Syllabus Book

2nd Year B. Tech.
Computer Engineering/
Information Technology

P P Savani University

School of Engineering

Department of Computer Engineering/ Information Technology

Effective From: 2019-20

Authored by: P P Savani University

P P SAVANI UNIVERSITY														
SCHOOL OF ENGINEERING														
TEACHING & EXAMINATION SCHEME FOR SECOND YEAR B.TECH. CE/ IT PROGRAMME														
Sem.	Course Code	Course Title	Offered By	Teaching Scheme					Examination Scheme						
				Contact Hours				Credit	Theory		Practical		Tutorial		Total
				Theory	Practical	Tutorial	Total		CE	ESE	CE	ESE	CE	ESE	
3	SESH2040	Discrete Mathematics	SH	3	0	2	5	5	40	60	0	0	50	0	150
	SECE2011	Database Management System	CE	3	4	0	7	5	40	60	40	60	0	0	200
	SECE1040	Programming with Python	CE	3	4	0	7	5	40	60	40	60	0	0	200
	SECE2021	Digital Workshop	CE	1	2	0	3	2	0	0	20	30	0	0	50
	SECE2031	Data Structures	CE	3	2	0	5	4	40	60	20	30	0	0	150
	SEPD2010	Critical Thinking, Creativity & Decision Making	SEPD	2	0	0	2	2	40	60	0	0	0	0	100
	SECE2910 /SEIT2910	Industrial Exposure	CE	2			0	2	0	0	100	0	0	0	100
						Total	**29**	**25**							**950**
4	SESH2051	Mathematical Methods for Computation	SH	3	0	2	5	5	40	60	0	0	50	0	150
	SEIT2021	Mobile Application Development	IT	3	4	0	7	5	40	60	40	60	0	0	200
	SEIT2031	Operating System	IT	3	2	0	5	4	40	60	20	30	0	0	150
	SECE2040	Computer Organization	CE	3	2	0	5	4	40	60	20	30	0	0	150
	SECE2051	Computer Graphics & Multimedia	CE	3	2	0	5	4	40	60	20	30	0	0	150
	SEPD2020	Values & Ethics	SEPD	2	0	0	2	2	40	60	0	0	0	0	100
	SEPD3030	Foreign Language (German)	SEPD	2			40	60	0	60	0	0	100	0	100
						Total	**31**	**26**							**1000**

CONTENT

Semester 3

Semester 4

P P Savani University
School of Engineering

Department of Science & Humanities

Course Code: SESH2040
Course Name: Discrete Mathematics
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	00	02	05	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- extend concepts of set theory by the study of relation and lattice.
- illustrate mathematical logic with various techniques of program verification.
- apply knowledge of discrete mathematics for problem-solving skills necessary to succeed in the design and analysis of algorithms, database management, software engineering, and computer networks.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Set, Relation & Function** Sets, Set operations, Introduction of Relations, Relations of Sets, Types of Relations, Properties of Relations, Equivalence Relation, Partial Ordering, Hasse Diagram, GLB & LUB, Functions, Classification of functions, Types of functions, Composition of function, Recursive function	08	17
2.	**Lattices** Definition & properties of Lattice, Lattices as Algebraic System, Sublattices, Types of lattices, Distributive lattices, Modular lattices, Complemented lattices, Bounded lattices, Complete lattices, Finite Boolean algebra	07	16
3.	**Group Theory** Binary operations, Properties of Group, Groupoid, semigroup & monoid, Abelian group, Subgroup, Cosets, Normal subgroup, Lagrange's theorem, Cyclic group, Permutation group, Homomorphism & Isomorphism of groups.	08	17

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Mathematical Logic and Proof** Propositions, logical operators, Algebra of proposition, Predicates & quantifiers, Nested Quantifiers, Rules of Inference, Proof Methods, Program Correctness techniques.	06	14
2.	**Graph Theory** Graphs and Graph Models, Graph Terminology and Types of graphs, Representing graphs and Isomorphism, Connectivity, Euler and Hamilton Paths-Circuits, Applications of weighted graphs.	08	18
3.	**Tree** Introduction to Trees, Rooted Tree, Properties of tree, Binary tree, Tree Traversal, Spanning Tree, DFS, BFS, Minimum Spanning Tree, Prim's Algorithm, Kruskal's Algorithm.	08	18

List of Tutorial(s):

Sr. No.	Name of Tutorial	Hours
1.	Problems based on Set, Relation & Function-1	2
2.	Problems based on Set, Relation & Funciton-2	2
3.	Problems based on Set, Relation & Funciton-3	2
4.	Problems based on Lattices	4
5.	Problems based on Group Theory-1	2
6.	Problems based on Group Theory-2	4
7.	Problems based on Mathematical Logic and Proof	2
8.	Problems based on Graph Theory-1	2
9.	Problems based on Graph Theory-2	2
10.	Problems based on Graph Theory-3	4
11.	Problems based on Tree-1	2
12.	Problems based on Tree-2	2

Text Book(s):

Title	Author/s	Publication
Discrete Mathematics and its Applications	Kenneth Rosen	McGraw Hill, New York.

Reference Book(s):

Title	Author/s	Publication
A Textbook of Discrete Mathematics	Dr. Swapan Kumar Sarkar	S. Chand & Company Ltd., New Delhi.
Discrete Mathematical Structure with Applications to Computer Science	J.P. Trembly, R. Manohar	Tata McGraw-Hill Publishing Company Ltd. New Delhi.
Graph Theory with Applications to Engineering and Computer Science	Narsingh Deo	PHI Learning Pvt. Ltd. New Delhi.

Web Material Link(s):

- http://nptel.ac.in/courses/111107058/
- http://nptel.ac.in/courses/111106086/
- http://nptel.ac.in/courses/111104026/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:

- Continuous Evaluation consists of the performance of tutorial which will be evaluated out of 10 marks for each tutorial and average of the same will be converted to 30 marks.
- MCQ based examination consists of 10 marks.
- Internal viva consists of 10 marks.

Course Outcome(s):

After the completion of the course, the student will be able to

- use concepts of set theory for understanding and fetching data from database using query.
- apply knowledge of group theory for data encryption.
- design and use foundational concepts of notations and results of graph theory in information storage and retrieval.
- apply the basic concepts of spanning tree algorithm namely DFA, BFS, Prim's and Kruskal's in the design of networks.

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE2011
Course Name: Database Management System
Prerequisite Course(s): Introduction to Computer Programming (SECE1020)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	04	00	05	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- learn the basic concept of database design and development of database management system.
- understand Query processing of SQL.
- understand the importance of back-end design and relational database management System (RDBMS).

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** File Organization, Comparison of File with DBMS, Application of DBMS, Purpose of DBMS, Views of data - level of abstraction, data independence, database architecture, database users & administrators.	04	10
2.	**Relational Model** Structure of relational databases, Domains, Relations, Relational algebra- operators and syntax, Relational algebra queries.	04	10
3.	**SQL Concepts** Basics of SQL, DDL, DML, DCL, Structure: creation, alteration, Defining constraints: Primary key, Foreign key, Unique key, Not null, check, IN operator, Aggregate functions, Built-in functions: numeric, date, string functions, set operations, Subqueries, correlated sub-queries: Join, Exist, Any, All, view and its types. Transaction control commands- Commit, Rollback, Savepoint.	10	22
4.	**Query Processing** Overview, Measures of query cost, Selection operation, Sorting, Join, Evaluation of expressions.	04	8

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Entity Relational Model** Entity-Relationship model: Basic concepts, Design process Constraints, Keys, Design issues, E-R diagrams, Weak entity sets, extended E-R features- generalization, specialization, aggregation, reduction to E-R database schema.	08	20
2.	**Database Design Concepts** Functional Dependency, definition, Trivial and non-trivial FD, Closure of FD set, closure of attributes, Irreducible set of FD, Normalization: 1NF, 2NF, 3NF, Decomposition using FD, Dependency preservation, BCNF, Multivalued dependency, 4NF Join dependency and 5NF, RAID Concepts.	07	14
3.	**Transaction Management** Transaction concepts, Properties of Transactions, Serializability of transactions, Testing for serializability, system recovery, Two-Phase Commit protocol, Recovery and Atomicity, Log-based recovery, Concurrent executions of transactions and related problems, Locking mechanisms, Solution to Concurrency Related Problems, Deadlock, Two-phase locking protocol.	05	10
4.	**PL/SQL Concepts** Cursors, Stored Procedures, Stored Function, Database Triggers, Indices.	03	6

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction to DBMS, SQL, and SQL tools.	02
2.	Implementation of a client-server architecture using TightVNC Server and Client software (remote access of a server by clients)	02
3.	Introduction to Data Dictionary concepts.	02
4.	Create all the master tables using Data Definition Language Commands like Create and Describe.	02
5.	Implement the use of alter table command.	02
6.	Introduction to Transaction Control Commands like Commit, Rollback and Save point.	02
7.	Use insert command to add data into created tables.	02
8.	Solve queries using update command.	02
9.	Implement SQL queries based on update and delete command.	02
10.	Write SQL queries to solve problems with the use of the select command.	02
11.	Generate different reports using select command.	02
12.	Introduction to SQL functions.	02
13.	Write SQL scripts to implement the listed queries, which require the usage of numerous SQL functions.	02
14.	Introduction to group functions and demonstration of their usage.	02
15.	Implement queries based on group by and having a clause.	02
16.	Execution of queries based on natural and inner joins.	02
17.	Implement SQL queries based on outer join and self-join.	02

18.	Write SQL queries based on group function and join.	02
19.	Introduction to sub-queries and demonstration of their usage.	02
20.	Write SQL queries based on the concept of single row sub-queries.	02
21.	Write SQL queries based on the concept of multiple row sub-queries.	02
22.	Write SQL scripts to generate desired reports using group by, join and sub-queries.	02
23.	Write SQL script to solve the questions based on all SQL concepts.	02
24.	Write the required SQL scripts to implement all the listed queries using Data Control Commands like Grant and Revoke.	02
25.	Introduction to different objects in SQL and create views based on given scenarios.	02
26.	Write the required SQL script to implement the given triggers.	02
27.	Write the required SQL script to implement the given triggers.	02
28.	Write the required SQL script to implement the given functions and procedures using PL/SQL block scripts.	02
29.	Write the SQL scripts to implement the given cursors.	02
30.	Submission of DBMS Mini Project Design.	02

Text Book(s):

Title	Author/s	Publication
Database System Concept	Abraham Silberschatz, Henry F. Korth, S. Sudarshan	McGraw Hill
SQL, PL/SQL-The Programming Language of Oracle	Ivan Bayross	BPB Publications

Reference Book(s):

Title	Author/s	Publication
An Introduction to Database system	C J Date	Addition-Wesley
Fundamental of Database system	R. Elmasri and S.B Navathe	The Benjamin/Cumming
SQL, PL/SQL the Programming Language of Oracle	Ivan Bayross	BPB Publications
Oracle: The Complete Reference	George Koch, Kevin Loney	TMH /Oracle Press

Web Material Link(s):

- https://nptel.ac.in/courses/106105175/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 marks per each practical and the average of the entire practical will be converted to 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks.
- External viva consists of 30 marks.

Course Outcome(s):

After the completion of the course, the student will be able to

- convert physical, data, conceptual data into relational databases.
- utilize database design for the development of software projects.
- apply various database constraints on relational databases.

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE1040
Course Name: Programming with Python
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	04	00	05	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- understand basics of object-oriented programming.
- identify appropriate approach to computational problems.
- develop logic building and problem-solving skills.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Python** History, Features of Python, Applications of Python, Working with Python, Input and Output Functions in Python, Variable Types, Basic Operators and Types of Data Int, Float, Complex, String, List, Tuple, Set, Dictionary and its Methods.	03	6
2.	**Decision Structures in Python** Conditional Blocks Using if, Else and Else If, Simple for Loops in Python, For Loop Using Ranges, String, List and Dictionaries Use of While Loops in Python, Loop Manipulation Using Pass, Continue, Break and Else.	04	5
3.	**Array and Strings in Python** Arrays, Basic Strings, Accessing Strings, Basic Operations, String Slicing, Testing, Searching and Manipulating Strings, Function and Methods.	03	8
4.	**Dictionary, List, Tuples and Sets** Dictionaries, Accessing Values in Dictionaries, Working with Dictionaries, Properties, Functions and Methods. Sets, Accessing Values in Set, Working with Set, Properties, Functions and Methods, Tuple, Accessing	06	8

	Tuples, Operations, Working, Functions and Methods. List, Accessing List, Operations, Working With Lists, Function and methods, two-dimensional lists.		
5.	**Functions, Modules and Packages in Python** Introduction to Functions, Defining a Function, Calling a Function, Types of Functions, Function Arguments, Anonymous Functions, Global and Local Variables, Importing Module, Math Module, Random Module, Introduction to Packages: Numpy, Pandas, Matplotlib.	07	13
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Python Object Oriented Programming** OOP Concept of Class, Object and Instances, Constructor, Class, Attributes, Methods, Using Properties to Control Attribute Access, and Destructors, Inheritance, Overlapping and Overloading Operators. (29-36) 16-4-19 Objects in Python: Creating Python Classes, Modules and Packages, Inheritance in Python, Polymorphism in Python.	08	19
2.	**Files in Python** Introduction to File Input and Output, Writing Data to a File, Reading Data From a File, Additional File Methods, Using Loops to Process Files, Processing Records.	07	15
3.	**Regular Expression in Python** RE Module, Basic Patterns, Regular Expression Syntax, Regular Expression Object, Match Object, Search Object, Findall method, Split method, Sub Method.	03	7
4.	**Exception Handling in Python** Handling IO Exceptions, Working with Directories, Metadata, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions, Throwing Mechanism, Caching Mechanism	04	9

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction to Python (Introduction to IDLE, different data types, Input Output in Python, Operators, Operator precedence).	10
2.	Working with Strings.	08
3.	Implementation of Dictionaries, Sets, Tuples and Lists and its various methods in Python.	10
4.	Working with decision structures in Python	08
5.	Working with functions and modules in Python	04
6.	Working with Object-oriented paradigms in Python	06
7.	Implementation of file handling in Python.	04
8.	Working with RE module in Python.	06
9.	Exception handling in Python.	04

 # Use of different libraries will be covered in Practical Assignments.

Text Book(s):

Title	Author(s)	Publication
Python Programming: A modular approach	Sheetal Taneja, Naveen Kumar	Pearson
Think Python: How to Think Like a Computer Scientist	Allen Downey	Green Tea Press

Reference Book(s):

Title	Author(s)	Publication
Python Cookbook	David Ascher, Alex Martelli Oreilly	O Reilly Media

Web Material Link(s):

- https://www.tutorialspoint.com/python/
- https://www.w3schools.com/python/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests, each of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the Course Coordinator.
- End Semester Examination consists of 60 marks.

Practical:

- Continuous Evaluation consists of the performance of practical which will be evaluated out of 10 for each practical and average of the same will be converted to 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks during End Semester Exam.
- Viva/oral performance consists of 30 marks during End Semester Exam.

Course Outcomes:

After completion of the course, the student will be able to

- develop efficient programs with their own logic & capabilities using Python language.
- understand the syntax and semantics of the 'Python' language.
- apply Python programming principles.

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE2021
Course Name: Digital Workshop
Prerequisite Course(s): Introduction to Computer Programming (SECE1020)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
01	02	00	02	00	00	20	30	00	00	50

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- understand the core concepts of digital logic design like number base representation, boolean algebra etc.
- develop the ability to design combinational and sequential circuits.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Binary Systems** Digital Computers and systems, Types of Data representation, Binary Numbers, Number base conversion, Octal and Hexadecimal Numbers, Complements, Binary Codes, Binary Storage and Registers, Binary Logic, Integrated Circuits.	02	-
2.	**Boolean Algebra and Logic Gates** Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and standard Forms, Logic Operations, Digital Logic gates, IC Digital Logic families.	02	-
3.	**Simplification of Boolean Functions** Map method, Product of sum simplification, NAND and NOR implementations, don't care conditions, Tabulation method.	02	-
4.	**Combinational Logic** Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure, Multilevel NAND Circuits, Multilevel NOR Circuits.	02	-

Section II			
Module	Content	Hours	Weightage in %
1.	**Combinational Logic with MSI and LSI** Introduction, Binary parallel adder, Decimal adder, Magnitude Comparator, Decoders, Multiplexers, Read-Only Memory (ROM), Programmable Logic Array (PLA).	03	-
2.	**Sequential Logic** Introduction, Flip-Flops, Triggering of Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction, and Assignment, Flip-Flop Excitation Tables, Design Procedure, Design of Counters, Design with state equations.	03	-
3.	**PCB Designing** Drawing and printing layout on board, photo etching process, masking process, PCB manufacturing techniques, Software.	01	-

List of Practical:

Sr. No	Name of Practical	Hours
1.	Study and verification of all logic gates	04
2.	Design and Implementation of Half Adder, Half Subtractor circuits	04
3.	Design and Implementation Full Adder and Full Subtractor circuits	04
4.	Understanding the breadboard connection	02
5.	Design and Implementation of Parity Generator and Checker circuits	04
6.	Verification of De Morgan's theorem, the postulates of Boolean algebra and Realization of Sum of Product and Product of Sum expression using universal gates	06
7.	PCB design of a small circuit with its layout using tapes & etching in the lab	06

Text Book(s):

Title	Author/s	Publication
Digital Electronic Principles and Integrated Circuit	Anil K. Maini	Wiley

Reference Book(s):

Title	Author/s	Publication
Digital Circuits and Logic Design	Samuel C. Lee	Prentice Hall India Learning Pvt Ltd.
Digital Logic and Computer Design	M. Morris Mano	Pearson
Fundamentals of Digital Electronics and Circuits	Anand Kumar	Prentice Hall India Learning Pvt Ltd.
Digital Design and Computer Architecture	David Harris & Sarah Harris	Elsevier
Fundamentals of Logic Design	Charles H. Roth Jr.	Jaico Publishing House

Web Material Link(s):

- https://learndigital.withgoogle.com/digitalworkshop-eu

Course Evaluation:

Practical:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 per each practical and average of the same will be converted to 10 marks.
- Students have to submit the project which consists of 10 marks.
- Practical performance/quiz/test consists of 15 marks.
- External viva consists of 15 marks.

Course Outcome(s):

After the completion of the course, the student will be able to

- learn the fundamentals of digital logic design.

design elementary combinational and sequential circuits using boolean algebra and karnaugh map.

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE2031
Course Name: Data Structures
Prerequisite Course(s): Introduction to Computer Programming (SECE1020)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	02	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- understand linear and non-linear data structures and its applications.
- analyze various searching and sorting algorithms and its impacts on data structures.
- develop logic building and problem-solving skills.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Object and Instance, Object-Oriented Concepts, Data types, Types of Data Structure, Abstract Data Types.	04	10
2.	**Array** Array Representation, Array as an Abstract Data Type, Programming Array in C, Sparse Matrices, Sparse Representations, and its Advantages, Row-measure Order and Column-measure Order representation.	04	10
3.	**Searching and Sorting** Linear Search, Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Radix sort.	04	10
4.	**Stack and Queue** Stack Definition and concepts, Operations on stack, Programming Stack using Array in C, Prefix and Postfix Notations and their Compilation, Recursion, Tower of Hanoi, Representation of Queue, Operation on Queue, Programming Queue using Array in C. Types of Queue, Applications of Stack & Queue.	07	15

5.	**Linked List-Part I** Dynamic Memory Allocation, Structure in C, Singly Linked List, Doubly Linked List, circular linked list.	03	5
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Linked List-II and Applications of Linked List** Linked implementation of Stack, Linked implementation of Queue, Applications of Linked List.	03	8
2.	**Trees and Graphs** Graph Definition, Concepts, and Representation, Types of Graphs, Tree Definition, concepts, and Representation. Binary Tree, Binary Tree Traversals, conversion from general to Binary Tree. Threaded Binary Tree, Heap, Binary Search Tree. Tree for Huffman coding, 2-3 Tree, AVL tree, Breadth First Search, Depth First Search, Spanning Tree, Kruskal's and Prim's Minimum Cost Spanning Tree Algorithms, Dijkstra's Shortest Path Algorithm.	12	25
3.	**Hashing** The Symbol Table Abstract Data Types, Hash Tables, Hashing Functions, Hash collision Resolution Technique, Linear Probing.	04	10
4.	**File Structures** Concepts of fields, records and files, Sequential, Indexed, and Relative/Random File Organization.	04	07

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction to Dynamic Memory Allocation	02
2.	Implementation of Structure in C.	02
3.	Write a program to perform Insertion sort.	02
4.	Write a program to perform Selection sort.	02
5.	Write a program to perform Bubble sort.	02
6.	Write a program to perform Linear Search.	02
7.	Write a program to perform Binary Search.	02
8.	Write a program to implement a stack and perform push, pop operation.	02
9.	Write a program to perform the following operations in a linear queue – Addition, Deletion, and Traversing.	02
10.	Write a program to perform the following operations in the circular queue – Addition, Deletion, and Traversing.	02
11.	Write a program to perform the following operations in singly linked list – Creation, Insertion, and Deletion.	02
12.	Write a program to perform the following operations in doubly linked list – Creation, Insertion, and Deletion	02
13.	Write a program to create a binary tree and perform – Insertion, Deletion, and Traversal.	02

14.	Write a program to create a binary search tree and perform – Insertion, Deletion, and Traversal.	02
15.	Write a program for traversal of graph (B.F.S., D.F.S.).	02

Text Book(s):

Title	Author/s	Publication
An Introduction to Data Structures with Applications	Jean-Paul Tremblay, Paul G. Sorenson	Tata McGraw Hill

Reference Book(s):

Title	Author/s	Publication
Data Structures using C & C++	Tanenbaum	Prentice-Hall
Fundamentals of Computer Algorithms	E. Horowitz, S. Sahni, and S. Rajsekaran	Galgotia Publication
Data Structures: A Pseudo-code approach with C	Gilberg & Forouzan	Thomson Learning

Web Material Link(s):

- https://nptel.ac.in/courses/106102064/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:

- Continuous Evaluation consists of the performance of practical, which will be evaluated out of 10 per each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/test consists of 15 marks.
- External viva consists of 15 marks during End Semester Exam.

Course Outcome(s):

After the completion of the course, the student will be able to

- differentiate primitive and non-primitive structures.
- design and apply appropriate data structures for solving computing problems.
- implement different data structures.
- apply sorting and searching algorithms to the small and large datasets.
- analyze algorithms for specific problems.

P P Savani University
School of Engineering

Centre for Skill Enhancement & Professional Development

Course Code: SEPD2010
Course Name: Critical Thinking, Creativity and Decision Making
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	00	02	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- develop a familiarity with the mechanics of critical thinking and logic.
- understand basic concepts of critical and creative thinking.
- explore and understand critical thinking for the purpose of creativity in the context of the professional, social and personal spectrum.
- explore an application critical thinking and creativity in personal, social, academic, global and professional life.
- understand decision making as a skill to be learned through critical thinking.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Critical Thinking** • Concept and meaning of Critical Thinking • Significance of Critical Thinking in personal, social and professional life • Thinking with arguments, evidences, and language	08	25
2.	**Applied Critical Thinking** • Inductive and Deductive Thinking • Questioning for Generating Ideas • Socratic Questioning and its application	07	25
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Conceptual Thinking** • Second-order thinking • Synthesizing •	03	10

2.	**Creative Thinking and Decision Making** • Problem Solving • Adapting Various Structures of Decision Making	06	20
3.	**Moral Thinking** • Generating and structuring ideas • Designing and Evaluating the solutions • Case Study	06	20

Text Book (s)

Title	Author/s	Publication
Thinking Skills for Professionals	B. Greetham, Palgrave	Macmillan, 2010

Reference Book (s):

Title	Author/s	Publication
An Introduction to Critical Thinking and Creativity: Think More, Think Better	J. Y. F. Lau	John Wiley & Sons., New Jersey
Critical Thinking: A Beginner's Guide to Critical Thinking, Better Decision Making, and Problem Solving	Jennifer Wilson	CreateSpace Independent Publishing Platform, 2017
Creativity and Critical Thinking	edited by Steve Padget	Routledge 2013

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Course Outcome(s):

After the completion of the course, the student will be able to

- comprehend the concept and application of critical thinking as well as its applications.
- understand the critical thinking in the context of creativity, logical arguments, moral reasoning.
- understand the application of critical thinking for social, academic, global and professional spectrum.
- correlate their thinking skills for better productivity and outcome-based tasks.
- be in a better position to apply the 360^{o} analysis of the situation for decision making.

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE2910/ SEIT2910
Course Name: Industrial Exposure
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
00	00	00	02	00	00	100	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- get exposed to the industrial spectrum.
- learn the mechanisms of industry/ workplace.
- be aware about work culture and policies of industries.

Outline of the Course:

Sr. No	Content
1.	Selection of Companies
2.	Company Information collection
3.	Report Writing
4.	Presentation & Question-Answer

Course Evaluation:

Sr. No.	Evaluation criteria	Marks
1	Actual work carried & Report Submission	50
2	Final Presentation & Question-Answer session	50
	Grand Total:	**100**

Course Outcome(s):
After completion of the course, the student will be able to
- get acquainted with the industrial scenario.
- be aware about his future prospects in the respective field.
- gain knowledge of work culture and industrial expectations.

Report Writing Guidelines

A. Report Format:

1. Title Page (to be provided by the respective supervisor)

The title page of the project shall give the following information in the order listed:

- Full title of the project as approved by the Mentor;
- The full name of the student/Group of students with enrollment number;
- The qualification for which the project is submitted;
- The name of the institution to which the project is submitted;
- The month and year of submission.

2. Project Certification Form
   [The form should be duly filled signed by the supervisors.]
3. Acknowledgements
   [All persons (e.g. supervisor, technician, friends, and relatives) and organization/authorities who/which have helped in the preparation of the report shall be acknowledged.]
4. Table of Contents/Index with page numbering
5. List of Tables, Figures, Schemes
6. Summary/abstract of the report.
7. Introduction/Objectives of the identified problem
8. Data Analysis and Finding of Solution
9. Application of the identified solution
10. Future Scope of enhancement of the Project and Conclusion
11. "Learning during Project Work", i.e. "Experience of Journey during Project Duration"
12. References(must)
13. Bibliography
14. Annexures (if any)

B. Guideline for Report Formatting:

- Use A4 size page with 1" margin all sides
- Header should include Project title and footer should contain page number and enrollment numbers
- Chapter Name should be of Cambria font, 20 points, Bold
- Main Heading should be of Cambria font, 14 points, Bold
- Sub Heading should be of Cambria font, 12 points, Bold
- Sub Heading of sub heading should be of Cambria font, 12 points, Bold, Italic
- Paragraph should be of Cambria font, 12 points, no margin at the start of the paragraph
- Line spacing for all content – 1.15, before - 0, after - 0
- No chapter number for references
- Before chapter 1, give page numbers in roman letter

P P Savani University
School of Engineering

Department of Science & Humanities

Course Code: SESH2051
Course Name: Mathematical Methods for Computation
Prerequisite Course(s): Elementary Mathematics for Engineers (SESH1010)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	00	02	05	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- recall existing knowledge of calculus and apply it for solving engineering problems involving differential equations.
- introduce partial differential equations with different methods of solution.
- use Laplace transform methods to solve differential equations.
- understand periodic functions expressed as a fourier series and applications of fourier series to odes.
- introduce the basic statistical data analysis and probability distribution.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Ordinary Differential Equation** First order ODEs, Formation of differential equations, Solution of differential equation, Solution of equations in separable form, Exact first order ODEs, Linear first order ODEs, Bernoulli Equation, ODEs of Second and Higher order, Homogeneous linear ODEs, Linear Dependence and Independence of Solutions, Homogeneous linear ODEs with constant coefficients, Differential Operators Nonhomogeneous ODEs, Undetermined Coefficients, Variation of Parameters.	10	20
2.	**Partial Differential Equation** Formation of First and Second order equations, Solution of First order equations, Linear and Non-liner equations of first, Higher order equations with constant coefficients, Complementary function, Particular Integrals.	7	18

3.	**Laplace Transform** Laplace Transform, Linearity, First Shifting Theorem, Existence Theorem, Transforms of Derivatives and Integrals, Unit Step Function, Second Shifting Theorem, Dirac's Delta function, Laplace Transformation of Periodic function, Inverse Laplace transform, Convolution.	6	12
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Fourier Series & Fourier Integral** Periodic function, Euler Formula, Arbitrary Period, Even and Odd function, Half-Range Expansions, Applications to ODEs, Representation by Fourier Integral, Fourier Cosine Integral, Fourier Sine Integral	7	15
2.	**Basics of Statistics** Elements, Variables, Observations, Quantitative and Qualitative data, Corss-sectional and Time series data, Frequency distribution, Dot plot, Histogram, Cumulative distribution, Measure of location, Mean, Median, Mode, Percentile, Quartile, Measure of variability, Range, Interquartile Range, Variance, Standard Deviation, Coefficient of Variation, Regression Analysis, Regression line and regression coefficient, Karl Pearson's method	7	15
3.	**Probability Distribution** Introduction, Conditional probability, Independent events, independent experiments, Theorem of total probability and Bayes' theorem, Probability distribution, Binomial distribution, Poisson distribution, Uniform distribution, Normal distribution.	8	20

List of Tutorials:

Sr No	Name of Tutorial	Hours
1.	Ordinary Differential Equation-1	2
2.	Ordinary Differential Equation-2	2
3.	Ordinary Differential Equation-3	4
4.	Partial Differential Equation-1	2
5.	Partial Differential Equation-2	4
6.	Laplace Transform	2
7.	Fourier Series-1	2
8.	Fourier Series-2	2
9.	Basics of Statistics-1	2
10.	Basics of Statistics-2	4
11.	Probability-1	2
12.	Probability-2	2

Text Book(s):

Title	Author/s	Publication
Advanced Engineering Mathematics	Erwin Kreyszig	Wiley India Pvt. Ltd. New Delhi.
Probability and Statistics for Engineers	Richard A. Johnson Irwin Miller, John Freund	Pearson India Education Services Pvt. Ltd., Noida.

Reference Book(s):

Title	Author/s	Publication
Higher Engineering Mathematics	B. S. Grewal	Khanna Publishers, New Delhi
Advanced Engineering Mathematics	R. K. Jain S.R.K. Iyengar	Narosa Publishing House New Delhi.
Differential Equations for Dummies	Steven Holzner	Wiley India Pvt. Ltd., New Delhi.
Higher Engineering Mathematics	H.K. Dass Er. Rajnish Verma	S. Chand & Company Ltd., New Delhi.

Web Material Link(s):

- http://nptel.ac.in/courses/111105035/
- http://nptel.ac.in/courses/111106100/
- http://nptel.ac.in/courses/111105093/
- http://nptel.ac.in/courses/111108081/
- http://nptel.ac.in/courses/111105041/1

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Tutorial:

- Continuous Evaluation consists of the performance of tutorial, which will be evaluated out of 10 per each tutorial and average of the same will be converted to 15 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/drawing/test of 15 marks during End Semester Exam.
- Viva/Oral performance of 10 marks during End Semester Exam.

Course Outcome(s):

After completion of the course, the student will be able to

- apply the respective 1st and 2nd order ODE and PDE.
- analyze engineering problems (growth, decay, flow, spring and series/parallel electronic circuits) using 1st and 2nd order ODE.
- classify differential equations and solve linear and non-linear partial differential equations.

- apply understanding of concepts, formulas, and problem-solving procedures to thoroughly investigate relevant real-world problems.
- select appropriate method to collect data and construct, compare, interpret and evaluate data by different statistical methods.
- apply concept of probability in decision making, artificial intelligence, machine learning etc.

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT2021
Course Name: Mobile Application Development
Prerequisite Course(s): Object Oriented Programming with Java (SEIT2010)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	04	00	05	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- understand life cycle of an application/activity.
- learn design of responsive mobile applications.
- develop mobile application using open source technologies.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction of Android** Android Operating System, History of Mobile Software Development, Open Handset Alliance (OHA), The Android Platform, Downloading and Installing Android Studio, Exploring Android SDK, Using the Command-Line Tools and the Android Emulator, Build the First Android application, Android Terminologies, Application Context, Application Tasks with Activities, Intents, and Closer Look at Android Activities.	04	05
2.	**Android Application Design and Resource** Anatomy of an Android Application, Android Manifest file, Editing the Android Manifest File, Managing Application's Identity, Enforcing Application System Requirements, Registering Activities and other Application Components, Working with Permissions.	03	05
3.	**Exploring User Interface Screen Elements** Introducing Android Views and Layouts, Displaying Text with TextView, Retrieving Data From Users, Using Buttons, Check Boxes and Radio Groups, Getting Dates and Times from Users, Using Indicators to Display and Data to Users, Adjusting Progress with SeekBar, Providing Users with Options and	08	15

	Context Menus, Handling User Events, Working with Dialogs, Working with Styles, Working with Themes.		
5.	**Designing User Interfaces with Layouts** Creating User Interfaces in Android, View versus View Group, Using Built-In Layout Classes such as Fame Layout, Linear Layout, Relative Layout, Table Layout, Multiple Layouts on a Screen, Data-Driven Containers, Organizing Screens with Tabs, Adding Scrolling Support.	05	15
6.	**Drawing and Working with Animation** Working with Canvases and Paints, Working with Text, Working with Bitmaps, Working with Shapes, Working with Animation.	03	10
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Android Storage APIs** Working with Application Preferences such as Creating Private and Shared Preferences, Adding, Updating, and Deleting Preferences. Working with Files and Directories, Storing SQLite Database such as Creating an SQLite Database, Creating, Updating, and Deleting Database Records, Closing and Deleting a SQLite Database.	07	15
2.	**Content Providers** Exploring Android's Content Providers, Modifying Content Providers Data, Enhancing Applications using Content Providers, Acting as a Content Provider, Working with Live Folders.	04	10
3.	**Networking APIs** Understanding Mobile Networking Fundamentals, Accessing the Internet (HTTP). **Android Web APIs** Browsing the Web with WebView, Building Web Extensions using WebKit, Working with Flash. **Multimedia APIs** Working with Multimedia, Working with Still Images, Working with Video, Working with Audio.	07	15
4.	**Telephony APIs:** Working with Telephony Utilities, Using SMS, Making and Receiving Phone Calls. **Working with Notifications**: Notifying a User, Notifying with Status Bar, Vibrating the Phone, Blinking the Lights, Making Noise, Customizing the Notification, Designing Useful Notification.	04	10

List of Practical:

Sr No	Name of Practical	Hours
1.	Create Hello World Application.	2
2.	Create login application where you will have to validate Email ID and Password.	2
3.	Create an application that will display toast (Message) on specific interval of Time.	2
4.	Create an UI such that, one screen have list of all friends. On selecting of any name, next screen should show details of that friend like Name, Image, Interest, Contact details etc.	4
5.	Create an application that will change color of the screen, based on selected options from the menu.	4
6.	Create an application UI component: ImageButton, Togglebutton, ProgressBar,	4
7.	Create an application UI component: Spinner, DatePicker, TimePicker, SeekBar	4
8.	Create an application UI component: Switch, RatingBar	4
9.	Using content providers and permissions, Read phonebook contacts using content providers and display in list.	4
10.	Create an app to send SMS and email	4
11.	Database Connectivity	4
12.	Create an application to make Insert, Update, Delete and Retrieve operation on the database.	6
13.	Create an application that will play a media file from the memory card.	4
14.	Create application using Google speech API	6
15.	Create application using Google maps API	6

Text Book(s):

Title	Author/s	Publication
Introduction to Android Application Development	Joseph Annuzzi Jr., Lauren Darcey, Shane Conder	Pearson Education

Reference Book(s):

Title	Author/s	Publication
Android Application Development for Dummies, 3rd Edition	Donn Felker	Wiley Publication

Web Material Link(s):

- https://nptel.ac.in/courses/106106156/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:

- Continuous Evaluation consists of performance of practical which will be evaluated out of 10 marks for each practical and average of the same will be converted to 20 marks.
- Internal viva consists of 20 marks.
- Practical performance/quiz/test consists of 30 marks during End Semester Exam.
- Viva/Oral performance consists of 30 marks during End Semester Exam.

Course Outcome(s):

After completion of the course, the students will be able to

- understand the differences between Android and other mobile development environments.
- learn how Android applications work, their life cycle, manifest, intents, and using external resources.
- design and develop useful Android applications with compelling user interfaces by using, extending, and creating your own layouts and views and using menus, data storage and other APIs.

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE2040
Course Name: Computer Organization
Prerequisite Course(s): Basic Understanding of Computer System

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	02	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- provide a comprehensive knowledge of overall basic computer hardware structures.
- learn architectures of various internal and external input output systems.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Basic Computer Organization and Design** Instruction codes, Computer registers, computer instructions Timing and Control, Instruction cycle Memory-Reference Instructions, Input-output and interrupt, Complete computer description, Design of Basic computer, Design of Accumulator Unit.	04	08
2.	**Programming the Basic Computer** Introduction Machine Language, Assembly Language The Assembler, Program loops, Programming Arithmetic and logic operations, subroutines, I-O Programming.	04	08
3.	**Computer Arithmetic** Introduction, Addition and subtraction, Multiplication and Division Algorithms, Floating Point Arithmetic.	05	12
4.	**Central Processing Unit** Introduction, General Register Organization, Stack Organization, Instruction format, Addressing Modes, data transfer and manipulation, Program Control, Reduced Instruction Set Computer (RISC).	05	12
5.	**Micro-programmed Control** Control Memory, Address sequencing, Micro-program Example, Design of control Unit	05	10

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Pipeline and Vector Processing** Flynn's taxonomy, Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction, Pipeline, RISC Pipeline, Vector Processing, Array Processors.	07	16
2.	**Input-Output Organization** Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA, Input-Output Processor (IOP), CPUIOP Communication, Serial communication.	06	14
3.	**Memory Organization** Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.	05	12
4.	**Multiprocessors** Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Arbitration, Inter-processor Communication and Synchronization, Cache Coherence, Shared Memory Multiprocessors.	04	08

List of Practical:

Sr No	Name of Practical	Hours
1.	Study basics of Computer Organization	06
2.	Make all the tables related to an assembler using C.	04
3.	Simulation of Memory Management Technique	06
4.	Make the first pass of an assembler using C.	02
5.	Make the second pass of an assembler using C.	02
6.	Simulation of I/O Device Management	06
7.	Write a program to add two numbers in assembly language.	02
8.	Write a program to print numbers from 1-100 in assembly language.	02

Text Book(s):

Title	Author/s	Publication
Computer System Architecture	M. Morris Mano	Pearson
Structured Computer Organization, 6th Edition	Andrew S. Tanenbaum and Todd Austin	PHI

Reference Book(s):

Title	Author/s	Publication
Computer Architecture & Organization	M. Murdocca & V. Heuring	WILEY
Computer Architecture and Organization	John Hayes	McGrawHill

Web Material Link(s):

- https://nptel.ac.in/courses/106106092/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:

- Continuous Evaluation consists of performance of practical, which should be evaluated out of 10 marks per each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/test consists of 15 marks during End Semester Exam.
- Viva/Oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):

After the completion of the course, the student will be able to

- identify and provide solutions for real-world control problems.
- learn to assemble various computer hardware and middleware.

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT2031
Course Name: Operating System
Prerequisite Course(s): Introduction to Computer Programming (SECE1020)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	02	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- learn the principles of operating system design.
- understand architecture of computer based operating systems and its components.
- understand various software hardware processes and its life cycle.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** What is OS? History of OS, Types of OS, Concepts of OS.	02	06
2.	**Processes and Threads** Process Concept, process state, process control block, Threads, Types of Threads, Multithreading	04	08
3.	**Interprocess Communication** Race Conditions, Critical Regions, Mutual exclusion with busy waiting, sleep and wakeup, semaphores, mutexes, monitors, message passing, barriers; CPU Scheduling: CPU-I/O burst cycle, types of schedulers, context switch, Preemptive Scheduling, Dispatcher, Scheduling criteria; Scheduling algorithms: FCFS, SJF, Priority scheduling, Round-Robin scheduling, Multilevel queue scheduling; Classical IPC Problems: The dining philosopher problem, The readers and writers problem.	12	26
4.	**Deadlocks:** Resources, Conditions for Deadlocks, Deadlock modelling, The ostrich algorithm, Deadlock detection and recovery, Deadlock avoidance, Deadlock prevention, Other issues: Two-phase locking, Communication deadlocks, live locks, starvation.	04	10

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Memory Management** Main memory: Background, Swapping, Contiguous memory allocation, Segmentation, Paging, Structure of page table, Virtual memory: Background, Demand paging, copy-on write, page replacement algorithms: Optimal page replacement, not recently used, FIFO, second chance page replacement, Cloak page replacement, LRU; Allocation of frames, Thrashing.	12	25
2.	**Input Output Management** Principles of I/O hardware: I/O devices, device controllers, memory mapped I/O, DMA; Principles of I/O software: goals of I/O software, programmed I/O, Interrupt driven I/O, I/O using DMA; I/O s/w layers: Interrupt handlers, device drivers, device dependent I/O s/w, user space I/O s/w; Disks: RAID, disk arm scheduling algorithms, error handling.	07	15
3.	**File Systems** Introduction; Files: naming, structure, types, access, attributes, operations; Directories: single level, hierarchical, path names, directory operations.	04	10

List of Practical:

Sr No	Name of Practical	Hours
1.	Study of basic commands of Linux.	02
2.	Study of Advance commands and filters of Linux/UNIX.	02
3.	Write shell scripts to perform several computations like add numbers, subtract numbers, find average, percentage. Also find factorial of a given number. Generate Fibonacci series etc.	04
4.	Simulate CPU scheduling algorithms. (E.g. FCFS, SJF, Round Robin etc.)	06
5.	Simulate contiguous memory allocation techniques. (E.g. Worst-fit, Best-fit, Next-fit, First-fit).	04
6.	Simulate banker's algorithm for deadlock avoidance.	04
7.	Simulate page replacement algorithms. (E.g. FIFO, LRU, Optimal)	04
8.	Simulate disk scheduling algorithms. (E.g. FCFS,SCAN,C-SCAN)	04

Text Book(s):

Title	Author/s	Publication
Operating System Principles	Silberschatz A., Galvin P. and Gagne G	Wiley
Modern Operating System	Andrew S. Tanenbaum	Pearson

Reference Book(s):

Title	Author/s	Publication
Operating Systems: Internals and Design Principles	William Stallings	Pearson

UNIX and Shell Programming	Behrouz A. Forouzan, Richard F. Gilberg	Cengage Learning
Operating Systems	Dhamdhere D. M	Tata McGraw Hill

Web Material Link(s):

- https://nptel.ac.in/courses/106106144/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:

- Continuous Evaluation consists of performance of practical, which will be evaluated out of 10 per each practical. At the end of the semester, average of the entire practical will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/test consists of 15 marks during End Semester Exam.
- Viva/Oral performance consists of 15 Marks during End Semester Exam.

Course Outcome(s):

After the completion of the course, the student will be able to

- learn the fundamentals of Operating System design.
- understand and differentiate various operating system architectures and its interfaces.
- perform inter-process communication.

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE2051
Course Name: Computer Graphics & Multimedia
Prerequisite Course(s): Introduction to Computer Programming (SECE1020)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
03	02	00	04	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help the learners to

- understand concepts of computer graphics & multimedia.
- learn basics of graphics and rendering algorithms in 2D and 3D.
- analyze and understand various aspects of computer vision technologies.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Graphics** Basic of Computer Graphics, Applications of computer graphics, Display devices, Random and Raster scan systems, Graphics input devices, Graphics software and standards	07	10
2.	**Graphics Primitives** Points, lines, circles and ellipses as primitives, scan conversion algorithms for primitives, Fill area primitives including scan-line polygon filling, inside-outside test, boundary and flood-fill, character generation, line attributes, area-fill attributes, character attributers.	08	20
3.	**2D Transformation and Viewing** Transformations (translation, rotation, scaling), matrix representation, homogeneous coordinates, composite transformations, reflection and shearing, viewing pipeline and coordinates system, window-to-viewport transformation, clipping including point clipping, line clipping (cohen-sutherland, liang- bersky , NLN), polygon clipping	08	20

Section II			
Module	Content	Hours	Weightage in %
1.	**3D Concepts and Object Representation** 3D display methods, polygon surfaces, tables, equations, meshes, curved lies and surfaces, quadric surfaces, spline representation, cubic spline interpolation methods, Bazier curves and surfaces, B-spline curves and surfaces	08	20
2.	**3D transformation and Viewing** 3D scaling, rotation and translation, composite transformation, viewing pipeline and coordinates, parallel and perspective transformation, view volume and general (parallel and perspective) projection transformations	06	10
3.	**Surface Detection** Visible surface detection concepts, back-face detection, depth buffer method, illumination, light sources, illumination methods (ambient, diffuse reflection, specular reflection), Color models: properties of light, XYZ, RGB, YIQ and CMY color model	06	15
4.	**Multimedia** Characteristics of a multimedia presentation, Uses of Multimedia, Text –Types, Unicode Standard, text Compression, Text file formats, Audio Components of an audio system, Digital Audio, Digital Audio processing, Sound cards, Audio file formats, Audio Processing software, Video-Video color spaces, Digital Video, Digital Video processing, Video file formats.	02	05

List of Practical:

Sr No.	Name of Practical	Hours
1.	Introduction to computer graphics and multimedia tools.	02
2.	To study the various graphics functions in C language.	02
3.	Develop the DDA Line drawing algorithm using C language.	02
4.	Develop the Bresenham's Line drawing algorithm using C language.	04
5.	Develop the Bresenham's Circle drawing algorithm using C language.	04
6.	Develop the C program for to display different types of lines.	04
7.	Perform the following 2D transformation operation Translation, Rotation and Scaling.	02
8.	Perform the Line Clipping Algorithm.	02
9.	Perform the Polygon clipping algorithm.	02
10.	Perform the basic transformations such as Translation, Scaling, Rotation for a given 3D object.	02
11.	Design and development of a mini project in the area of computer graphics and multimedia. (It will include animation in 2D, 3D and various shapes.)	04

Text Book(s):

Title	Author(s)	Publication
Computer Graphics – C Version	D. Hearn, P. Baker	Pearson Education

Reference Book(s):

Title	Author(s)	Publication
Computer Graphics	Foley, van Dam	Pearson Education
Computer Graphics	Sinha, Udai	TMH
Computer Graphics with OpenGL	Hearn, Baker	Pearson

Web Material Link(s):

- https://nptel.ac.in/courses/106106090/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Practical:

- Continuous Evaluation consists of performance of practical, which should be evaluated out of 10 marks per each practical. At the end of the semester, average of the entire practical will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/test consists of 10 marks during End Semester Exam.
- Viva/oral performance consists of 20 marks during End Semester Exam.

Course Outcome(s):

After completion of the course, the students will be able to

- learn basics of graphics and rendering algorithms in 2D and 3D.
- analyze and implement various computer vision technology-based applications.
- design and develop various computer graphics & multimedia-based applications.

P P Savani University
School of Engineering

Centre for Skill Enhancement & Professional Development

Course Code: SEPD2020
Course Name: Values and Ethics
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	00	02	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to:
- develop a familiarity with the mechanics of values and ethics.
- understand basic concepts of values and ethics
- explore and understand values, ethics in context of professional, social and persona spectrum
- explore an understand values, ethics in context of globalization and global issues
- explore an application of values and ethics in personal, social, academic, global and professional life.
- facilitate to understand harmony at all the levels of human living and live accordingly.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Values** • Definition and Concept • Types of Values • Values and its Application	03	10
2.	**Elements and Principles of Values** • Universal & Personal Values • Social, Civic & Democratic Values • Adaptation Models & Methods of Values	06	20
3.	**Values and Contemporary Society** • Levels of Value Crisis • Value Crisis Management • Values in Indian Scriptures	06	20
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Ethics and Ethical Values** • Definition and Concept • Acceptance and Application of Ethics • Ethical Issues and Dilemma • Universal Code of Ethics: Consequences of Violation	07	25

2.	**Applied Ethics** • Professional Ethics • Organizational Ethics • Ethical Leadership • Ethics in Indian Scriptures	08	25

Text Book(s)

Title	Author/s	Publication
Values and Ethics in Business and Profession	Samita Manna, Suparna Chakraborti	PHI Learning Pvt. Ltd., New Delhi, 2010

Reference Book(s):

Title	Author/s	Publication
Just a Job?: Communication, Ethics, and Professional life	George Cheney	Oxford University Press, 2010
Professional Ethics and Human Values	M. Govindarajan, S. Natarajan, V. S. Senthilkumar	PHI Learning Pvt. Ltd, 2013
Creating Values In Life: Personal, Moral, Spiritual, Family and Social Values	Ashok Gulla	Author House, Bloomington, 2010
E-Book(s)		
• Ethics for Everyone, Arthur Dorbin, 2009. (http://arthurdobrin.files.wordpress.com/2008/08/ethics-for-everyone.pdf) • Values and Ethics for 21st Century, BBVA. (https://www.bbvaopenmind.com/wp-content/uploads/2013/10/Values-and-Ethics-for-the-21st-Century_BBVA.pdf)		

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which will be converted out of 30 marks.
- Faculty evaluation consists of 10 marks as per the guidelines provided by the course coordinator.
- End Semester Examination consists of 60 marks.

Course Outcome(s):

After the completion of the course, the student will be able to

- understand and relate the concepts and mechanics of values and ethics in their life.
- correlate the significance of value and ethical inputs in and get motivated to apply them in their life and profession.
- realize the significance of value and ethical inputs in and get motivated to apply them in social, global and civic issues.
- apply such principles with reference to Indian scriptures.

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Center for Skill Enhancement and Professional Development

Course Code: SEPD3030
Course Name: Foreign Language (German)
Prerequisite Course(s): --

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
02	00	00	02	40	60	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to

- develop and integrate the use of the four language skills i.e. listening, speaking, reading and writing.
- use the language effectively and appropriately on topics of everyday life situations.
- develop an interest in the appreciation of German.
- develop an intercultural awareness.
- enhance the ability of the candidates to express their ideas and feelings in their own words and for them to understand the use of correct language.
- appreciate the language as an effective means of communication.
- understand language when spoken at normal conversational speed in everyday life situations.
- understand the basic structural patterns of the language, vocabulary and constructions.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	Introduction to German • Alphabets • German accents • German Numbers • What are the similarities and differences between English and German? • Greetings	02	15
2.	German Time • Basic Introduction	02	08
3.	Vocabulary part-1 • The days of the week	02	05

	• The months of the year • Seasons • Directions • Weather		
4.	Vocabulary part-2 • Family • Colors and Shapes • Day/time indicators • Body parts • Clothing	02	07
5.	Vocabulary Part-3 • Food and Meals • Fruits, Vegetables and Meats • Sports and Hobbies	02	05
6.	• Transportation • House and Furniture	02	05
7.	• School Subject • Places • Common Expressions	02	05
Section II			
Module No.	Content	Hours	Weightage in %
1.	German grammar • Verb Sein (to be) • Verb Haben (to have) • Introduction of Regular verbs and Irregular verb • Konjugation of Regular verb • First group verbs ('EN' group)	02	10
2.	• Konjugation of Regular verbs • Second group verbs ('Ten/Den' group) • Konjugation of Irregular verbs • Third group verbs (Stem change verb) • Fourth group verbs (Spell Change Verb)	02	10
3.	• Nicht trennbare und trennbare Verben • Die Modalverben • Personalpronomen-Nominativ	02	10
4.	• W-Frage • Ja/Nein-Fragen • Nomen und Artikel-Nominativ • Die Anrede	02	10
5.	• Nomen-Genusregein • Adjektiv • Nomen und Artikel-Akkusativ • Personalpronomen-Akkusativ	02	10

6.	• Practice of Writing • Practice of Speaking	02	-
7.	• Practice of Listening	2	-
8.	• Practice of Reading	2	-

Text Book(s):

Title	Author/s	Publication
Namaste German	Yoshita Dalal	Yoshita Dalal

Reference Book(s):

Title	Author/s	Publication
Fit In Deutsch	Hueber	Goyal Publication

Web Material Link(s):

- https://www.youtube.com/watch?v=iGovllrEsF8&list=PLRps6yTcWQbpoqIOCmqMeI1HLnLIRmO_t
- https://www.youtube.com/watch?v=GwBfUzPCiaw&list=PL5QyCnFPRx0GxaFjdAVkx7K9TfEklY4sg

Course Evaluation:

Theory:

- Continuous Evaluation consists of a test of 30 marks and 1 hour of duration.
- Faculty evaluation consists of 10 marks as per the guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks exam.

Course Outcome(s):

After the completion of the course, the student will be able to

- demonstrate speaking, reading, writing and listening in German.
- understand German Technology.
- communicate easily in four Language and they can get good job in German Company.
- demonstrate the level of proficiency necessary to enable them to function in an environment where German is used exclusively.