing algorithms. Students will learn how to analyze the performance of algorithms, measure their efficiency, and compare different algorithms based on their time and space complexity. The course is designed for students with a solid understanding of programming and data structures. By the end of the course, students will have a deep understanding of the principles of algorithm design and analysis and will be equipped with the tools and techniques necessary to develop efficient algorithms for a wide range of computational problems.

Pre-requisites:

1. CE01T (Data Structures)

Course Objectives:

- To provide a deep understanding of algorithmic design and analysis techniques that enable the development of efficient and effective algorithms for solving computational problems.
- To develop a strong foundation in the theory of algorithms, including concepts such as time and space complexity, algorithmic paradigms, data structures, graph algorithms, sorting and searching, and dynamic programming.
- To equip students with the tools and techniques necessary to compare and evaluate the performance of different algorithms and choose the best algorithm for a given problem.
- To provide students with the knowledge and skills required for a successful career in software development, data analysis, and other fields that require strong analytical and problem-solving abilities.

Course Outcomes:

Learner will be able to:
CO1: Analyze the time and space complexity of algorithms.
CO2: Apply and Analyze Divide and Conquer strategy to solve given problems.
CO3: Apply and Analyze Greedy strategy to solve given problems.
CO3: Apply and Analyze Dynamic Programming strategy to solve given problems.
CO4: Apply and Analyze Backtracking, Branch and Bound strategy to find solution for the given problems.
CO5: Classify a problem as computationally tractable or intractable and discuss strategies to address intractability.

Course Scheme:

Contact Hours		**Credits Assigned**	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	75

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Introduction to Algorithm Analysis	Performance analysis: Space, and Time complexity, Growth of function. Asymptotic Notations: Big-Oh, Omega Theta notation. Analysis of selection sort, insertion sort and Naïve String-Matching Algorithm. Recurrences: The substitution method, Recursion tree method, Master method.	8
2	Divide and Conquer Approach	General method, Analysis of Merge sort and Quick sort, Finding minimum and maximum algorithms and their Analysis, Analysis of Binary search.	4
3	Greedy Method Approach	General Method, Analysis of Minimum cost spanning trees: Kruskal and Prim's algorithm, Single source shortest path: Analysis of Dijkstra's Algorithm, Fractional Knapsack Problem and Job Sequencing with Deadlines	6
4	Dynamic Programming Approach	General Method, Finding nth term in Fibonacci series, Single Source Shortest Path: Bellman Ford Algorithm All Pair Shortest Path: Floyd Warshall's Algorithm, Longest Common Subsequence,0/1 Knapsack Problem, Matrix Chain Multiplication and Sum of Subset Problem.	7
5	Backtracking and Branch and Bound	General Method, Backtracking: N-queen problem, Graph Coloring. Branch and Bound: 15 Puzzle problem, Travelling Salesperson Problem	3
6	Introduction to Complexity Theory	The class P and NP. Polynomial reduction. NP-Complete Problems. NP-Hard Problems	2
Total			**30**

Text Books:

1. T. H. Cormen, C.E. Leiserson, R. L. Rivest, and C. Stein, "Introduction to algorithms", 2nd Edition, PHI Publication 2005.
2. Jon Kleinberg, Eva Tardos "Algorithm Design", Pearson Education.

3. Ellis Horowitz, Sartaj Sahni, S. Rajsekaran. “Fundamentals of computer algorithms” University Press.

Reference Books:

1. Sanjoy Dasgupta, Christos Papadimitriou, Umesh Vazirani, “Algorithms”, Tata McGraw-Hill Edition.
2. S. K. Basu, “Design Methods and Analysis of Algorithm”, PHI.

Course Name: Analysis of Algorithms Lab

Course Code: CE04P

Category: Core

Preamble:
The course covers the fundamental principles and techniques used in designing and analyzing algorithms. Students will learn how to analyze the performance of algorithms, measure their efficiency, and compare different algorithms based on their time and space complexity. The course is designed for students with a solid understanding of programming and data structures. By the end of the course, students will have a deep understanding of the principles of algorithm design and analysis and will be equipped with the tools and techniques necessary to develop efficient algorithms for a wide range of computational problems.

Pre-requisites:

- CE01P (Data Structures Lab)

Course Objectives:

- To introduce the methods of designing and analyzing algorithms.
- Design and implement efficient algorithms for a specified application.
- Strengthen the ability to identify and apply suitable algorithms for the given real-world problem.
- Analyze worst-case running time of algorithms and understand fundamental algorithmic problems.

Course Outcomes:

At the end of the course, the students will be able to
CO1: Implement the algorithms using different approaches.
CO2: Analyze the complexities of various algorithms.
CO3: Apply and Analyze Greedy strategy to solve given problems.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	--	25	50

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Suggested List of Practical's:

Sr No.	Suggested Topic(s)
1.	Introduction: Selection sort, Insertion sort
2.	Divide and Conquer Approach:

	Finding Minimum and Maximum, Merge sort, Quick sort, Binary search
3.	Greedy Method Approach: Single source shortest path- Dijkstra Fractional Knapsack problem Job sequencing with deadlines Minimum cost spanning trees-Kruskal and Prim's algorithm
4.	Dynamic Programming Approach: Single source shortest path- Bellman Ford All pair shortest path- Floyd Warshall 0/1 knapsack Longest common subsequence
5.	Backtracking: N-queen problem Graph coloring

Text Books:

1. T. H. Cormen, C.E. Leiserson, R. L. Rivest, and C. Stein, "Introduction to algorithms", 2nd Edition, PHI Publication 2005.
2. Jon Kleinberg, Eva Tardos "Algorithm Design", Pearson Education.
3. Ellis Horowitz, Sartaj Sahni, S. Rajsekaran. "Fundamentals of computer algorithms" University Press.

Reference Books:

1. Sanjoy Dasgupta, Christos Papadimitriou, Umesh Vazirani, "Algorithms", Tata McGraw-Hill Edition.
2. S. K. Basu, "Design Methods and Analysis of Algorithm", PHI.

Course Name: Database Management System

Course Code: CE05T

Category: Core

Preamble:

The goal of the course is to introduce the students to relational database design. This course covers the design and implementation of databases using SQL commands.

Pre-requisites:

CE01T (Data Structure)

Course Objectives:

- Develop entity relationship data model and its mapping to relational model.
- Learn relational algebra and Formulate SQL queries.
- Apply normalization techniques to normalize the database.
- Understand concept of transaction, concurrency control and recovery techniques.

Course Outcomes:

Learner will be able to:
CO1: Recognize the need of database management system.
CO2: Design ER and EER diagram for real life applications.
CO3: Construct relational model and write relational algebra queries.
CO4: Formulate SQL queries.
CO5: Apply the concept of normalization to relational database design.
CO6: Describe the concept of transaction, concurrency and recovery.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of Hours
1	Introduction Database Concepts	Introduction, Characteristics of databases, File system v/s Database system,	2

		Data abstraction and data Independence, DBMS system architecture, Database Administrator	
2	Entity–Relationship Data Model	The Entity-Relationship (ER) Model: Entity types: Weak and strong entity sets, Entity sets, Types of Attributes, Keys, Relationship constraints: Cardinality and Participation, Extended Entity-Relationship (EER) Model: Generalization, Specialization and Aggregation	4
3	Relational Model and relational Algebra	Introduction to the Relational Model, relational schema and concept of keys. Mapping the ER and EER Model to the Relational Model, Relational Algebra-operators, Relational Algebra Queries.	6
4	Structured Query Language (SQL)	Overview of SQL, Data Definition Commands, Integrity constraints: key constraints, Domain Constraints, Referential integrity, check constraints, Data Manipulation commands, Data Control commands, Set and string operations, aggregate function-group by, having, Views in SQL, joins, Nested and complex queries, Triggers	6
5	Relational-Database Design	Pitfalls in Relational-Database designs, Concept of normalization, Function Dependencies, Armstrong Axioms of functional dependency, Closure set of attributes, Equivalence of Functional dependency, First Normal Form, 2NF, 3NF, BCNF	6
6	Transactions Management and Concurrency and Recovery	Transaction concept, Transaction states, ACID properties, Transaction Control Commands, Concurrent Executions, Serializability-Conflict and View, Concurrency Control: Lock-based, Timestamp-based protocols, Recovery System: Log based recovery, Deadlock handling	6
Total			**30**

Text Books:

1. Korth, Slberchatz, Sudarshan, Database System Concepts, 6thEdition, McGraw Hill
2. Elmasri and Navathe, Fundamentals of Database Systems, 5thEdition, Pearson Education
3. Raghu Ramkrishnan and Johannes Gehrke, Database Management Systems, TMH

Reference Books:

1. Peter Rob and Carlos Coronel, Database Systems Design, Implementation and Management Thomson Learning, 5thEdition.
2. Dr. P.S. Deshpande, SQL and PL/SQL for Oracle 10g, Black Book, Dream Tech Press.
3. G. K. Gupta, Database Management Systems, McGraw Hill, 2012

Course Name: Database Management System Lab

Course Code: CE05P

Category: Core

Preamble:

The goal of the course is to introduce the students to relational database design. This course covers the design and implementation of databases using SQL commands.

Pre-requisites:

CE01P (Data Structure Lab)

Course Objectives:

- To explore design and develop of relational model.
- To present SQL and procedural interfaces to SQL comprehensively
- To introduce the concepts of transactions and transaction processing

Course Outcomes:

Learner will be able to:

CO1: Design ER /EER diagram and convert it to relational model for the real world application.
CO2: Apply DDL, DML, DCL and TCL commands.
CO3: Write simple and complex queries.
CO4: Use PL / SQL Constructs.
CO5: Demonstrate the concept of concurrent transactions execution and frontend-backend connectivity.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Suggested List of practicals

Sr. No.	Suggested Topic(s)

1	Identify the case study and detail statement of problem. Design an Entity-Relationship (ER) / Extended Entity-Relationship (EER) Model.
2	Mapping ER/EER to Relational schema model
3	Create a database using Data Definition Language (DDL) and apply integrity constraints for the specified System
4	Apply DML Commands for the specified system
5	Perform Simple queries, string manipulation operations and aggregate functions.
6	Implement various Join operations.
7	Perform Nested and Complex queries
8	Perform DCL and TCL commands
9	Implementation of Views and Triggers.
10	Demonstrate Database connectivity

Text Books:

1. Korth, Slberchatz, Sudarshan, Database System Concepts, 6thEdition, McGraw Hill
2. Elmasri and Navathe, Fundamentals of Database Systems, 5thEdition, Pearson Education
3. Raghu Ramkrishnan and Johannes Gehrke, Database Management Systems, TMH

Reference Books:

1. Peter Rob and Carlos Coronel, Database Systems Design, Implementation and Management Thomson Learning, 5thEdition.
2. Dr. P.S. Deshpande, SQL and PL/SQL for Oracle 10g, Black Book, Dream Tech Press.
3. G. K. Gupta, Database Management Systems, McGraw Hill, 2012

Course Name: Social Service Internship/Project

Course Code: GESB01

Category: CEP/FP

Preamble:

This course is designed to empower and equip students with the knowledge, skills, and experiences necessary to make a meaningful impact through fieldwork. This program is not only an opportunity for students to gain practical experience in the field of social work to address environmental issues but also a chance to develop a deeper understanding of the social issues that affect our communities. Students will engage in a variety of activities, including direct service, advocacy, community outreach, and sustainable solution development. These experiences will give students a comprehensive view of the social service landscape, fostering personal and professional growth.

Pre-requisites:

Nil

Course Scheme:

Contact Hours		**Credits Assigned**	
Theory	Practical	Theory	Practical
-	2*+4**	-	3

Assessment guidelines:

Head of Learning	**ISA**	**MSE**	**Field Work**	**Total**
Practical	50***	-	50	100

*Weekly reporting
**Fieldwork
***Report and Presentation of Fieldwork

Course Name: Biology

Course Code: BS17

Category: MDM

Preamble:

This course introduces students to virology and its related terms and concepts. It also introduces basic concepts of the nervous system, biological immune system, and computational neuroscience. This course will help the learners understand the mathematical models that are inspired from the corresponding biological models/processes and are extensively used in machine learning, deep learning, artificial immune system, computer security, artificial intelligence, etc.

Pre-requisites:

Nil

Course Objectives:

- Enable the learner to understand the concepts of virology.
- Enable the learner to understand the structure and functioning of the nervous system.
- Enable the learner to understand basics of natural immune systems.
- Enable the learner to understand basics of computational neuroscience.
- Enable the learner to understand the derivation of mathematical models from their biological counterparts.

Course Outcomes:

Learner will be able:

CO1: To develop an understanding of virology.

CO2: To understand the structure and functioning of biological nervous system.

CO3: To understand Principles of natural immune system.

CO4: To understand working principles of biological neural system.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology

for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of Hours
1	Virology	Virus structure and morphology. Viruses of veterinary importance. Important virus families, their replication strategies, pathogenicity and transmission of viruses. Plant viruses, plant virus propagation. Bacteriophages, bacteriophage propagation viroids	5
2	Nervous System	Neuron structure, anatomy in vertebrates: central & peripheral Nervous systems, Functions of the Nervous system: Neurons & Synapses, Neural circuits and systems, Reflexes & other stimulus response circuits, Intrinsic pattern generation	5
3	Immunology	Introduction and history; Components of Immune system: Innate & Adaptive. Primary and secondary organs of the immune system, Cells of the immune system	5
4	Computational Neuroscience-I Single Neuron Modeling	Ion flux in membranes, Nernst Planck Equation, Ion-Channels, Excitable membranes, Spiking, Hodgkin Huxley models, Integrate and Fire Neurons	5
5	Computational Neuroscience-II Neural Encoding and Decoding	Spike train statistics, Receptive fields, Linear and Nonlinear models of Receptive fields, Applications of Information Theory in neural coding and decoding	5
6	Computational Neuroscience-III Plasticity: Adaptation and Learning	Synapses: structure and function, plasticity, Spike Timing Dependent Plasticity (STDP), Learning rules, Supervised and Unsupervised Learning, Classical conditioning, Reinforcement Learning.	5
Total			**30**

Textbooks:

1. Fields Virology Vol 1 and 2. B.N. Fields, D.M. Knipe, P.M. Howley, R.M. Chanock, J.L. Melnick, T.P. Monath, B. Roizman, and S.E. Straus, eds.), 3rd Edition. Lippincott-Raven, Philadelphia, PA.
2. Principles of anatomy & physiology, Tortora & G.J.Derricson, J. Willey publication (15th edition)
3. Dayan, Peter, and L. F. Abbott.Theoretical Neuroscience: Computational and Mathematical Modeling of Neural Systems. Cambridge, MA: MIT Press, 2001. ISBN: 9780262041997.

Reference Books:

1. Principles of Virology: Molecular Biology, Pathogenesis, and Control of Animal Viruses. S. J. Flint, V. R. Racaniello, L. W. Enquist, V. R. Rancaniello, A. M. Skalka. Latest edition / Pub. Date: December 2003 Publisher: American Society Microbiology--- Chapters 3-13.
2. Nervous system, Columbia Encyclopedia. Columbia University Press

Course Name: Chemistry

Course Code: BS19

Category: MDM

Preamble:

This course of Chemistry imparts the students sound knowledge on the principles of chemistry involving different application-oriented topics required in technology & engineering.

Pre-requisites:

Nil

Course Objectives:

- The contents of this course will aid in quantification and understand the applications of several concepts in Chemistry.
- To appreciate the need for and importance of engineering chemistry for industrial and domestic use.
- To gain knowledge on existing and future upcoming materials used in device fabrication.
- To impart knowledge of green chemical technology and its applications.
- To enhance the thinking capabilities in line with the modern trends in engineering and technology.

Course Outcomes:

Learner will be able:
CO1: Interpret properties, synthesis, and uses of important materials in various engineering applications.
CO2: Apply the fundamentals of electrochemistry in prevention & control measures related to corrosion of structures and devices.
CO3: Associate Green Chemistry principles in product development knowledge.
CO4: Students will be able to perform standard computational chemistry tasks.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology

for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of Hours
1	Engineering Materials- Nanomaterials & Composite Materials	Advanced polymeric materials: Advanced polymeric materials: Conducting polymers- Polypyrrole, Polyaniline, polythiophene, (properties & applications), Light Emitting polymers (LEPs), Liquid crystal properties. In computers- electronics engineering materials used in computers Nanomaterials: Introduction, Fullerenes, Carbon nanotubes, Nanowires, Electronic and mechanical properties, Applications of nanomaterials - Catalysis, Electronics & Telecommunication, Medicines, Energy sciences. Composite Materials: Basics of composites, Types of Composites: Particle, Fibre, Reinforced, Structural, Real-life applications Smart materials: Shape Memory Alloys, piezo-electric, chromo-active, photo active materials, etc. required in computer field Packaging materials, Package substrates, Board fabrication Solder material- lead-free fabrication, Cooling- best liquid coolant, Magnets in the laptop speakers-neodymium magnets, rare earth alloys	10
2	Electrochemistry, Corrosion and Corrosion Control	Electrochemistry- types of electrochemical cells, Electrochemical series and Galvanic series, Numerical problems on Nernst equation Definition of corrosion, Direct chemical corrosion- Oxidation corrosion, Electrochemical corrosion and its mechanisms, Types of electrochemical corrosion- differential aeration, galvanic, stress, Intergranular, Microbial (soil) corrosion. Factors affecting corrosion (general factors), Protection of corrosion- anodic & cathodic protection, Coatings- Organic & Metallic, Applications with few practical problems of corrosion. Numerical problems based on Faraday's law Case studies like- Corrosion in electronic gadgets	8
3	Chemistry of Semiconductors	Silicon & Germanium - Physical and atomic properties, Isotopes, Chemistry and compounds, applications in industry. Study of compounds- GaAs, GaP, InP. Problems in Semiconductor industry- Shortage of semiconductors, the degradation due to corrosion, the alternative materials, reusability of the semiconductors Strengthening of semiconductors using chemical methods	5
4	Green Chemistry	Introduction to Green Chemistry, 12 Principles of Green Chemistry	3

Module No.	Module Name	Content	No of Hours
5	Introduction to Computational chemistry	The students are expected to write and execute at least six of the following computer programs in BASIC/Fortran/C 1. Linear regression. 2. Quadratic equation.	4
Total			**30**

Textbooks:

1. Shashi Chawla, "A Textbook of Engineering Chemistry", Dhanpat Rai & Co. (PVT.) LTD., New Delhi (2004).
2. S. S. Dara, "Engineering Chemistry", Chand & Co, New Delhi (2006)
3. Jain and Jain, "Engineering Chemistry", Dhanpat Rai & Co (PVT.) LTD, New Delhi (2006).

Reference Books:

1. B.R. Puri and L.R. Sharma, "Principles of Physical Chemistry", 45th Edition, Vishal Publishing Co. 2012.
2. Peter Atkins, "Physical Chemistry", XI th ed, Oxford, United Kingdom, Oxford University Press, 2017
3. V. K. Ahluwalia, "Green Chemistry: A textbook", Alpha Science International
4. J. D. Lee, "Concise Inorganic Chemistry"
5. V.R.Gowariker, "Polymer Science", New Age International Publication
6. S.K.Kulkarni, "Introduction to Nanotechnology"
7. C. N. Banwell, Elaine M. McCash, "Fundamentals of Molecular Spectroscopy", (4th edition), Tata McGraw Hill.
8. Y.R. Sharma, "Elementary Organic Spectroscopy", S. Chand and Co.
9. William D. Callister, "Materials Science and Engineering: An Introduction", Wiley
10. Mel Schwartz, "Smart Materials", CRC Press New York, 2009
11. Dimitris C. Lagoudas, "Shape Memory Alloys", Springer, New York, 2008
12. Micky Rakotondrabe, "Smart Materials- Based Actuators at Micro/Nano-Scale", Springer Science + Business Media, New York, 2013
13. Computer and Chemistry: introduction to programming and numerical methods T. R. Dickson, Freeman (1968)
14. Computer programs for chemistry D. F. Detar W. A. Benjamin Inc, New York Vol. 1-3 (1968-69)

Course Name: Psychology

Course Code: GESB07

Category: MDM

Preamble:
Psychology is a science that seeks to understand behavior and mental processes and a profession that applies empirical knowledge to improve the lives of people. It is a broad discipline. Psychologists study the intersection of two critical relationships: one between brain function and behavior, and one between the environment and behavior. Because it is a scientific discipline, psychologists follow scientific methods, using careful observation, experimentation, and analysis.

This course allows students to apply knowledge about the psychological principles to understand how psychology can address and solve complex, real-world situations of the human experience, including the personal and interpersonal challenges, workplace, health, product design, law and more.

Pre-requisites:

NIL

Course Objectives:

- The objective of this course is to facilitate the learners with the understanding of concepts of psychology and the cognitive processes that affect behavior, such as, motivation, emotion, problem solving, creativity, concept formation, judgement and decision making.
- It also focuses on the application of psychological principles in the effective interpersonal and group functioning, such as, communication, conflict and negotiation, leadership.
- It aims at understanding how people interact with machines and technology. Using psychological science to guide the design of products, systems and devices we use every day.

Course Outcomes:

Learner will be able to:
CO1: Increase the understanding of self and others
CO2: Overcome biases and become more empathic and understanding of others and ourselves.
CO3: Improve goal setting behavior, communication, leadership, and group functioning.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total

Theory	25	-	50	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of Hours
1	Introduction to psychology	● Introduction and Brief history of psychology: Its origin and evolution ● Definitions of Psychology ● Psychology as a science ● Psuedo- Psychology ● Goals of psychology and Branches of psychology	10
2	Foundations of Individual Behaviour	● What is Individual Behaviour? ● Personality, perception and attitudes ● Factors Influencing Individual Behaviour- personal, environmental and organizational ● Individual Decision Making	10
3	Group and Team Building	● Understanding Team Design Characteristics: Differences between Groups and Teams ● Types of Groups & Types of Teams ● Stages of Group Development ● GroupThink and Social Loafing ● Designing Effective Teams & Importance of Interpersonal skills	10
Total			**30**

Reference Books:

1.Aamodt, M.G. (2004). Applied Industrial/Organizational Psychology. (4th ed). Wadsworth/ Thomson Learning.

2.Aswathappa, K. (2005). Human Resource and Personnel Management – Text and Cases, 4th ed, New Delhi, Tata McGraw-Hill Publishing Co. Ltd.

3.Baron, R. A., & Kalsher, M. J. (2008). Psychology: From Science to Practice (2nd ed.). Pearson Education inc., Allyn and Bacon.

4.Capuzzi, D., & Gross, D. R. (2007). Counseling and Psychotherapy: Theories and Interventions. (4th ed.). Pearson Prentice Hall. First Indian reprint 2008 by Dorling Kindersley India pvt ltd.

5.Ellis, A. & Abrams, M. (2009). Personality Theories: Critical perspectives. California, Sage publications.

6.Ellis, A. (2001). Overcoming destructive beliefs, feelings, and behaviors: New directions for Rational Emotive Behavior Therapy. Prometheus Books.

7.Ellis, A., & Joffe Ellis, D. (2019). Rational emotive behavior therapy (pp. 3–7). American Psychological Association. https://doi.org/10.1037/0000134-001

8.Ellis, A., & MacLaren, C. (2005). Rational emotive behavior therapy: A therapist's guide (2nd ed.). Hardcover.

9.Galotti, K.M. (2007). Cognitive Psychology in and out of the Lab. (4th ed.). Thomson Learning.
10.Goldstein, E. B. (2005). Cognitive Psychology: Connecting Mind, Research, and Everyday Experience. Wadsworth/ Thomson Learning.
11.Jones, G.R., & Mathew, M. (2009). Organisational theory, design, and change. 5th ed., Pearson Education, Dorling Kindersley India, New Delhi.
12.Landy, F. J., & Conte, J. M. (2009). Work In The 21st Century: An Introduction to Industrial and Organizational Psychology, 3rd Edition Wiley-Blackwell.
13.Luthans, F. (2005). Organizational Behavior. (10th ed.). McGraw Hill.
14.Matthewman, L., Rose, A., & Hetherington, A. (2009). Work Psychology: An introduction to Human Behaviour in workplace. Oxford university press.
15.Schultz, D., & Schultz, S. E. (2010). Psychology and Work Today (10th ed.). Pearson Prentice Hall.
16.Singh, D. (2006). Emotional intelligence at work: A professional guide. 3rd ed., New Delhi, Sage publications.
17.Sternberg, R.J. (2009). Applied Cognitive Psychology: Perceivnig, Learning, and Remembering. New Delhi: Cengage learning India, Indian reprint 2009.
18.Robbin, Judge and Vohra (2012): Organizational Behaviour, ed.xiv, Pearson-Education, New Delhi.
19.Sakaran, U. (2008), Organizational Behaviour, TMH, N. Delhi.
20.Newstrom J W and K Davis (2010): Organizational Behaviour: Human Behaviour at Work, ed. v., New Delhi: TATA McGraw.
21.F. Luthans (2011): Organizational Behaviour, ed. vii, PHI, New Delhi.
22.Prasad L.M. (2010): Organization Theory and Behaviour, HPH, New Delhi.
23.Mullins L.J. (2009): Management and Organizational Behaviour, Pearson-Education, N. Delhi.
24.Khanna Sushama (2011): "Udai Pareek's Understanding Organizational Behaviour", revised and updated, Oxford University Press, New Delhi.
25.McShane, Glinow, Sharma: (2008): Organizational Behaviour 4th Edition, TATA McGraw Hill, New Delhi.
26.Academy of Management Executive, 16, 67–79.
27.Academy of Management Journal, 44, 1251–1262.
28.Journal of Applied Psychology, 90, 497–508.
29.Journal of Applied Psychology, 92, 885–892.
30.Personnel Psychology, 53, 625–642; Langfred, C. W. (2007).
31.Personnel Psychology, 46, 823–850; Magjuka, R. J., & Baldwin, T. T. (1991).
32.Personnel Psychology, 44, 793–812; Vinokur-Kaplan, D. (1995).
33.Journal of Applied Behavioral Science, 31, 303–327.
34.Journal of Applied Psychology, 92, 1189–1199.
35.Surowiecki, J. (2005). The wisdom of crowds. New York: Anchor Books.
36.Science Quarterly, 4, 84–110; Shin, S. J., & Zhou, J. (2007).
37.Journal of Applied Psychology, 92, 1709–1721.

Course Name: Presentation Skills

Course Code: HS04

Category: HSSM_AEC

Preamble:

The course, Presentation Skills, is intended to equip students with the necessary skill-set to help them bridge the gap from the campus to the corporate world. It will help them to be industry ready in sync with the requirements of the program they are pursuing.

Pre-requisites:

Nil

Course Objectives:

- To familiarize students about constructing a personal brand effectively.
- To create engaging and deliver effective business presentation skills by utilizing digital tools.
- To apply communication and strategic planning in business plan pitches and presentations.
- To develop an appreciation for cultural diversity and enhance intercultural communication skills.
- To understand the nuances of storyboarding and storytelling
- To present oneself professionally in interviews, group discussions and various corporate situations.

Course Outcomes:

Learner will be able to:

CO1: Understand the significance of brand-building and apply strategies to construct an effective personal brand.

CO2: Demonstrate proficiency in delivering impactful presentations by utilizing digital tools and applying structured communication principles.

CO3: Proficient in crafting comprehensive business plans by employing persuasive marketing and financial strategies and implementation plans.

CO4: Craft engaging visual stories through storyboarding and storytelling, create compelling video presentations.

CO5: Demonstrate readiness for placements by gaining practice in aptitude tests, HR interviews and GDs, and crafting professional resumes.

CO6: Understand intercultural communication, global citizenship, and respect cultural diversity.

Course Scheme:

Contact Hours		**Credits Assigned**	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	50	-	-	50

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Personal Branding	Introduction to Personal Branding –Purpose, Significance, Benefits and Techniques to build a personal brand. Corporate/Organisational Branding. Online identity of Brand on social media. Maintenance and Improvement of your Brand Factors affecting your Brand	6
2	Corporate Presentations	Business Presentation Tips Digital Presentations PAIBOC Model and Minto Pyramid Principles	4
3	Business Plan Presentations	Introduction to Business Plans Company Overview & Industry Analysis Persuasive Communication in Marketing Strategy Operations Strategy in Financial Management Implementation Plan	6
4	Storyboarding and Storytelling	Visual Story Telling Video Presentations Story Structure with images Film and Animation	4
5	Placement Readiness	Mock HR Interviews Mock GDs Aptitude Tests Placement ready resume	6
6	Global Communication	An introduction to inter-cultural communication Introduction to languages and cultures Global media in mass communication Tips to become a global citizen Respecting cultural diversity	4
Total			**30**

Guidelines to conduct practical sessions:

1. Personal Branding
2. Personal Branding
3. Personal Branding
4. Corporate Presentations
5. Corporate Presentations
6. Business Plan Presentations
7. Business Plan Presentations
8. Business Plan Presentations
9. Storyboarding and Storytelling
10. Storyboarding and Storytelling
11. Placement Readiness
12. Placement Readiness
13. Placement Readiness
14. Global Communication
15. Global Communication

List of Assignments:

1. Personal Branding (Individual)
2. Corporate Presentations (Group)
3. Business Plan Presentations (Group)
4. Storyboarding and Storytelling (Group)
5. Global Communication (Individual)

Recommended Online Courses:

1. Introduction to Personal Branding - https://www.coursera.org/learn/personal-branding
2. Strategic Self-Marketing and Personal Branding - https://www.coursera.org/learn/self-marketing
3. Learn to Storyboard for Film or Animation - https://www.udemy.com/course/storyboard-for-film-or-animation/
4. Powerful Tools for Teaching and Learning: Digital Storytelling - https://www.coursera.org/learn/digital-storytelling
5. Presentation Skills: Speechwriting, Slides and Delivery Specialization - https://www.coursera.org/specializations/presentation-skills
6. Business English for Cross-Cultural Communication - https://www.coursera.org/learn/cross-cultural-communication-business

Reference Books:

1. Personal Development for Life and Work, Wallace and Masters, Thomson Learning
2. Organizational Behaviour, Robbins Stephens, Pearson Education
3. Me 2.0: 4 Steps to Building Your Future, Dan Schawbel, Diversion Books
4. Branding Pays: The Five-Step System to Reinvent Your Personal Brand, Karen Kang, Branding Pays Media
5. The Presentation Secrets of Steve Jobs: How to Be Insanely Great in Front of Any Audience, Carmine Gallo, McGraw Hill Education
6. Talk Like TED: The 9 Public-Speaking Secrets of the World's Top Minds, Carmine Gallo, St. Martin's Press
7. The Storytelling Animal: How Stories Make Us Human, Jonathan Gottschall, Mariner Books
8. Made to Stick: Why Some Ideas Survive and Others Die, Chip Heath and Dan Heath, Random House

9. The Culture Map: Decoding How People Think, Lead, and Get Things Done Across Cultures, Erin Meyer, Public Affairs
10. Kiss, Bow, or Shake Hands: The Bestselling Guide to Doing Business in More Than 60 Countries, Terri Morrison and Wayne A. Conaway, Adams Media
11. Brand Thinking and Other Noble Pursuits, Debbie Millman, Allworth
    Building a Brand Story: Clarify Your Message So Customers Will Listen, Donald Miller, HarperCollins

Course Name: Exploring Indian Arts

Course Code: GEA03

Category: Indian Knowledge System

Preamble:

Wide platter of General Education courses are offered to First Year Engineering students with an aim to focus on holistic personality development These courses will also help to create balance in brain hemispheres and thereby improve learners' clarity in thoughts and responses.

Pre-requisites:

NIL

Course Objectives:

- To develop the intellectual skills and competencies necessary to participate effectively in society and the world
- To develop broad knowledge of living and non-living world
- To develop ability to appreciate and acknowledge creativity.

Course Outcomes:

Learner will be able to:
CO1: Understand how they can contribute towards each type of art.
CO2: Work towards developing holistic personality through critical and creative thinking.
CO3: Complement technical knowledge by developing diversified perspectives on various aspects of learning.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

ISA: Quizzes

ESE: Art Form (Painting/Singing/Folk Dance)

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours

1	Introduction to Indian Art	Indian art consists of a variety of art forms, including painting, sculpture, pottery, and textile arts such as woven silk. Geographically, it spans the entire Indian subcontinent, including what is now India, Pakistan, Bangladesh, Sri Lanka, Nepal, and at times eastern Afghanistan. A strong sense of design is characteristic of Indian art and can be observed in its modern and traditional forms. Discussing different types & forms in Indian Art. Drawing, painting, Handicraft performing Art to performing art.	
2	Indian Architecture	Photos & videos of Indian structure will be shown. Students will share their views on the same. The session starts with Students will get one Topic, which they must discuss with their teammates & present in front of the class. Assignments will be on Architectural sites. They will choose their own topic & will present in limited timespan.	
3	Indian Music/ Performing Art	Discussion on what is performing Art. There are 4 major streams dance, music, theater & film. As per each state how the language changes, which state is famous for what thing. How was the impact of Rulers & Kings and it was depicted in paintings & sculptors. Students will share their native experiences & will perform for their class.	
4	Painting styles & Handicrafts	Warli Painting is of tribal art mostly created by the tribal people from the North Sahyadri Range in Maharashtra, India. This range encompasses cities such as Dahanu, Talasari, Jawhar, Palghar, Mokhada, and Vikramgad of Palghar district. This tribal art was originated in Maharashtra, where it is still practiced today.	
5	Madhubani Painting	Madhubani Painting (also Mithila art) is a style of painting practiced in the Mithila region of India and Nepal. It is named after the Madhubani district of Bihar, India, which is where it originated. Artists create these paintings using a variety of mediums, including their own fingers, or twigs, brushes, nib-pens, and matchstick. The paint is created using natural dyes and pigments. The paintings are characterized by their eye-catching geometrical patterns. There is ritual content for particular occasions, such as birth or marriage, and festivals, such as Holi, Surya Shasti, Kali Puja, Upanayana, and Durga Puja.	
Total			**30**

Course Name: Indian Traditional Knowledge Systems

Course Code: GESB03

Category: HSSM_IKS

Preamble:

India has a vast tradition of Sanskrit texts dealing with various scientific thoughts. Number of treatises on the topics like Agriculture, Animal Husbandry, Chemistry, Astronomy, Mathematics, Botany, etc. focus on the development of thoughts in the concerned area.

This course aims at introducing a student with various treatises on physical as well as social sciences and their contribution to modern branches of sciences. Taking into consideration the vast scope of these sciences, major treatises will be introduced in the course thereby making a student to ponder over the ancient knowledge systems of India.

Pre-requisites:

NIL

Course Objectives:

- The objective of this course is to facilitate the learners with the concepts of Indian traditional knowledge and to make them understand the importance of roots of knowledge system.
- It aims at imparting basic principles of thought process, reasoning and inference

Course Outcomes:

Learner will be able to:

CO1: Understand and the rich history of Indian knowledge system

CO2: Understand the different areas of contribution from India

CO3: Apply the different principals of traditional knowledge in modern systems

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours

1	Review of Scientific Literature in Sanskrit	References of sciences/scientific knowledge through different textual sources etc.	-
2	Chemistry and Mathematics	Various treatises on Chemistry, Use of chemistry in medicines, Metallurgy, Use of chemistry for occult practices, Mathematical concepts through Shulbasutras, Development of different mathematical branches and treatises based on that, Development of astronomy, etc.	-
3	Dietetics	Study of different texts based on culinary art Nalapakadarpana, Bhojanakutuhalam, Supashastra, Modes of preservation of food, Dietary guidelines through branches of Ayurveda, Food and diseases, etc.	-
4	Agriculture, Astronomy, and Zoology	Study of krishisuktas, Krishiparashara, Brihatsamhita, Types of crops, Manures, Types of land- devamatruka, nadimatruka, Indian Astronomy, Use of animals in warfare, Animal husbandry, Animals for medicines, etc.	-
Total			**30**

Reference Books:

1. Nirmal Trikha, "Scientific Knowledge in Sanskrit Literature"
2. S. Balachandra Rao, "Indian Astronomy: An Introduction"
3. B. Seal, "Ancient Indian Sciences"
4. Melissa Stewert, "Science in Ancient India (Science of the Past)"
5. Sudheer Birodkar, "India's Contribution to World Culture"
6. R. C. Majumdar, "Ancient India"
7. Swami ChidatmanJee Maharaj, "Ancient Indian Sciences"
8. Stella Kramrisch, "The Art of India through the Ages"
9. K.Krishna Murthy, "Early Indian Secular Architecture"

Course Name: Indian Constitution

Course Code: GEPS01

Category: HSSM_IKS

Preamble:

This course introduces learners to the framework that demarcates fundamental political code, structure, procedures, powers, and duties of government institutions and sets out fundamental rights, directive principles, and the duties of citizens.

Pre-requisites:

NIL

Course Objectives:

- To understand what a constitution is and why it is necessary
- To understand how the constitution, embodies certain ideals
- To understand importance of fundamental rights and fundamental duties
- To understand the functioning of the Parliament.

Course Outcomes: Learner will be able to:

CO1: Learner will be able to understand constitution principles
CO2: Learner will be able to co-relate with political system
CO3: Learner will be able to pursue the values of civic life
CO4: Learner will be able to exercise their rights and duties

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Introduction	Historical background of constitution, Philosophy of constitution	
2	Citizenship	Citizenship at the commencement of the Constitution, Rights of citizenship of certain persons of Indian origin residing outside India, Persons voluntarily acquiring citizenship of a foreign State not to be citizens, Continuance of the rights of citizenship, Fundamental Duties	
3	Fundamental Rights	Definition, Laws inconsistent with or in derogation of the fundamental rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Core issues (Uniform civil code, Article 370, Reservation)	
4	Directive Principles of State Policy	Definition, Certain principles of policy to be followed by the State, Equal justice and free legal aid, Organisation of village panchayat, Right to work, to education and 10 public assistance in certain cases, Provision for just and humane conditions of work and maternity relief, Living wage, etc., for workers, Participation of worker; in management of industries, Uniform civil code for the citizens, Provision for free and compulsory education for children, Promotion of educational and economic interests of Scheduled Castes, Scheduled Tribes and other weaker sections, Protection and improvement of environment and safeguarding of forests and wild life, Protection of monuments and places and objects of national importance, Separation of judiciary from executive, Promotion of international peace and security	
5	The Parliament	Constitution of Parliament, Composition of the Council of States, Composition of the House of the People, Duration of Houses of Parliament, Rights of Ministers and Attorney-General as respects Houses, Law making procedure, Amendment process and language	
6	Judiciary	Establishment and Constitution of Supreme Court, High Courts for States, Subordinate Courts, Working of quasi – judicial bodies	
7	Elections	Superintendence, direction and control of elections to be vested in an Election Commission, Power of Parliament.to make provision with respect to elections to Legislatures, Power of Legislature of a Slate to make provision with respect to elections to such Legislature Bar to interference by Couns in electoral matters	
8	Landmark cases	Nanavati case, Shah Bano, Keshvanand BhartiVishakha Case etc	
Total			**30**

Recommended Online Courses:

1. Constitutional Studies
   https://onlinecourses.nptel.ac.in/noc20_lw03/preview
2. Constitution of India
   https://www.udemy.com/course/constitution-of-india/

Reference Books:

1. D.C. Gupta, "Indian Government and Politics"
2. D.D. Basu, "Introduction to the Constitution of India"
3. P. M. Bakshi, "The Constitution of India"
4. M. V. Pylee, "Constitutional History of India"

Detailed syllabus of Second Year Semester-IV

Course Name: Engineering Mathematics-IV

Course Code: BS42

Category: Basic Science (BS)

Preamble:

The course aims to help students understand probability, analyze probability distributions, apply statistical methods, and test hypotheses using t-tests, F-tests, and chi-square tests and to optimize the function linear and non-linear programming techniques are included.

Pre-requisites:

BS41: Engineering Mathematics III

Course Objectives:

- Understanding the Statistical Techniques like Probability Distribution and Correlation and Regression to solve real world problems.
- Ability to write the suitable hypothesis and apply appropriate testing procedure
- Understand the important applications of Non-parametric test.
- To understand the concept of linear and Non-linear programming problem to optimize the function.

Course Outcomes:

Student will be able to:

CO1: Use statistical methods to analyze and interpret data sets.
CO2: Analyze the behaviour of discrete and continuous probability distributions.
CO3: Apply the statistics for testing the significance of the given large and small sample data
CO4: Use the non-parametric test for testing of Hypothesis
CO5: Apply LPP technique to optimize the functions
CO6: Apply various techniques of Operation research to solve Non-Linear Programming Problems

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
3	-	3	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	20	30	50	100

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the

semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Statistical techniques	Correlation: Covariance, Karl Pearson's Correlation Coefficient. Spearman's rank correlation coefficient, Regression lines, fitting of first- and second-degree curves	8
2	Probability Distribution	Random Variable: Probability distribution for discrete and continuous random variable, Bayes Theorem (without proof) Expectation, Variance, Probability distributions: Poisson and Normal distributions.	8
3	Testing of Hypothesis	Formation of Hypothesis, Test of significance: Test of significance for Small samples: t- Test for single mean, difference of means	6
4	Non-parametric test and Anova	Chi-square test for goodness of fit and independence of attributes, F- test for ratio of variances, Analysis of Variance (One Way ANOVA)	7
5	Linear Programming	Simplex method, Big-M method (Method of penalty) Duality, Dual of LPP and Dual simplex method	8
6	Non-linear programmi ng	NLPP with one equality constraint (two or three variables) using the method of Lagrange's multipliers, NLPP with two equality constraints, NLPP with inequality constraint: Karush-Kuhn-Tucker conditions (KKT)	8
Total			**45**

Text Books:

1. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India.
2. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, Wiley.
3 S. C. Gupta and V. K. Kapoor , "Fundamentals of Statistics"
4 J. K. Sharma , "Operations Research: Theory and Applications" Macmillan Publishers India, 1997.

Reference Books:

1. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India
2. D. C. Montgomery and G. C. Runger, Applied Statistics and Probability for Engineers, Wiley.
3. J. L. Devore, Probability and Statistics for Engineering and the Sciences, Cengage Learning.
4. Operations Research: Theory and Applications" by S.D. Sharma and Kedar Nath Ram Nath. Singiresu S.Rao, Engineering Optimization, New Age International.

Course Name: Computer Graphics

Course Code: CE06T

Category: Core

Preamble:
The goal of the course is to introduce students to the technical concepts behind creating synthetic computer-generated images, focusing on underlying mathematical concepts covering geometrical and attribute related features. This course attempts to uncover various 2D and 3D rendering techniques.

Pre-requisites:
Data Structure- CE01T
Structured Programming Approach- ES04T

Course Objectives:

- To enable learners to understand the basics of computer graphics, including the principles of image representation, display technology, and color models.
- To enable learner to understand 2D and 3D geometric transformations, including translation, scaling, rotation, orthographic and perspective projection.
- To enable learners to design and implement graphical user interfaces (GUIs) for software applications.

Course Outcomes:

Learner will be able to:
CO1: Understand the basic concepts of Computer Graphics.
CO2: Demonstrate various algorithms for scan conversion, for filling of basic geometrical objects and their comparative analysis.
CO3: Apply geometric transformations, viewing and clipping on graphical objects.
CO4: Explore 3-D geometric transformations, curve representation techniques and projections methods.
CO5: Understand visible surface detection techniques and illumination models.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of Hours
1	Introduction and Overview of Graphics System.	Definition and Representative uses of Computer Graphics, Classification of application areas,	2

		Overview of Coordinate Systems, Definition of Scan Conversion, Rasterization and Rendering. Raster Scan & Random Scan Displays, Architecture of Raster Graphics System with display processor, Architecture of Random Scan Systems.	
2	Raster Algorithms.	Scan Conversions of Point, Line, and Circle: DDA Algorithm and Bresenham Algorithm for Line Drawing, Midpoint Algorithm for Circle. Aliasing, Antialiasing Techniques like Pre and Post Filtering, Super Sampling, and Pixel Phasing. Filled Area Primitives: Scanline Polygon Fill Algorithm, Inside Outside Tests, Boundary Fill and Flood fill Algorithm.	8
3	Two Dimensional Geometric Transformations, Viewing and Clipping.	• Basic transformations: Translation, Scaling, Rotation. Matrix Representation and Homogeneous Coordinates, Composite Transformation. • Viewing Transformation Pipeline and Window to Viewport Coordinate Transformation. Clipping Operations: Point Clipping, Line Clipping Algorithms: Cohen–Sutherland, Midpoint Subdivision, Liang–Barsky, Polygon Clipping Algorithms: Sutherland–Hodgeman and Weiler – Atherton Algorithm.	8
4	Three-Dimensional Object Representations, Geometric Transformations and 3D Viewing.	Boundary Representation and Space Partitioning Representation: Polygon Surfaces, Bezier Curve B-Spline Curve, Fractal-Geometry: Fractal Dimension, Koch Curve. 3D-Transformations: Translation, Rotation, Scaling and Reflection. Composite Transformations: Rotation about an Arbitrary Axis. 3D-Transformation Pipeline Projections– Parallel and Perspective Projection. (Matrix Representation).	6
5	Visible Surface Detection.	Classification of Visible Surface Detection Algorithm, Back Surface Detection Method: Depth Buffer Method, Scan Line Method, Area Subdivision Method.	4
6	Illumination Models and Surface Rendering	Basic Illumination Models: Diffused reflection, Phong Specular Reflection Model, Halftone and Dithering Techniques, Polygon Rendering: Constant shading, Gouraud Shading, Phong Shading.	2
Total			**30**

Textbooks:

1. "Computer Graphics C version" by Hearn & Baker, 2nd Edition, Pearson Publication, ISBN-13: 978-8177587654.
2. "Computer Graphics Principles and Practice in C", by James D. Foley, Andries van Dam, Steven K Feiner, John F. Hughes, 2nd Edition, Pearson Publication, ISBN-0201121107, ISBN-9780201121100.
3. "Computer Graphics", by Samit Bhattacharya, Oxford Publication. ISBN: 9780198096191.

4. “Computer Graphics”, by Rajesh K. Maurya, Wiley India Publication, ISBN-13: 978-81-265-3100, ISBN: 81-265-3100-2

Reference Books:

1. “Procedural Elements for Computer Graphics “ by D. Rogers , Tata McGraw-Hill Publications.
2. “Computer Graphics”, by Zhigang Xiang , Roy Plastock , Schaum’s Outlines McGraw-Hill Education.
3. “Computer Graphics using OpenGL , by F.S.Hill , Jr. ,Third edition, Pearson Publications.

Course Name: Computer Graphics Lab

Course Code: CE06P

Category: Core

Preamble:

The goal of the course is to introduce students to the technical concepts behind creating synthetic computer-generated images, focusing on underlying mathematical concepts covering geometrical and attribute related features. This course attempts to uncover various 2D and 3D rendering techniques.

Pre-requisites:

Data Structure Lab-CE01P
SPA Lab-ES04P

Course Objectives:

- To enable learner to develop practical experience with raster algorithms for line, circle drawing and creating/ manipulating images.
- To enable learners to apply 2D & 3D geometric transformations to create visual effects and animations.
- To enable learners to use viewing transformations to define a camera position and orientation. Also implement clipping algorithms to remove parts of an image that are outside the view.

Course Outcomes:

Learner will be able to:
CO1: Understand various algorithms to draw lines in computer graphics applications, display lines with varying thickness and styles.
CO2: Understand and implement various area fill algorithms to efficiently fill areas with colors or patterns in computer graphics applications.
CO3: Apply 2D & 3D geometric transformations and clipping operations on an object to create visual effects and animations.
CO4: Understand Open GL library functions to generate graphical objects and create animated sequences in graphics applications.

Course Scheme:

Contact Hours		**Credits Assigned**	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	**ISA**	**MSE**	**ESE**	**Total**
Practical	25	-	25	050

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Suggested List of Practicals:

Sr No.	Suggested Topic(s)
1.	Implement DDA Line Drawing algorithms and Bresenham algorithm.
2.	Program to display thick line, dotted line, and dashed line.
3.	Line generation using parallelism approach.
4.	Implement midpoint Circle algorithm.
5.	Implement Area Filling Algorithm: Boundary Fill, Flood Fill, Scan line Polygon Fill
6.	Implement Curve: Bezier for n control points, B Spline (Uniform)
7.	Implement Fractal (Koch Curve).
8.	Character Generation: Bit Map method and Stroke Method
9.	Implement 2D Transformations: Translation, Scaling, Rotation, Reflection, Shear.
10.	Implement Line Clipping Algorithm: Cohen Sutherland / Liang Barsky.
11.	Implement polygon clipping algorithm.
12.	Program to represent a 3D object using polygon surfaces and then perform 3D transformation.
13.	Program to perform projection of a 3D object on Projection Plane: Parallel and Perspective.
14.	Study of Open GL library functions and using it to generate graphical objects.
15.	Program to perform surface rendering using Open GL functions.
16.	Program to generate an animated sequence.

Textbooks:

1. "Computer Graphics C version" by Hearn & Baker, 2nd Edition, Pearson Publication, ISBN-13: 978-8177587654.
2. "Computer Graphics Principles and Practice in C", by James D. Foley, Andries van Dam, Steven K Feiner, John F. Hughes, 2nd Edition, Pearson Publication, ISBN-0201121107, ISBN-9780201121100.
3. "Computer Graphics", by Samit Bhattacharya, Oxford Publication. ISBN: 9780198096191.
4. "Computer Graphics", by Rajesh K. Maurya, Wiley India Publication, ISBN-13:978-81-265-3100, ISBN:81-265-3100-2

Reference Books:

1. "Procedural Elements for Computer Graphics " by D. Rogers , Tata McGraw-Hill Publications.
2. "Computer Graphics", by Zhigang Xiang , Roy Plastock , Schaum's Outlines McGraw-Hill Education.
3. "Computer Graphics using OpenGL , by F.S.Hill , Jr. ,Third edition, Pearson Publications.

Course Name: Operating System

Course Code: CE07T

Category: Core

Preamble:

The goal of the course is to introduce the students to modern operating systems design. This course covers the design and implementation of operating systems with a focus on modern, concurrent kernels.

Pre-requisites:

CE01T (Data Structure)

Course Objectives:

- To enable learner to understand how operating system manages allocation and deallocation of different resources needed by user/ application.
- To enable learner to understand how operating system controls access to various resources and provides security.
- To enable learner to evaluate performance of different approaches used by operating systems, for effective resource utilization.

Course Outcomes:

Learner will be able to:
CO1: Understand the benefits of software modularity and how it applies to OS design.
CO2: Compare various OS scheduling policies based on performance parameters.
CO3: Analyze methods to achieve synchronization and handle deadlocks.
CO4: Evaluate performance of Memory allocation and replacement policies.
CO5: Compare various files and I/O management techniques.
CO6: Understand how principles of general OS are applied in Linux OS.

Course Scheme:

Contact Hours		**Credits Assigned**	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	**ISA**	**MSE**	**ESE**	**Total**
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of Hours
1	Introduction to Operating System	Operating System definitions, Processes and Interrupts, Functions of Operating System, Operating System Structures, User mode and kernel mode of a process, Types of Operating System, System Calls, Booting	4
2	Process Management and Synchronization	Process Management: Definition of Process, Process Control Block, Process Scheduling: Types and scheduling algorithms (FCFS, SJF, SRTN, Priority, RR), Threads: Definition and Concept of Multithreading. Process Synchronization: Principles of Concurrency, Inter-process communication, Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Producer and Consumer problem,	6
3	Deadlock	Principles of Deadlock: Conditions and Resource, Allocation Graphs, Deadlock Prevention, Deadlock Avoidance: Banker's Algorithm, Deadlock Detection and Recovery, Dining Philosophers Problem.	6
4	Memory Management	Memory Management Requirements, Memory Partitioning: Fixed, Partitioning, Dynamic Partitioning, Memory Allocation Strategies: Best-Fit, First Fit, Worst Fit, Paging and Segmentation, TLB, Page table design Virtual Memory: Demand Paging, Page Replacement Strategies: FIFO, Optimal, LRU, Thrashing, Kernel Memory Allocation	6
5	File Systems and I/O Management	Files and File Systems, Directory Systems, File allocation methods: Contiguous allocation, Linked allocation, Indexed allocation, Kernel I/O subsystem, Communication and Data Transfer with I/O Devices, Disk Organization, I/O Management and Disk Scheduling: FCFS, SSTF, SCAN, CSCAN, LOOK, C-LOOK, RAID Structure	5
6	The Linux System	Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File Systems, Network Structure, Security	3
Total			**30**

Textbooks:

1. William Stallings, Operating System: Internals and Design Principles, Prentice Hall, 8thEdition, 2014, ISBN-10: 0133805913 • ISBN-13: 9780133805918
2. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, John Wiley &Sons, Inc., 9thEdition, 2016, ISBN 978-81-265-5427-0
3. Andrew Tannenbaum, Operating System Design and Implementation, Pearson, 3rdEdition.

Reference Books:

1. Sumitabha Das, "UNIX: Concepts and Applications", McGraw Hill, 4thEdition
2. Achyut Godbole and Atul Kahate, Operating Systems, McGraw Hill Education, 3rdEdition

Course Name: Operating System Lab

Course Code: CE07P

Category: Core

Preamble:

The course introduces learners to Linux shell commands and simulate various algorithms used by general OS for managing resources. This courses project will explore the key operating system facilities in the relative isolation of an OS development framework with the goal of maximizing experiential learning.

Pre-requisites:

CE01P (Data Structure Lab)

Course Objectives:

- To enable learner to visualize the working of operating system by simulating techniques used by it to manage resources.
- To enable learner to apply techniques of process synchronization in multithreaded programs and hence develop concurrent applications.

Course Outcomes:

Learner will be able to:
CO1: Understand various shell commands of Linux OS.
CO2: Compare performance of different process scheduling policies.
CO3: Perform process/ thread synchronization for consistency and concurrency.
CO4: Simulate OS techniques for memory and virtual memory management.
CO5: Develop project to explore key OS facilities.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Suggested List of Practicals:

Sr No.	Suggested Topic(s)
1.	Linux commands

2.	Non-Preemptive process Scheduling
3.	Preemptive process Scheduling
4.	Process synchronization using mutex locks.
5.	Deadlock Handling
6.	Dynamic memory allocation techniques
7.	Adddress translation in virtual memory
8.	Page replacement policies
9.	Disk scheduling techniques

Textbooks:

2. William Stallings, Operating System: Internals and Design Principles, Prentice Hall, 8thEdition, 2014, ISBN-10: 0133805913 • ISBN-13: 9780133805918
3. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, John Wiley &Sons, Inc., 9thEdition, 2016, ISBN 978-81-265-5427-0
4. Andrew Tannenbaum, Operating System Design and Implementation, Pearson, 3rdEdition.

Reference Books:

2. Sumitabha Das, "UNIX: Concepts and Applications", McGraw Hill, 4thEdition
2. Achyut Godbole and Atul Kahate, Operating Systems, McGraw Hill Education, 3rdEdition

Course Name: Theory of Computer Science

Course Code: CE09

Category: Core

Preamble:

This course introduces students to formal language and automata theory. It covers different types of grammars and automata of different powers that are required to recognize languages defined by the grammars.

Pre-requisites:

BS41 (Engineering Mathematics-III)

Course Objectives:

- Acquire conceptual understanding of fundamentals of grammars and languages.
- Build concepts of theoretical design of deterministic and non-deterministic finite automata and push down automata.
- Develop understanding of different types of Turing machines and applications.

Course Outcomes:

Learner will be able to:
CO1: Express rules in mathematical form (grammar).
CO2: Classify the problem into appropriate type of grammar.
CO3: Apply equivalence theory to recognize power of different automata.
CO4: Design Automata to meet the required specifications.
CO5: Create a tool that designs automata for a given grammar.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Tutorial	Theory	Tutorial
2	1	2	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory + Tutorial	40	20	40	100

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology

for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Introduction to Language and Automata	Concepts: Symbol, Alphabet, Language and Grammar. Types of Grammar and Automata.	2
2	Finite Automata	Deterministic: 5-tuple representation of DFA. Designing DFA for Regular Language. Minimization of DFA. Non-Deterministic: 5-tuple representation of NFA with epsilon moves and NFA without epsilon moves. Equivalence of language recognized by NFA and DFA	6
3	Regular Language and grammar	Regular Expression and Regular Grammar. Equivalence of FA and Regular Expression. Properties of Regular Sets/ Languages. Classifying language as Regular and Non-regular.	6
4	Context Free and Sensitive Languages.	Concepts: CFG, CFL, Derivations and Ambiguity. CFL as a superset of Regular. Normal Forms (CNF and GNF). Properties of CFL.	6
5	Push-down Automata	7-tuple Deterministic PDA. Deterministic and Non-Deterministic PDA. Equivalence of NPDA and CFL.	4
6	Turing Machine	Basic 7-tuple Turing Machine (TM). Variants of TM. TM as acceptor of Recursively Enumerable (RE) Languages. Halting Problem. Recursive and RE Languages. Undecidability	6
Total			**30**

Suggestion for list of Tutorials:

1. At-least one tutorial on each module. Recommended to add additional tutorials for module 3, 5 and 7.
2. Questions should be short and conceptual only. Each tutorial should be designed worth 2 Marks. Required to be solvable in 5 to 10 mins.
3. Tutorial to have major questions mapping to level 1 of Blooms Taxonomy (Understanding) and few questions mapping to level 2 of Blooms Taxonomy (Applying)

Reference Books:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman. Introduction to Automata Theory, Languages and Computation. Pearson Education. 2008.
2. Michael Sipser. Introduction to the Theory of Computation. Thomson Course Technology. 2012.
3. Peter Linz. An Introduction to Formal Languages and Automata. Jones and Bartlett Student Edition. 2016.

Course Name: Computer Network

Course Code: CE11T

Category: Core

Preamble:

This course aims to give students an overview of the concepts and fundamentals of computer networks. It covers protocol layering, enabling students to analyze network performance. Additionally, the course provides insights into the functions of the OSI and TCP/IP models and various routing protocols.

Pre-requisites:

Fundamentals of Computer Hardware and Networking (ES06T) and Analysis of Algorithm (CE04T)

Course Objectives:

- To introduce concepts and fundamentals of data communication and computer networks.
- To explore the inter-working of various layers of OSI.
- To explore the issues and challenges of protocols design while delving into TCP/IP protocol suite.
- To assess the strengths and weaknesses of various routing algorithms.
- To understand various transport layer and application layer protocols.

Course Outcomes:

Learner will be able to:
CO1: Demonstrate the concepts of data communication and compare ISO - OSI model with TCP/IP model.
CO2: Explore different design issues at data link layer.
CO3: Design the network using IP addressing and subnetting / super netting schemes.
CO4: Analyse various routing algorithms and protocols at network layer.
CO5: Analyse transport layer protocols and congestion control algorithms.
CO6: Explore protocols at application layer.

Course Scheme:

Contact Hours		**Credits Assigned**	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of Hours
1	Introduction to Computer Networks	Introduction to computer network, network application, (Interconnection networking devices), Network topology, protocol hierarchies, design issues for the layers, connection oriented and connectionless services. Revisiting OSI Model & TCP/IP Model.	4
2	Data Link Layer	Data Link Layer 2.1 DLL Design Issues (Services, Framing, Error Control, Flow Control), Error Detection and Correction(Hamming Code, CRC, Checksum) , Elementary Data Link protocols , Stop and Wait, Sliding Window(Go Back N, Selective Repeat), HDLC 2.2 Medium Access Control sublayer Channel Allocation problem, Multiple access Protocol(Aloha, Carrier Sense Multiple Access (CSMA/CD), Local Area Networks - Ethernet (802.3)	8
3	IP Addressing & Network Layer	IPv4 Addressing (classfull and classless), Subnetting, Supernetting design problems, IPv4 Protocol, Network Address Translation (NAT). IPv6 Addressing, Transition from IPV4 to IPV6	8
4	Routing Protocols	Shortest Path (Dijkastra's), Link state routing, Distance Vector Routing	4
5	Transport Layer	Connection management (Handshake), UDP, TCP, TCP state transition, TCP timers. TCP Flow control (sliding Window), TCP Congestion Control: Slow Start.	4
6	Application Layer	Protocols: DNS, HTTP, SMTP, Telnet, FTP, DHCP	2
Total			**30**

Textbooks:

1. Behrouz A. Forouzan, Forouzan Mosharrat , Computer Networks A Top down Approach, Mc Graw Hill education.
2. Andrew S Tanenbaum, Computer Networks -, 4th Edition, Pearson Education.

Reference Books:

1. Keshav, An Engineering Approach to Computer Networks, 2nd Edition, Pearson Education.
2. B. A. Forouzan, “TCP/IP Protocol Suite”, Tata McGraw Hill edition, Third Edition.

Course Name: Computer Networks Lab

Course Code: CE11P

Category: Core

Preamble:

This course is to provide students with an overview of the concepts and fundamentals of computer networks.

Pre-requisites:

Fundamentals of Computer Hardware and Networking Lab **(**ES06P) and Analysis of Algorithms Lab (CE04P)

Course Objectives:

- To practically explore OSI layers and understand the usage of simulation tools.
- To analyze, specify and design the topological and routing strategies for an IP based networking infrastructure.
- To identify the various issues of a packet transfer from source to destination, and how they are resolved by the various existing protocols.

Course Outcomes:

Learner will be able to:
CO1: Execute and evaluate network administration commands and demonstrate their use in different network scenario
CO2: Demonstrate the installation and configuration of network simulator.
CO3: Demonstrate and measure different network scenarios and their performance behavior.
CO4: Implement the socket programming for client server architecture.
CO5: Analyze the traffic flow of different protocols
CO6: Design a network for an organization using a network design tool

Course Scheme:

Contact Hours		**Credits Assigned**	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	**ISA**	**MSE**	**ESE**	**Total**
Practical	25	-	25	050

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Suggested List of Practicals

Learners are expected to perform practicals based on the following suggested topics.

Sr No	Suggested Topic(s)
1	Study, understand and perform various networking commands: Ping, Tracert, trace route, ipconfig, ifconfig, nslookup, netstat
2	Designing Network Layout
3	Program for Error Detection
4	Program for Error Correction
5	Program on IP Addressing
6	Case study on Subnetting and Supernetting
7	Socket Programming
8	Chat Application
9	Installation and configuration of Wireshark tool Study the packet transmission using Wireshark and understand/visualize the IP protocol
10	Cisco Packet Tracer

Textbooks:

1. Behrouz A. Forouzan, Forouzan Mosharrat , Computer Networks A Top down Approach, Mc Graw Hill education.
2. Andrew S Tanenbaum, Computer Networks -, 4th Edition, Pearson Education.

Reference Books:

1. Keshav, An Engineering Approach to Computer Networks, 2nd Edition, Pearson Education.
2. B. A. Forouzan, "TCP/IP Protocol Suite", Tata McGraw Hill edition, Third Edition.

Course Name: Python Programming

Course Code: ES11

Category: SC_VSEC

Preamble:

This course is designed to take students from beginner to advanced Python programming. It covers the fundamentals of Python programming, as well as advanced topics such as object-oriented programming, multithreading, web development and data analysis. Students will gain practical experience through hands-on programming assignments and projects.

Pre-requisites:

- Basic knowledge of Python programming
- Understanding of basic concepts in databases
- Familiarity with HTML, CSS, and JavaScript for web development

Course Objectives:

- To enable learner to understand variables, data types, control structure, functions, file handling in python.
- To enable learners to write programs using object-oriented programming concepts in Python.
- To enable learners to understand the use of different python libraries in data analysis.
- To enable learners to create web applications using python web framework.

Course Outcomes:

Learner will be able to:
CO1: Understand the variables, data types, control structure, functions and modules in Python.
CO2: Understand and implement the data structure of python such as List, Tuple, String, Dictionary Set.
CO3: Understand and apply object-oriented programming concepts in Python to write programs.
CO4: Perform CRUD operations on databases and understand File handling in Python.
CO5: Perform data analysis and visualization using Python libraries such as NumPy, Pandas, and Matplotlib.
CO6: Understand Multithreading and Explore python web framework for developing python-based web application.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	4	-	2

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	50	-	25	075

Detailed Syllabus:

Module No.	Module Name	Content	No of Hours

1	Introduction to Python Programming	Overview of Python programming. Basic syntax, data types, and control structures in Python. Function and Modules in Python. Date and Time modules.	8
2	Data Structures in Python	Lists, Tuples, String, Dictionaries, Sets Implementing Stack & Queue using Python data structures. List comprehension in python.	12
3	Object-Oriented Programming (OOP) in Python	Class and object creation. inheritance, and polymorphism, absract class. Exception handling in python.	12
4	File Handling, GUI Programming and database connectivity.	Reading and writing files in Python. Desing GUI using Tkinter library. Connecting to databases using Python. Performing CRUD operations on databases using Python.	10
5	Data Analysis and Visualization using Python	Introduction to Python libraries for data analysis and visualization Using NumPy, Pandas, and Matplotlib for data analysis and visualization	8
6	Multi-Threading & Web Development in Python	Introduction to multi-threading in Python. Creating threads and managing threads. Introduction to Python Webframework.	10
Total			**60**

Textbooks:

1. Core Python Programming, Dr. R. Nageswara Rao, Dreamtech Press.
2. Beginning Python: Using Python 2.6 and Python 3.1, James Payne Wrox Publication.
3. Introduction to computing and problem solving using python , E Balagurusamy,McGraw Hill Education.

Reference Books:

1. Learn Python the Hard Way, Zed A. Shaw, Pearson Education.
2. Learn Python the Hard Way: (3rd Edition) (Zed Shaw's Hard Way Series).
3. Eric Matthes, “Python Crash Course, A Hands – on Project Based Introduction to Programming”, 2nd Edition, No Starch Press, 2019.
4. Martin C. Brown, “Python: The Complete Reference”, 4th Edition, Mc-Graw Hill, 2018.

Suggested List of Practical's:

Sr No.	Suggested Topic(s)
1.	Programs to explore basics of python likes input output statements, conditional & control statements.
2.	Programs to understand function, module in python.
3.	Programs to use python data structure- List, Tuple, String, Dictionary & Set.
4.	Programs to implement stack & Queue data structure.
5.	Programs to use list comprehension in python.
6.	Programs to create classes and object in python.
7.	Programs to implements inheritance, and polymorphism, absract class concepts in python.
8.	Programs to demonstrate exception handling.
9.	Programs to understand file handling in python.

10	Creating GUI with python containing widgets such as labels, textbox,radio,checkboxes and custom dialog boxes.
11	Program to demonstrate CRUD(create, read, update and delete) operations on database (SQLite/MySQL) using python.
12	Program to demonstrate use of NumPy: Array objects.
13	Program to demonstrate Data Series and Data Frames using Pandas.
14	Programs on Threading using python.
15	Program on simple socket for basic information exchange between server and client.
16	Program on Web application using python framework.

Course Name: Professional Skills

Course Code: HS02T

NEP Vertical _Basket: HSSM_VEC

Preamble:

The course will groom learners in the areas of developing professional etiquettes, building digital profiles, imbibing workplace ethics, and organizational behavior. This course will also be an essential guide in building business communication and soft skills concepts.

Pre-requisites:

Nil

Course Objectives:

- To introduce the concepts of the job application process and digital profile building.
- To create awareness of professional etiquettes and corporate culture in tune with 21st Century soft skills.
- To enable learners to enrich their personality through self-awareness and SWOT analysis and understand various interpersonal skills required for the workplace.
- To build the foundations of professional ethics and corporate social responsibility among learners.

Course Outcomes:

Learner will be able to:

CO1: Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and writing resume.

CO2: Acquire basic proficiency in building a digital profile by demonstrating an awareness of professional and ethical responsibilities.

CO3: Understand the nuances of professional etiquettes and professionalism.

CO4: Enrich their personality through SWOT analysis, identify their personality traits and learning styles

CO5: Develop interpersonal skills to build effective professional relations.

CO6: Demonstrate awareness of contemporary issues, knowledge of ethical responsibilities and CSR.

Course Scheme:

Contact Hours		**Credits Assigned**	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

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Detailed Syllabus:

Module No.	Module name	Content	No. of Hours
1	Employment Skills	Job Application & Resume Writing, Group Discussion, Interview Skills, Digital Profile Building (ePortfolio, LinkedIn)	10
2	Professional Etiquettes	Corporate Grooming and Workplace Etiquette, Telephone Etiquette, Netiquettes, Telephone Etiquette, Digital Footprints, Social Media, Personal Profile Privacy	4
3	Interpersonal Skills	Assertiveness, Negotiation, Leadership, Team Building, Problem Solving, Decision Making, Cultural and Emotional Intelligence	6
4	Ethics	Introduction to Ethics, Plagiarism and Online, Plagiarism Checker, Patents, Trademark and Copyrights and GI – Geographical Indicators, Professional Ethics, Corporate Social Responsibility (CSR) –Information Confidentiality	4
5	Personality Enrichment	SWOT Analysis and JOHARI window, Developing Positive Attitude, Personality Types and Learning Styles, Vision and Goal Setting, Stress Management and Time Management	4
6	21st Century Skills	Creative Thinking, Critical Thinking, Collaboration and Communication	2
Total			**30**

Suggested List of Assignments:

6. Draft a Cover Letter and a Resume in response to a job vacancy advertisement (Individual)
7. Role plays and documentation on Professional Etiquettes (Group)
8. Role Play and documentation on Interpersonal Skills (Group)
9. Analysis of case studies on Ethics (Individual)
10. SWOT Analysis (Individual)
11. Assignment on 21st Century Skills (Group)

Suggested Online Courses:

1. LinkedIn Mastery: Creating an awesome profile –

https://www.udemy.com/course/linkedin-mastery-creating-an-awesome-profile/

2. Soft Skills: The 11 Essential Career Soft Skills – https://www.udemy.com/course/soft-skills-the-11-essential-career-soft-skills/
3. Understanding Personality Types at Work – https://www.udemy.com/course/understanding-personality-types-at-work/
4. Speak English Professionally: In Person, Online & On the Phone - https://www.coursera.org/learn/speak-english-professionally
5. How to Write a Resume (Project Centered Course) https://www.coursera.org/learn/how-to-write-a-resume
6. Interviewing and Resume Writing in English Specialization https://www.coursera.org/specializations/english-interview-resume
7. Build Your Professional ePortfolio in English – https://www.coursera.org/learn/eportfolio-english

Reference Books:

1. Wallace and Masters, "Personal Development for Life and Work", Thomson Learning, 2021.
2. Dr. K.Alex, "Soft Skills", S. Chand and company, 2014.
3. Robbins Stephens, "Organizational Behaviour", Pearson Education, 2016.
4. Dorch, Patricia, "What Are Soft Skills?", Executive Dress Publisher, NewYork, 2013.
5. Francis Peter, "Soft Skills and Professional Communication", Tata McGraw Hill, 2019.
6. Kitty O Locker, "Business Communication- Building Critical Skills", McGraw Hill, Sixth Edition.
7. Chaturvedi and Chaturdevi, "Business Communication - Concepts Cases and Applications", Pearson, 2021.
8. Jones, "How to Speak Fluently", Indian Publishing House, 2021.

Course Name: Professional Skills Lab

Course Code: HS02P

NEP Vertical_Basket: Humanities, Social Sciences and Management

Preamble:

The course, Professional Skills for the Workplace, will groom students in the areas of developing professional etiquettes, building digital profiles, imbibing workplace ethics, and organizational behaviour. This course will also be an essential guide in building business communication and soft skills concepts.

Pre-requisites:

Nil

Course Objectives:

Student will be able to:

- Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews, and writing resume.
- Acquire basic proficiency in building a digital profile on LinkedIn, etc. and demonstrate an awareness of professional etiquettes through role play.
- Develop interpersonal skills to build effective professional relations by participating in seminars and quizzes.
- Demonstrate awareness of contemporary issues, knowledge of ethical responsibilities and CSR through case studies.
- Enrich their personality through SWOT analysis, identify their personality traits and learning styles through diagnostic tests.
- Demonstrate awareness of 21st century skills through poster presentation and discussions.

Course Outcome:

Student will be able to:
CO1: Observe and participate in Group Discussions and Mock Interviews on the lines of campus placement training.
CO2: Build a digital profile by demonstrating awareness of a professional persona.
CO3: Identify various interpersonal skills through participation in presentations and role play.
CO4: Differentiate between ethical and non-ethical behaviour through analysis of case studies.
CO5: Identify their personality traits and learning styles through activities like SWOT analysis.
CO6: Demonstrate awareness of 4 C's relevant to 21st Century Skills.

Course Scheme:

Contact Hours		**Credits Assigned**	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

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Suggested list of Practical:

1. Icebreakers – Introducing others.
2. GD Practice Session 01
3. GD Practice Session 02
4. Final GD – ISA
5. Mock Interviews
6. Digital Profiling/ E-portfolio
7. Role Play on Professional Etiquettes
8. Quizzes on interpersonal skills
9. Case Studies on Ethics
10. Personality Enrichment – SWOT Analysis, JOHARI Window
11. Personality Enrichment - Identifying self-learning styles, MBTI test
12. Poster Presentation/Other activities on 21st Century Skills