Syllabus Book

B. Tech.

(Computer Science Engineering)

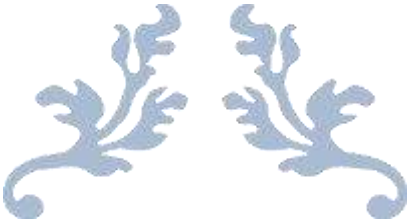
P P Savani University

School of Engineering

Effective From: 2021-22

Authored by: P P Savani University

CONTENT



FIRST YEAR B. TECH.

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

TEACHING & EXAMINATION SCHEME FOR B. TECH. COMPUTER SCIENCE ENGINEERING PROGRAMME AY: 2021-22

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	
1	SESH1070	Fundamentals of Mathematics	SH	2	0	2	4	4	40	60	0	0	50	0	150
	SECV1040	Basics of Civil & Mechanical Engineering	CV	4	2	0	6	5	40	60	20	30	0	0	150
	SECE1050	Programming for Problem Solving	CE	3	4	0	7	5	40	60	40	60	0	0	200
	SESH1240	Electrical & Electronics Workshop	SH	0	2	0	2	1	0	0	50	0	0	0	50
	SEHV1010	Universal Human Values-I	SH	2	0	0	2	0	100	0	0	0	0	0	100
						Total	**21**	**15**							**650**
2	SESH1080	Linear Algebra & Calculus	SH	3	0	2	5	5	40	60	0	0	50	0	150
	SEIT1030	Object Oriented Programming with Java	IT	3	4	0	7	5	40	60	40	60	0	0	200
	SEIT1010	Introduction to Web Designing	IT	0	2	0	2	1	0	0	50	0	0	0	50
	SEME1020	Engineering Workshop	ME	0	2	0	2	1	0	0	50	0	0	0	50
	SEME1040	Concepts of Engineering Drawing	ME	2	2	0	4	3	40	60	20	30	0	0	150
	SESH1210	Applied Physics	SH	3	2	0	5	4	40	60	20	30	0	0	150
	CFLS1010	Linguistic Proficiency	CFLS	2	0	0	2	2	40	60	0	0	0	0	100
						Total	**27**	**21**							**850**

P P Savani University
School of Engineering

Department of Applied Science and Humanities

Course Code: SESH1070
Course Name: Fundamentals of Mathematics
Prerequisite Course(s): Algebra, Geometry, Trigonometry &Pre-Calculus till 12th Standard level

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
2	0	2	4	40	60	0	0	50	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- summarize concept of calculus to enhance ability of analysing mathematical problems.
- acquire knowledge and ability to work with differentiation and integration for
- applications of mathematical techniques in engineering.
- develop the tool of power series for learning advanced Engineering Mathematics.
- analyse and solve system of linear equations and understand characteristics of Matrices.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1	**Calculus** Limits, Continuity, Types of Discontinuity, Successive Differentiation, Rolle's Theorem, LMVT, CMVT, Maxima and Minima.	8	28
2	**Sequence and Series-I** Convergence and Divergence, Comparison Test, Integral Test, Ratio Test, Root Test, Alternating Series, Absolute and Conditional Convergence.	6	20
Section II			
Module No.	Content	Hours	Weightage in %
1	**Sequence and Series-II** Power series, Taylor and Macluarin series, Indeterminate forms and L'Hospitals Rule.	6	20
2	**Matrix Algebra** Elementary Row and Column operations, Inverse of matrix, Rank of matrix, System of Linear Equations, Characteristic	10	32

	Equation, Eigen values and Eigen vector, Diagonalization, Cayley Hamilton Theorem, Orthogonal Transformation		

List of Tutorial:

Sr. No.	Name of Tutorial	Hours
1.	Calculus-1	2
2.	Calculus-2	2
3.	Integration	2
4	Sequence and Series-1	2
5.	Sequence and Series-2	2
6.	Sequence and Series-3	2
7.	Matrix Algebra-1	2
8.	Matrix Algebra-2	2
9.	Matrix Algebra-3	2
10.	Matrix Algebra-4	2

Text Book(s):

Title	Author/s	Publication
Thomas' Calculus	George B. Thomas, Maurice D. Weir & Joel Hass	Pearson
Elementary linear Algebra	Howard Anton and Chrish Rorres	Wiley

Reference Book(s):

Title	Author(s)	Publication
Advanced Engineering Mathematics	E Kreyszig	John Wiley and Sons
A textbook of Engineering Mathematics	N P Bali and Manish Goyal	Laxmi
Higher Engineering Mathematics	B S Grewal	Khanna
Engineering Mathematics for First Year	T Veerarajan	Tata Mc Graw Hill
Engineering Mathematics-1 (Calculus)	H. K. Dass, Dr. Rama Verma	S. Chand

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.

Tutorial:

- Continuous Evaluation consists of 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

SESH1070	FUNDAMENTALS OF MATHEMATICS
CO 1	To recall the concepts of limit, continuity and differentiability for analysing mathematical problems.
CO 2	Explain concepts of limit, derivatives and integrals.
CO 3	Analyze the series for its convergence and divergence to slove real world problems.
CO 4	Evaluate linear system using matrices.
CO 5	Adapt the knowledge of eigenvalues and eigenvectors for matrix diagonalization

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Calculus	1, 2, 3, 4
2	Sequence and Series-I	1, 2, 3, 4
3	Sequence and Series-II	1, 2, 3, 4
4	Matrix Algebra	1, 2, 3, 4

P P Savani University
School of Engineering

Department of Civil Engineering

Course Code: SECV1040
Course Name: Basics of Civil & Mechanical Engineering
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	
4	2	0	5	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- study the fundamentals of mechanical systems.
- study and appreciate significance of mechanical engineering in different fields of engineering.
- carry out simple land survey and recent trends in civil engineering.
- understand components of building, building terminology and construction materials.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Civil Engineering: An Overview** Introduction, Branches, Scope, Impact, Role of Civil Engineer, Unit of Measurement, Unit Conversion (Length, Area, Volume)	03	04
2.	**Introduction to Surveying and Levelling:** Introduction, Fundamental Principles, Classification **Linear Measurement:** Instrument Used, Chaining on Plane Ground, Offset, Ranging **Angular Measurement:** Instrument Used, Meridian, Bearing, Local Attraction **Levelling:** Instrument Used, Basic Terminologies, Types of Levelling, Method of Levelling **Modern Tools:** Introduction to Theodolite, Total Station, GPS	07	12
3.	**Building Materials and Construction:** Introduction (Types and Properties) to Construction Materials Like Stone, Bricks, Cement, Sand, Aggregates, Concrete, Steel. Classification of Buildings, Types of Loads	10	14

	Acting on Buildings, Building Components and their Functions, Types of Foundation and Importance, Symbols Used in Electrical Layout, Symbols Used for Water Supply, Plumbing and Sanitation		
4.	**Construction Equipment:** Types of Equipment- Functions, Uses. Hauling Equipment- Truck, Dumper, Trailer. Hoisting Equipment- Pulley, Crane, Jack, Winch, Sheave Block, Fork Truck. Pneumatic Equipment- Compressor. Conveying Equipment- Package, Screw, Flight/scrap, Bucket, Belt Conveyor. Drill, Tractor, Ripper, Rim Pull, Dredger, Drag Line, Power Shovel, JCB, HOE.	04	08
5.	**Recent Trends in Civil Engineering:** Mass Transportation, Rapid Transportation, Smart City, Sky Scarper, Dams, Rain Water Harvesting, Batch Mix Plant, Ready Mix Concrete Plant, Green Building, Earth Quake Resisting Building, Smart Material	06	12
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Basic Concepts of Thermodynamics:** Prime Movers - Meaning and Classification; the Concept of Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific Heat Capacity, Internal Energy, Specific Volume; Thermodynamic Systems, All Laws of Thermodynamics	04	06
2.	**Fuels and Energy:** Fuels Classification: Solid, Liquid and Gaseous; their Application, Energy Classification: Conventional and Non-Conventional Energy Sources, Introduction and Applications of Energy Sources like Fossil Fuels, Solar, Wind, and Bio-Fuels, LPG, CNG, Calorific Value	04	06
3.	**Basics of Steam Generators:** Introduction, Classification, Cochran, Lancashire and Babcock and Wilcox Boiler, Functioning of Different Mountings and Accessories	LAB	12
4.	**Basics of I.C Engines:** Construction and Working of 2 Stroke & 4 Stroke Petrol and Diesel Engines, Difference Between 2-Stroke - 4 Stroke Engine & Petrol-Diesel Engine, Efficiency of I. C. Engines	12	14
5.	**Power Transmission Elements:** Construction and Applications of Couplings, Clutches and Brakes, Difference Between Clutch and Coupling, Types of Belt Drive and Gear Drive	10	12

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Unit conversation Exercise and Chart preparation of building components	02
2.	Linear measurements	02
3.	Angular measurements	02
4.	Determine R. L of given point by Dumpy level. (Without Change Point)	02
5.	Determine R. L of given point by Dumpy level. (With Change Point)	02
6.	Presentation on various topics as in module about recent trends	04
7.	To understand construction and working of various types of boilers	04
8.	To understand construction and working of mountings	04
9.	To understand construction and working of accessories	04
10.	To understand construction and working 2 –stroke & 4 –stroke Petrol Engines	02
11.	To understand construction and working 2 –stroke & 4 –stroke Diesel Engines	02

Text Book(s):

Title	Author(s)	Publication
Elements of Mechanical Engineering	S. B. Mathur, S. Domkundwar	Dhanpat Rai & Sons Publications
Elements of Mechanical Engineering	Sadhu Singh	S. Chand Publications
Elements of Civil Engineering	Anurag A. Kandya	Charotar Publication
Surveying Vol. I & II	Dr. B. C. Punamia	Laxmi Publication

Reference Book(s):

Title	Author(s)	Publication
Thermal Engineering	R. K. Rajput	Laxmi Publications
Basic Mechanical Engineering	T.S. Rajan	Wiley Eastern Ltd., 1996.
Surveying and Levelling	N. N. Basak	Tata McGraw Hill
Surveying Vol. I	S. K. Duggal	Tata McGraw Hill
Surveying and Levelling	R. Subramanian	Oxford University
Building Construction and Construction Material	G. S. Birdie and T. D. Ahuja	Dhanpat Rai Publishing
Engineering Material	S.C. Rangwala	Charotar Publication

Web Material Link(s):

- http://nptel.ac.in/course.php
- http://nptel.ac.in/courses/105107157/
- http://nptel.ac.in/courses/105101087/
- http://nptel.ac.in/courses/105107121/
- http://nptel.ac.in/courses/105104100/

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 Course Coordinator.
- End Semester Examination will consist 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 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/drawing/test of 15 marks during End Semester Exam.
- Viva/Oral performance of 15 marks during End Semester Exam.

Course Outcome(s):

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

SECV1040	**BASICS OF CIVIL & MECHANICAL ENGINEERING**
CO 1	Apply the principles of basic mechanical engineering.
CO 2	Comprehend the importance of mechanical engineering equipments like ic engine and power transmission elements.
CO 3	Understand different structural loads, components , materials and equipments used in the construction of a building.
CO 4	Adapt various methods of area plotting and marking before starting the construction activity.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1.	Civil Engineering: An Overview	1,2,3
2.	Introduction to Surveying and Levelling:	1,2
3.	Building Materials and Construction:	1,2
4.	Construction Equipment:	1,2
5.	Recent Trends in Civil Engineering:	1,2
6.	Basic Concepts of Thermodynamics:	1,2,3
7.	Fuels and Energy:	1,2,3
8.	Basics of Steam Generators:	1,2
9.	Basics of I.C Engines:	1,2
10.	Power Transmission Elements:	1,2

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE1050
Course Name: Programming for Problem Solving
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	
3	4	0	5	40	60	40	60	0	0	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand the basic components of a computer system.
- identify an 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 Computers:** Introduction, Central Processing Unit, Main Memory Unit, Interconnection of Units, Communication between Units of a Computer System. Memory Representation and Hierarchy, Random Access Memory, Read-only Memory, Classification of Secondary Storage Devices, Types of I/O Devices. Classification of Programming Languages, Generations of Programming Languages - Machine Language, Assembly Language, High-Level Language, 4GL.	04	10
2.	**Introduction to C, Constants, Variables and Data Types:** Features of C Language, the Structure of C Program, Flow Charts and Algorithms Types of Errors, Debugging, Tracing the Execution of the Program, Watching Variables Values in Memory. Character Set, C Tokens, Keyword and Identifiers, Constants and Variables, Data Types - Declaration and Initialization, User Define Type Declarations - Typedef, Enum, Basic Input, and Output Operations, Symbolic Constants, Overflow and Underflow of Data.	06	15

3.	**Operators, Expressions, and Managing I/O Operations:** Introduction to Operators and its Types, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associatively. Introduction to Reading a Character, Writing a Character, Formatted Input and Output.	05	10
4.	**Conditional Statements:** Decision Making & Branching: Decision Making with If and If - else Statements, Nesting of If-else Statements, The Switch and go-to statements, Ternary (?:) Operator. Looping: The while Statement, The Break Statement & The Do. While loop, The FOR loop, Jump within loops - Programs.	07	15
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Arrays:** Introduction, One-dimensional Arrays, Two-dimensional Arrays, Concept of Multidimensional Arrays.	05	12
2.	**Strings:** Declaring and Initializing String Variables, Arithmetic Operations on Characters, Putting Strings Together, Comparison of Two Strings, String Handling Functions.	04	10
3.	**User-Defined Functions:** Concepts of User-defined Functions, Prototypes, function Definition, Parameters, Parameter Passing, Calling a Function, Recursive Function, Macros and Macro Substitution	04	10
4.	**Structure and Unions:** Introduction, Structure Definition, Declaring and Initializing Structure Variables, Accessing Structure Members, Copying & Comparison of Structures, Arrays of Structures, Arrays within Structures, Structures within Structures, Structures and Functions, Unions.	04	08
5.	**Pointers and File Management:** Basics of Pointers, a Chain of Pointers, Pointer and Array, Pointer to an Array, an Array of Pointers, Pointers and Functions, Dynamic Memory Allocation. Introduction to file Management and its Functions.	06	10

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction to Unix Commands (creating a folder, creating a file, deleting a file, renaming files, copy a file from one location to another, listing entire directories and files, list directories, listing files, moving files from one location to another)	02
2.	Introduction to C programming environment, compiler, Linker, loader, and editor.	02

3.	Working with basic elements of C languages (different input functions, different output functions, different data types, and different operators)	06
4.	Working with C control structures (if statement, if-else statement, nested if-else statement, switch statement, break statement, goto statement)	06
5.	Working with C looping constructs (for loop, while loop, do-while and nested for loop)	10
6.	Working with the array in C (1-D array, and 2-D array)	04
7.	Working with strings in C (input, output, different string inbuilt functions)	04
8.	Working with user-defined functions in C (function with/without return type, function with/without argument, function and array)	06
9.	Working with recursive function in C	02
10.	Working with structure and union in C (structure declaration, initialization, an array of structures, structure within structure, structure and functions, an array within structure and union)	08
11.	Working with pointer in C (initialization, pointer to pointer, pointer and array, an array of pointer, pointer and function)	06
12.	Working with files in C (opening a file, data insertion, and extraction from file, file management functions)	04

Text Book(s):

Title	Author/s	Publication
Programming in ANSI C	E. Balagurusamy	Tata McGraw Hill
Introduction to Computer Science	ITL Education Solutions Limited	Pearson Education

Reference Book(s):

Title	Author(s)	Publication
Programming in C	Ashok Kamthane	Pearson
Let Us C	Yashavant P. Kanetkar	Tata McGraw Hill
Introduction to C Programming	ReemaThareja	Oxford Higher Education
Programming with C	Byron Gottfried	Tata McGraw Hill

Web Material Link(s):

- http://www.digimat.in/nptel/courses/video/106104128/L01.html
- https://www.youtube.com/watch?v=3QiItmIWmOM

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 practical performance which should 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-voce consists of 30 marks during End Semester Exam.

Course Outcome(s):

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

SECE1050	**PROGRAMMING FOR PROBLEM SOLVING**
CO 1	Observe and interpret the concepts for data representation, algorithms and coding methods in computer system.
CO 2	Immediately analyze the syntax and semantics of the "c" language and apply in program.
CO 3	Manage the less memory usage while developing the program.
CO 4	Classify the types of errors occur while running the program.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction to Computers	1,2
2	Introduction to C, Constants, Variables and Data Types	1,2,3
3	Operators, Expressions, and Managing I/O Operations	3,4
4	Conditional Statements	2,3,4
5	Arrays	2,3
6	Strings	2,3
7	User-Defined Functions	2,3,4
8	Structure and Unions	1,2,3
9	Pointers and File Management	2,3

P P Savani University
School of Engineering

Department of Applied sciences & Humanities

Course Code: SESH1240
Course Name: Electrical & Electronics Workshop
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	
0	2	0	1	0	0	50	0	0	0	50

CE: Continuous Evaluation, ESE: End Semester Exam

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

- identify basic fundamental electronic components in circuits.
- learn to use common electronic component on breadboard.
- understand components of instruments, terminology and applications.

List of Practical:

Sr No	Name of Practical	Hours
1	Understanding of electronic component with specification.	2
2	Understanding of Galvanometer, Voltmeter, Ammeter, Wattmeter and Multimeter	2
3	Understanding of breadboard connections	2
4	Drawing and wiring of basic circuits on breadboard	2
5	Verification of Ohm's law	2
6	Half wave, full wave using centre tap transformer and full wave bridge rectifier	3
7	Kirchhoff's laws (KVL,KCL).	3
8	Faraday's laws of Electromagnetic Induction and Electricity Lab	4
9	LDR characteristics	2
10	Study of CRO, measurement of amplitude (voltage) & time period (frequency)	4
11	PCB designing	4

Text Book:

Title	Author/s	Publication
Electronic Principles	Albert Malvino and David J Bates	Mc Graw Hill(7th Edition)

Reference Book:

Title	Author/s	Publication
Electronic Devices	Thomas L. Floyd	Pearson (7th Edition)
Electronic Devices and Circuits	David A. Bell	Oxford Press (5th Edition)
Integrated Electronics	Jacob Millman, Christos	Tata McGraw Hill (2nd Edition)

Course Evaluation:

Practical:

- Continuous Evaluation Consist of Performance of Practical which should be evaluated out of 10 for each practical in the next turn and average of the same will be converted to 20 Marks.
- Internal viva consists of 20 marks.

Course Outcome(s):

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

SESH1240	**ELECTRICAL & ELECTRONICS WORKSHOP**
CO 1	Identify the ability to design various electronic circuit on a bread board.
CO 2	Recognize the basic electronic devices and components in a circuit connection.
CO 3	Identify the ability to design a pcb.
CO 4	Define the practical side of basic physics laws.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
01	Electronic Components	1,2,3,4
02	Electronic Devices	1,2,3,4
03	Understanding of Breadboard	1,2,4,5,6
04	Wiring of Breadboard	1,2,4,5,6
05	Ohm’s Law	1,2,3,4
06	Rectifiers	1,2,3,5,6
07	KCL & KVL	1,2,3,4,6
08	LDR	1,2,3,6
09	Electricity Lab	1,2,3,4
10	CRO	1,2,4,5
11	PCB	1,2,6

P P Savani University
School of Engineering

Department of Applied Science and Humanities

Course Code: SESH1080
Course Name: Linear Algebra & Calculus
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	
3	0	2	5	40	60	-	-	50	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- learn about and work with vector space, linear transformation and inner product space.
- apply concepts of linear algebra for solving science and engineering problems.
- introduce the concept of improper integral and Beta-Gamma Function.
- develop the tool of Fourier series for learning advanced Engineering Mathematics.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Vector Space** Concept of vector space, Subspace, Linear Combination, Linear Dependence and Independence, Span, Basis and Dimension, Row Space, Column Space and Null Space, Rank and Nullity.	9	20
2.	**Linear Transformation** Introduction of Linear Transformation, Kernal and Range, Rank and Nullity, Inverse of Linear Transformation, Rank Nullity Theorem, Composition of Linear Maps, Matrix associated with linear map.	7	15
3.	**Inner Product Space** Inner Product, Angle and Orthogonality, Orthogonal projection, Gram- Schmidt process and QR Decomposition, Least square decomposition, Change of basis.	7	15

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Beta and Gamma function** Improper Integrals, Convergence, Properties of Beta and Gamma Function, Duplication Formula (without proof)	6	14
2.	**Fourier Series** Periodic Function, Euler Formula, Arbitrary Period, Even and Odd function, Half Range Expansion, Parseval's Theorem	8	18
3.	**Curve tracing** Tracing of Cartesian Curves, Polar Coordinates, Polar and Parametric Form of Standard Curves, Areas and Length in Polar co-ordinates	8	18

List of Tutorial:

Sr. No.	Name of Tutorial	Hours
1.	Vector Space-1	4
2.	Vector Space-2	2
3.	Linear Transformation-1	2
4	Linear Transformation-2	2
5.	Inner Product-1	2
6.	Inner Product-2	2
7.	Beta and Gamma Function-1	2
8.	Beta and Gamma Function-2	2
9.	Curve tracing-1	2
10.	Curve tracing-2	2

Text Book(s):

Title	Author/s	Publication
Thomas' Calculus	George B. Thomas, Maurice D. Weir and Joel Hass	Pearson
Elementary Linear Algebra	Howard Anton and Chrish Rorres	Wiley

Reference Book(s):

Title	Author(s)	Publication
Advanced Engineering Mathematics	E Kreyszig	John Wiley & Sons
A textbook of Engineering Mathematics	N P Bali and Manish Goyal	Laxmi
Higher Engineering Mathematics	B S Grewal	Khanna
Engineering Mathematics for First Year	T Veerarajan	Tata Mc Graw Hill
Engineering Mathematics-1 (Calculus)	H. K. Dass and Dr. Rama Verma	S. Chand

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.

Tutorial:

- Continuous evaluation consists of 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

SESH1080	**Linear Algebra & Calculus**
CO 1	Define the concepts of Vector Space, Linear Transformation and Inner Product Space.
CO 2	Practice functions like Gamma, Beta functions & their relation which is helpful to evaluate some definite integral arising in various branch of engineering.
CO 3	Identify the Ordinary differentials and Partial differentials. Solve the maximum and minimum value of function.
CO 4	Construct the graphs for function with intervals and identify more application for function.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Vector Space	1, 2, 3, 4
2	Linear Transformation	1, 2, 3, 4
3	Inner product space	1, 2, 3, 4
4	Partial Derivatives	1, 2, 4, 5
5	Beta and Gamma Function	1, 2, 4, 5
6	Curve Tracing	1, 2, 4, 5, 6

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT1030
Course Name: Object Oriented Programming with Java
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	
3	4	0	5	40	60	40	60	0	0	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** Programming language Types and Paradigms, Flavors of Java, Java Designing Goal, Features of Java Language, JVM –The heart of Java, Java's Magic Bytecode.	03	05
2.	**Object-Oriented Programming Fundamentals** Class Fundamentals, Object and Object reference, Object Lifetime and Garbage Collection, Creating and Operating Objects, Constructor and initialization code block, Access Control, Modifiers, Nested class, Inner Class, Anonymous Classes, Abstract Class and Interfaces, Defining Methods, Method Overloading, Dealing with Static Members, Use of "this" reference, Use of Modifiers with Classes & Methods, Generic Class Types.	06	15
3.	**Java Environment and Data types** The Java Environment: Java Program Development, Java Source File Structure, Compilation Executions; Basic Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Data-types, and Operators.	05	10

4.	**Class and Inheritance** Use and Benefits of Inheritance in OOP, Types of Inheritance in Java, Inheriting Data Members and Methods, Role of Constructors in inheritance, Overriding Super Class Methods, Use of "super", Polymorphism in inheritance, Type Compatibility and Conversion, Implementing interfaces.	07	15
5.	**Java Packages** Organizing Classes and Interfaces in Packages, Package as Access Protection, Defining Package, CLASSPATH Setting for Packages, Making JAR Files for Library Packages, Import and Static Import, Naming Convention for Packages.	02	05
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Array and String Concepts** Defining an Array, Initializing & Accessing Array, Multi-Dimensional Array, Operation on String, Using Collection Bases Loop for String, tokenizing a String, Creating Strings using String Buffer.	04	10
2.	**Exception Handling** The Idea behind Exception, Exceptions & Errors, Types of Exception, Control Flow In Exceptions, JVM reaction to Exceptions, Use of try, catch, finally, throw, throw in Exception Handling, In-built and User Defined Exceptions, Checked and Un-Checked Exceptions.	05	10
3.	**Thread** Understanding Threads, Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, InterCommunication of Threads.	06	15
4.	**Applet** Applet & Application, Applet Architecture, Parameters to Applet.	03	05
5.	**Input-Output Operations in Java** Streams and the new I/O Capabilities, Understanding Streams, The Classes for Input and Output, The Standard Streams, Working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File, Channel, Serializing Objects.	04	10

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to Java Environment and Netbeans	02
2.	Implementation of Java programs with classes and objects	04

3.	Implementation of Java programs to create functions, constructors with overloading and overriding	04
4.	Implementation of Java programs to demonstrate different access specifiers	04
5.	Implementation of Java programs using the concept of inner classes	02
6.	Implementation of Java programs for variables, data types, operators	04
7.	Implementation of Java programs for inheritance (single, multilevel, hierarchical)	04
8.	Implementation of Java programs to demonstrate the use of super keyword	02
9.	Implementation of Java programs for anonymous and abstract classes	02
10.	Implementation of Java programs for Interface	02
11.	Implementation of Java programs to demonstrate Java packages	02
12.	Implementation of Java programs to use arrays and string	06
13.	Implementation of Java programs for exception handling using all keywords (try, catch, throw, throws and finally)	04
14.	Implementation of Java programs to demonstrate the life cycle of thread	02
15.	Implementation of Java programs for the concepts of thread priority, synchronization, inter-thread communication	06
16.	Implementation of Applets, AWT and Web Servers	06
17.	Implementation of file handling operations	04

Text Book(s):

Title	Author/s	Publication
Core Java Volume I – Fundamentals	Cay Horstmann and Gray Cornell	Pearson

Reference Book(s):

Title	Author/s	Publication
Java the complete reference	Herbert Schildt	McGraw Hill
Thinking in Java	Bruce Eckel	Pearson
Learning Java	Patrick Niemeyer & Jonathan Knudsen	O'Reilly Media

Web Material Link(s):

- https://www.coursera.org/learn/object-oriented-java
- https://www.javatpoint.com/java-tutorial
- https://www.tutorialspoint.com/java/index.htm

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 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

SEIT1030	**OBJECT ORIENTED PROGRAMMING WITH JAVA**
CO 1	Learn and acquire principles of object oriented programming concepts and its application using java programming.
CO 2	Identify syntax, semantics, data types, conditional statements, control structures, and arrays and strings in java programming language.
CO 3	Explain building blocks of java classes, objects, constructors and methods in console based java application.
CO 4	Identify the concept of polymorphism, inheritance, abstraction and interfaces and construct programs in java.
CO 5	Classify the role of packages and exception handling for access protection, name space management and reliability of code.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction	1, 2
2	Object Oriented Programming Fundamentals	1, 2, 3
3	Java Environments and Data Types	2, 3,4
4	Class and Inheritance	2, 5,6
5	Java Packages	2,4,5,
6	Array and String Concept	2,3,6
7	Exception Handling	2,3,4
8	Thread	3,5,6
9	Applet	3,6
10	Input-Output Operation in Java	4,5,6

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT1010
Course Name: Introduction to Web Designing
Course Prerequisite(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	
0	2	0	1	0	0	50	0	0	0	50

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand basic components of internet.
- learn basic web technologies such as HTML, JavaScript and CSS.
- develop basic knowledge of website designing.

Course Content:

Module No.	Content	Hours	Weightage in %
1.	Introduction to World Wide Web, Web Server, Website, Website design Principles, Planning the Website, Navigation, Introduction to HTML, CSS, Java Script	30	100%

List of Practical:

Sr. No	**Name of Practical**	**Hours**
1.	Implementation of HTML tags	12
2.	Designing Websites with basic CSS	4
3.	Designing of Responsive Website Designs using Java Script	4
4.	Development of mini project based on HTML, CSS and Java Script	10

Reference Book:

Title	**Author/s**	**Publication**
HTML Black Book	Steven Holzner	Dreamtech press

Web Material Link(s):

- https://www.w3schools.com/

Course Evaluation:

Practical:

- Continuous Evaluation consist of performance of practical which will be evaluated out of 10 for each practical and average of the same will be converted to 20 marks.
- Prepared project during practical hours will be evaluated as a part of final submission which carries 30 marks.

Course Outcome(s):

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

SEIT1010	INTRODUCTION TO WEB DESIGNING
CO 1	Discover the fundamentals of website designing and webpage designing.
CO 2	Create a webpage with different look and structure.
CO 3	Manipulate the data as per the user reqirement.
CO 4	Write a code for generating a small website.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction to World Wide Web	1, 2
2	Web Server, Website, Website design Principles, Planning the Website,	1, 2
3	Navigation, Introduction to HTML	2, 3, 6
4	CSS	2, 3, 6
5	Java Script	2, 3, 6

P P Savani University
School of Engineering

Department of Mechanical Engineering

Course Code: SEME1020
Course Name: Engineering Workshop
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	
0	2	0	1	0	0	50	0	0	0	50

CE: Continuous Evaluation, ESE: End Semester Exam

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

- learn about the safety measures required to be taken while using working in workshop.
- learn about how to select the appropriate tools required for specific operation.
- learn about different manufacturing technique for production out of the given raw material.
- understand applications of machine tools, hand tools, power tools and welding process.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction:** Introduction to Various Shops / Sections and Workshop Layouts, Safety Norms to be Followed in a Workshop.	-	-
2.	**Fitting Shop:** Introduction of Fitting Shop; Safety; Making a Job as per Drawing including Marking and other Performing Operations.	-	-
3.	**Carpentry and Drilling Shop:** Introduction of Carpentry Shop; Preparation of Job as per Drawing including Marking and other Performing Operations.	-	-
4.	**Sheet Metal Shop:** Introduction of Sheet Metal Shop; Preparation of Job as per Drawing including Marking and other Performing Operations	-	-
5.	**Smithy Shop:** Introduction of Sheet Metal Shop; Preparation of Job as per Drawing including Marking and other Performing Operations	-	-
6.	**Introduction to Machine Tools:** Introduction and Demonstration of various Machine Tools like Lathe, Drilling, Grinding, Hack Saw Cutting etc.	-	-

7.	**Introduction to Welding & Plumbing:** Introduction and Demonstration of Welding process. Introduction and Demonstration of Plumbing Shop.	-	-

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction and Demonstration of Safety Norms. Different Measuring Instruments.	02
2.	To Perform a Job of Fitting Shop.	06
3.	To Perform a Job of Carpentry Shop.	06
4.	To Perform a Job of Sheet Metal Shop.	06
5.	To Perform a Job of Black Smithy Shop.	04
6.	Introduction and Demonstration of Grinding & Hacksaw Cutting Machine.	02
7.	Introduction and Demonstration of Plumbing Shop & Welding Process.	04

Text Book(s):

Title	Author(s)	Publication
Elements of Workshop Technology Vol. I	Hajra Chaudhary S. K.	Media promoters & Publishers
Workshop Technology Vol. I and II	Raghuvanshi B.S.	Dhanpat Rai & Sons

Reference Book(s):

Title	Author(s)	Publication
Workshop Technology Vol. I	W.A.J. Chapman	Edward Donald Publication
Workshop Practices	H S Bawa	Tata McGraw-Hill
Basic Machine Shop Practice Vol. I, II	Tejwani V. K.	Tata McGraw-Hill

Web Material Link(s):

- http://nptel.ac.in/course.php

Course Evaluation:

Practical:

- Continuous Evaluation Consist of Performance of Practical which will be evaluated out of 10 for each practical/Tutorial and average of the same will be converted to 30 Marks.
- Internal Viva consists of 20 Marks.

Course Outcome(s):

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

SEME1020	ENGINEERING WORKSHOP
CO 1	Understand the various measuring instruments.
CO 2	Understand the safety norms required in the workshop.
CO 3	Understand the application of various tools required for different operations.
CO 4	Remember the process of manufacture from a given raw material.
CO 5	Explain various manufacturing processes in machine shop.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction	1, 2,4
2	Fitting shop:	1, 2, 3
3	Carpentry and Drilling Shop:	1, 2, 3
4	Sheet Metal Shop:	2, 3, 4
5	Smithy Shop:	2, 3, 4
6	Introduction to Machine Tools:	2, 3, 4
7	Introduction to Welding & Plumbing:	2,3,4

P P Savani University
School of Engineering

Department of Mechanical Engineering

Course Code: SEME1040
Course Name: Concepts of Engineering Drawing
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	
3	2	0	4	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- know conventions and the methods of engineering drawing.
- interpret engineering drawings using fundamental technical mathematics.
- construct basic and intermediate geometry.
- improve their visualization skills so that they can apply these skills in developing new products.
- improve their technical communication skill in the form of communicative drawings.
- comprehend the theory of projection.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction:** Importance of the course; Use of Drawing Instruments and Accessories; BIS – SP – 46; Lettering, Dimensioning and Lines; Representative Fraction; Types of Scales (Plain and Diagonal Scales); Construction of Polygons	07	15
2.	**Engineering Curves:** Classification and Application of Engineering Curves; Construction of Conics, Cycloidal Curves, Involutes and Spiral along with Normal and Tangent to each.	12	25
3.	**Principles of Projections:** Types of Projections; Introduction of Principle Planes of Projections. Projection of Points in all four Quadrants	04	10

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Projection of Plane:** Projection of Planes (Circular and Polygonal) with inclination to one Referral Plane and two Referral Planes	07	15
2.	**Orthographic Projection:** Types of Projections: Principle of First and Third Angle Projection -Applications & Difference; Projection from Pictorial View of Object, View from Front, Top and Sides.	08	20
3.	**Isometric Projections and Isometric Drawing:** Isometric Scale, Conversion of Orthographic Views into Isometric Projection, Isometric View or Drawing.	07	15

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction sheet (dimensioning methods, different types of line, construction of different polygon, divide the line and angle in parts, use of stencil, lettering)	04
2.	Plane scale and Diagonal scale	04
3.	Engineering curves	06
4.	Projection of Points and Plane	04
5.	Orthographic Projection	06
6.	Isometric Projection	06

Text Book(s):

Title	Author(s)	Publication
A Text Book of Engineering Graphics	P J Shah	S. Chand & Company Ltd., New Delhi
Engineering Drawing	N D Bhatt	Charotar Publishing House, Anand

Reference Book(s):

Title	Author(s)	Publication
Engineering Drawing	P.S.Gill	S. K. Kataria & sons, Delhi
Engineering Drawing	B. Agrawal & C M Agrawal	Tata McGraw Hill, New Delhi
Engineering Drawing made Easy	K. Venugopal	Wiley Eastern Ltd

Web Material Link(s):

- http://nptel.ac.in/courses/105104148/

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 Course Coordinator.
- End Semester Examination will consist of 60 marks.

Practical:

- Continuous Evaluation Consist of Performance of Practical which should be evaluated out of 10 for each practical Tutorial and average of the same will be converted to 10 Marks.
- Internal Viva consists of 10 Marks.
- Practical performance/quiz/drawing/test of 15 Marks during End Semester Exam.
- Viva/Oral performance of 15 Marks during End Semester Exam.

Course Outcome(s):

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

SEME1040	CONCEPTS OF ENGINEERING DRAWING
CO 1	Remember bis standards while drawing lines and representing letters & dimensions.
CO 2	Understand different types of scaling and, construction of geometrical shapes using engineering tools.
CO 3	Classify the projection angles concerning the observer, object, and reference planes.
CO 4	Construct orthographic views of an object when its position with respect to the reference planes is defined.
CO 5	Develop 3d isometric views concerning 2d orthographic views and vice versa.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1,2
2	Engineering Curves:	2,3,6
3	Principles of Projections	2,3,4
4	Projection of Plane	2,4,6
5	Orthographic Projection	4, 5, 6
6	Isometric Projections and Isometric Drawing	4,6

P P Savani University
School of Engineering

Department of Applied Science & Humanities

Course Code: SESH1210
Course Name: Applied Physics
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	
3	2	0	4	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- prepare students for career in engineering where physics principles can be applied for the advancement of technology.
- think in core concept of engineering application by studying various topics involved in branch specific application.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Quantum Mechanics:** Wave-Particle Duality, De-Broglie Matter Wave, Phase and Group Velocity, Heisenberg Uncertainty Principle and its Applications, Wave Function and its Significance, Schrodinger's Wave Equation, Particle in One Dimensional Box	06	15
2.	**Acousic and Ultrasonic:** Introduction, Classification and Characterization of Sound, Absorption Coefficients, Sound Absorbing Materials, Sound Insulation, Ultrasonic, Properties of Ultrasonic, Generation of Ultrasonic Applications of Ultrasonic.	05	10
3.	**Solid State Physics** Introduction, Lattice Points and Space Lattice, Unit Cells and Lattice Parameters, Primitive Cell, Crystal Systems. The Bravais Space Lattices. Miller Indices, X-Ray Properties, Diffraction and Bragg's Law, Bragg's X-Ray Spectrum	06	10
4.	**Nanophysics** Nanoscale, Surface to Volume Ratio, Surface Effects on Nanomaterials, Quantum Size Effects, Nanomaterials and Nanotechnology, Unusual Properties of Nanomaterials, Synthesis of Nanomaterials, Applications of Nanomaterials	06	15

Section II			
Module No.	Content	Hours	Weightage in %
1.	**Non-Linear Optics:** Laser, Spontaneous and Stimulated Emission of Light, Applications of Laser. Fundamental Ideas about Optical Fibre, Advantages of Optical Fibre of Optical Fibre, Applications of Optical Fibre.	07	12
2.	**DC and AC Circuits Fundamentals** Introduction of Electrical Current, Voltage, Power and Energy; Sources of Electrical Energy Inductor and Capacitor, Fundamental Laws of Electric Circuits – Ohm's Law and Kirchhoff's Laws; Analysis of Series, Parallel and Series-Parallel Circuits. Alternating Voltages and Currents and their Vector and Time Domain Representations, Average and Rms Values, From Factor, Phase Difference, Power and Power Factor, Purely Resistive Inductive and Capacitive Circuits, R-L, R-C, R-L-C Series Circuits, Impedance and Admittance, Circuits in Parallel, Series and Parallel Resonance.	08	25
3.	**Electronics:** Semiconductors, Intrinsic and Extrinsic Semiconductor Advantages of Semiconductor Devices, Diodes, Transistors, Types of Bipolar Junction Transistor, Unijunction Junction Transistor, FET and MOSFETS.	07	13

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Volt-Ampere Characteristics of Light Emitting Diode	02
2.	Volt-Ampere Characteristics of Zener Diode	02
3.	To determine value of Planck's constant (h) using a photovoltaic cell	02
4.	To determine the Hall coefficient (R) and carrier concentration of a given material (Ge) using Hall effect.	04
5.	To study the Capacitors in series and parallel DC circuit.	04
6.	To determine velocity of sound in liquid using Ultrasonic Interferometer	04
7.	To study RLC Series circuit.	02
8.	To determine numerical aperture of an optical fiber.	02
9.	Determination of Young's Modulus of given material.	02
10.	Analysis of errors.	02

Text Book(s):

Title	Author/s	Publication
Concept of the Modern Physics	A. Beiser	Tata McGraw-Hill Education
Basic electrical engineering	Kothari and Nagrath	Tata McGraw-Hill Education
Quantum Mechanics	P.M. Mathew, K. Venkatesan	Tata McGraw-Hill Education
Waves and Acoustics	Pradipkumar Chakrabarti Satyabrata Chawdhary	New Central Book Agency
Lasers and Nonlinear Optics	G.D. Baruah	Pragati Prakashan
Solid State Physics: Basic Electronics:	S.O. Pillai	New Age Internation Publishers
Basic Electronics for Scientists and Engineers	Dennis L. Eggleston	Cambridge University Press

Web Material Link(s):

- http:/nptel.ac.in/course.php

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests, each of 30 marks and 1 hour of duration and averageof 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 Consist of Performance of Practical which will be evaluated out of 10 marksfor each practical and average of the same will be converted to 10 marks.
- Internal Viva consists of 10 marks.
- Practical performance/quiz/drawing/test of 20 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

SESH1210	APPLIED PHYSICS
CO 1	Understand the framework of quantum mechanics and apply the knowledge of basic quantum mechanics to construct one dimensional schrodinger's wave equation.
CO 2	Classify the phenomenon of acoustics and ultrasonic in various engineering field and apply it for various engineering and medical fields. interpret the concept of nanotechnology and understand the synthesis and applications of nanomaterials from technological prospect.
CO 3	Discover the types and properties of superconductors. relate the behaviour of superconductors at high temperatures.
CO 4	Describe the laser and articulate the idea of optical fiber communications and apply the concepts of lasers and optical fiber communications in every possible sector.
CO 5	distinguish pure, impure semiconductors and characteristics of semiconductor devices. thus will be able to use basic concepts to analyze and design a wide range of semiconductor devices.

Level of Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Quantum Mechanics	2,3
2	Acoustic and Ultrasonic	1,3
3	Nanophysics	2,4
4	Superconductivity	2,6
5	Non linear Optics - 1	1,2
6	Non linear Optics - 2	2,3
7	Electronics	3,6

SECOND YEAR B. TECH.

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING															
TEACHING & EXAMINATION SCHEME FOR B. TECH. COMPUTER SCIENCE ENGINEERING PROGRAMME AY: 2021-22															
3	SESH2040	Discrete Mathematics	SH	3	0	2	5	5	40	60	0	0	50	0	150
	SECE2111	Database Management System	CE	3	2	0	5	4	40	60	20	30	0	0	150
	SECE2021	Digital Workshop	CE	0	2	0	2	2	0	0	20	30	0	0	50
	SECE2031	Data Structures	CE	3	2	0	5	4	40	60	20	30	0	0	150
	SECE2120	Programming with Python	CE	3	2	0	5	4	40	60	20	30	0	0	150
	SEIT2041	Mobile Application Development	IT	2	4	0	6	4	40	60	40	60	0	0	200
	CFLS1020	Global Communication Skills	CFLS	2	0	0	2	2	40	60	0	0	0	0	100
	SECE2910	Industrial Exposure	CE	2			0	2	0	0	100	0	0	0	100
						Total	**30**	**27**							**1050**
4	SESH2051	Mathematical Methods for Computation	SH	3	0	2	5	5	40	60	0	0	50	0	150
	SECE2040	Computer Organization	CE	3	2	0	5	4	40	60	20	30	0	0	150
	SECE3011	Computer Network	CE	3	2	0	5	4	40	60	20	30	0	0	150
	SEIT2031	Operating System	IT	3	2	0	5	4	40	60	20	30	0	0	150
	SEIT3010	Software Engineering	IT	3	0	1	4	4	40	60	0	0	50	0	150
	CFLS3010	Foreign Language-I	CFLS	2	0	0	2	2	40	60	0	0	0	0	100
	SEPD3040	Integrated Personality Development Course-I	SEPD	2	0	0	2	1	100	0	0	0	0	0	100
						Total	**28**	**24**							**950**

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 ofSets, 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 ofInference, 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

SESH2040	**Discrete Mathematics**
CO1	Summarize the concepts of set theory for understanding & fetching data from a database using query.
CO2	Classify the basic concepts of spanning tree algorithms namely DFA, BFS, Prim's and Kruskal's in the design of networks.
CO3	Construct the algorithm of group theory for data encryption.
CO4	Combination of design, foundational concepts of notations and results of graph theory used for better understanding of problems.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Set, Relation & Function	1,2,4,6
2	Lattices	1,2,3,4,6
3	Group Theory	1,2,3,5,6
4	Mathematical Logic and Proof	1,2,3,4,6
5	Graph Theory	1,2,3,5,6
6	Tree	1,2,3,5,6

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE2111
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	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 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**	04	8

	Overview, Measures of query cost, Selection operation, Sorting, Join, Evaluation of expressions.		
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.	01
2.	Implementation of a client-server architecture using TightVNC Server and Client software (remote access of a server by clients)	01
3.	Introduction to Data Dictionary concepts.	01
4.	Create all the master tables using Data Definition Language Commands like Create and Describe.	01
5.	Implement the use of alter table command.	01
6.	Introduction to Transaction Control Commands like Commit, Rollback and Save point.	01
7.	Use insert command to add data into created tables.	01
8.	Solve queries using update command.	01
9.	Implement SQL queries based on update and delete command.	01
10.	Write SQL queries to solve problems with the use of the select command.	01
11.	Generate different reports using select command.	01
12.	Introduction to SQL functions.	01
13.	Write SQL scripts to implement the listed queries, which require the usage of numerous SQL functions.	01
14.	Introduction to group functions and demonstration of their usage.	01
15.	Implement queries based on group by and having a clause.	01

16.	Execution of queries based on natural and inner joins.	01
17.	Implement SQL queries based on outer join and self-join.	01
18.	Write SQL queries based on group function and join.	01
19.	Introduction to sub-queries and demonstration of their usage.	01
20.	Write SQL queries based on the concept of single row sub-queries.	01
21.	Write SQL queries based on the concept of multiple row sub-queries.	01
22.	Write SQL scripts to generate desired reports using group by, join and sub-queries.	01
23.	Write SQL script to solve the questions based on all SQL concepts.	01
24.	Write the required SQL scripts to implement all the listed queries using Data Control Commands like Grant and Revoke.	01
25.	Introduction to different objects in SQL and create views based on given scenarios.	01
26.	Write the required SQL script to implement the given triggers.	01
27.	Write the required SQL script to implement the given triggers.	01
28.	Write the required SQL script to implement the given functions and procedures using PL/SQL block scripts.	01
29.	Write the SQL scripts to implement the given cursors.	01
30.	Submission of DBMS Mini Project Design.	01

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 10 marks.
- Internal viva 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

SECE2111	**Database Management System**
CO1	Understand the importance of back-end design and relational database management System
CO2	Work with physical data, conceptual data and its conversion into relational databases.
CO3	Apply various database constraints on relational databases.
CO4	Device database design for the development of software projects

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction	1, 2
2	Relational Model	2, 4
3	SQL Concepts	3 ,4, 6
4	Query Processing	2, 5
5	Entity Relational Model	2, 3, 6
6	Database Design Concepts	2, 3, 5
7	Transaction Management	2, 4
8	PL/SQL Concepts	3, 4, 6

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE2021
Course Name: Digital Workshop
Prerequisite Course(s): Programming for problem solving (SECE1050)

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	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:

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to Binary system.	4
2.	Introduction to Boolean Algebra and Logic Gates.	4
3.	Study and verification of all logic gates.	2
4.	Design and Implementation of Half Adder, Half Subtractor circuits.	2
5.	Design and Implementation Full Adder and Full Subtractor circuits.	2
6.	Comparator, Decoders, Multiplexers.	4
7.	Realization of Sum of Product and Product of Sum expression using universal gates.	2
8.	Design and Implementation of Parity Generator and Checker circuits.	2
9.	Introduction to sequential Circuit: S-R Latch.	4
10.	Introduction to sequential Circuit: Flip-Fop.	4

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.

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 20 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

SECE2021	Digital Workshop
CO 1	Identify the basic logic gates and apply them to digital circuits.
CO 2	Understand the breadboard for implementation of circuits using discrete electronic components.
CO 3	Remember and understand the core concepts of digital logic design like number base representation, boolean algebra etc.
CO 4	Develop the ability to design combinational and sequential circuits.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Verify all logic gates	1,2,3,4,6
2	Half Adder & Full Adder	1,2,3,4,6
3	Half Sub & Full Sub	1,2,3,4,6
4	Breadboard	1,2,3,4,6
5	De Morgan’s Theorem	1,2,3,4
6	Code Converter	1,2,3,6
7	7 segment display	1,2,3,4,5,6
8	Parity Generator & Checker	1,2,3,6
9	Decade Counter	1,2,3,6
10	Flip Flops	1,2,4,6

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

SECE2031	DATA STRUCTURES
CO 1	Differentiate primitive and non primitive data structures.
CO 2	Understand the concept of dynamic memory management.
CO 3	Apply algorithm for solving problems like sorting, searching, insertion and deletion of data.
CO 4	Describe the hash function and concepts of collision and its resolution methods.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1.	Introduction to Computer and its Architecture	1,2,4
2.	Memory and Operating Systems	1,2,3
3.	Recent Advances in Computer	2,4,5
4.	Computer Programming Language	1,2,3,4
5.	Constants, Variables and data Types	1,2,3
6.	Operators and Expression and Managing I/O operations	2,3,6
7.	Conditional statement and branching	2,4,5
8.	Arrays and Strings	1,2,3,6

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE2120
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	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 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,	06	8

	Properties, Functions and Methods, Tuple, Accessing 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).	04
2.	Working with Strings.	04
3.	Implementation of Dictionaries, Sets, Tuples and Lists and its various methods in Python.	06
4.	Working with decision structures in Python	04
5.	Working with functions and modules in Python	02
6.	Working with Object-oriented paradigms in Python	04
7.	Implementation of file handling in Python.	02
8.	Working with RE module in Python.	02
9.	Exception handling in Python.	02

 # 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 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

SECE2120	PROGRAMMING WITH PYTHON
CO 1	Interpret the fundamental python syntax, semantics and fluent in the use of python control flow statements.
CO 2	Determine the methods to create and manipulate python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
CO 3	Articulate the object oriented programming concepts such as encapsulation, inheritance and polymorphism as used in python.
CO 4	Identify the commonly used operations involving file systems and regular expressions.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level

1	Introduction to Python	1, 2,4
2	Decision Structures in Python	1, 2, 3
3	Array and Strings in Python	1, 2, 3
4	Dictionary, List, Tuples and Sets	2, 3, 4
5	Functions, Modules and Packages in Python	2, 3, 4
6	Python Object Oriented Programming	2, 3, 4
7	Files in Python	2,3,4
8	Regular Expression in Python	3,4,5
9	Exception Handling in Python	2,3

P P Savani University

School of Engineering

Department of Information Technology

Course Code: SEIT2041
Course Name: Mobile Application Development
Prerequisite Course(s): Object Oriented Programming with Java

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	04	00	04	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.	03	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.	02	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	02	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.	05	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.	03	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.	04	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.	03	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 the completion of the course, the student will be able to

SEIT2041	**MOBILE APPLICATION DEVELOPMENT**
CO 1	Develop user friendly mobile applications by implementing different practicals.
CO 2	Understand the concepts of front end development using various technologies.
CO 3	Analyse and implement frameworks, database and design patterns in mobile applications.
CO 4	Create a small but realistic working mobile application using different application programming interface.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction of Android	1,2,3
2	Android Application Design and Resource	3,4
3	Exploring User Interface Screen Elements	2,3,4
4	Designing User Interfaces with Layouts	2,6
5	Drawing and Working with Animation	2,4,6
6	Android Storage APIs	2,5
7	Content Providers	1,2,4
8	Networking APIs, Android Web APIs, Multimedia APIs	2,5
9	Telephony APIs, Working with Notifications	4,3,6

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE2910
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	
02			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

SECE2910	INDUSTRIAL EXPOSURE
CO 1	Study, analysis and describe about the surrounding industrial environment.
CO 2	Describe use of advanced tools and techniques industry.
CO 3	Connect with industrial personnel and follow engineering practices and discipline prescribed in industry.
CO 4	Develop awareness about general workplace behavior and build interpersonal and team skills.
CO 5	Prepare professional work reports and presentations.

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

SESH2051	MATHEMATICAL METHODS FOR COMPUTATION
CO 1	Describe 1st and 2nd order odes and pdes.
CO 2	Classify differential equations and evaluate linear & non linear partial differential equations.
CO 3	Apply laplace transform as a tool which are used to evaluate differential equation and fourier integral representation.
CO 4	Elaborate analysis of categorial data and quantitative data.

CO 5	Adapt the knowledge of various probability distribution and their applications in mathematical models, sport stragies and insurance.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Ordinary Differential Equation	1, 2, 3, 5
2	Partial Differential Equation	1, 2, 4, 5
3	Laplace Transform	1, 2, 4, 5
4	Fourier Series & Fourier Integral	1, 2, 3, 4, 5
5	Basics of Statistics	1, 2, 3, 4, 5
6	Probability Distribution	1, 2, 3, 4, 5

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE2040
Course Name: Computer Organization
Prerequisite Course(s): NIl

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.	06	15
2.	**Programming the Basic Computer** Introduction Machine Language, Assembly Language The Assembler, Program loops, Programming Arithmetic and logic operations, subroutines, I-O Programming.	05	08
3.	**Computer Arithmetic** Introduction, Addition and subtraction, Multiplication and Division Algorithms, Floating Point Arithmetic.	06	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).	06	15
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.	08	20
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	15
3.	**Memory Organization** Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.	08	15

List of Practical:

Sr No	Name of Practical	Hours
1.	Study basics of Computer Organization	04
2.	Study and implement programs on number system	08
3.	Study and implement programs on conversion and	04
4.	Study and build different circuits using Logisim.	14

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

SECE2040	COMPUTER ORGANIZATION
CO 1	Describe the design and working of basic components used to build computer system.
CO 2	Visualize and understand the working of cpu, different instruction formats, addressing modes, pipeline and vector processing and evaluate the performance of pipeline approach.
CO 3	Describe the requirements of different memories and evaluate memory management techniques.
CO 4	Examine the working mechanism of input and output devices and information transfer.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Basic Computer Organization and Design	2,4
2	Programming the Basic Computer	2,3,4
3	Computer Arithmetic	2,4.5
4	Central Processing Unit	1,2,5
5	Micro-programmed Control	1,2
6	Pipeline and Vector Processing	2,5
7	Input-Output Organization	2,3,4
8	Memory Organization	2,5,6
9	Multiprocessors	2

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE3011
Course Name: Computer Network
Prerequisite Course(s): Operating System (SEIT2031)

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 students to
- understand the concept of data communication.
- understand the concepts and layers of OSI and TCP-IP reference models.
- get familiar with different protocols and network components.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Overview of network and data communication, Data Communications, Computer Networking, Protocols and Standards, types of Network, Network Topology, Protocol hierarchies, and design issues of layers, Interfaces, and services. Reference Model: The OSI reference model, TCP/IP reference model, network standards.	04	10
2.	**Physical Layer** Data and transmission techniques, Multiplexing, Transmission media, Asynchronous Communication, Wirelesstransmission, ISDN, ATM, Cellular Radio, Switching techniques issues.	07	15
3.	**Data Link Layer** Layer design issues, services provided to network layers, Framing, Error control, and Flow control, Data link control and protocols – Simplex protocol, Sliding window protocol	07	15
4.	**Medium Access Sub Layer** Channel Allocations, Multiple Access protocols- ALOHA, CSMA, CSMA/CD protocols, Collision-free protocols, Limited contention protocols, LAN architectures, IEEE 802 and OSI, Ethernet (CSMA/CD), Bus, Token Ring, DQDB, FDDI, Bridges	05	10

	and recent developments.		
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Network Layer** A network Layer design issue, Routing algorithms, and protocols, Congestion Control Algorithms, Internetworking, Addressing, N/W Layer Protocols and recent developments.	08	20
2.	**Transport Layer** Transport services, Design issues, transport layer protocols, Congestion Control, QOS and its improvement.	06	15
3.	**Application Layer** Client-Server Model, DNS, SMTP, FTP, HTTP, WWW, and recent development	08	15

List of Practical:

Sr. No	Name of Practical	Hours
1.	Implement Packet Generation having information of packet number (2-dig), Total no of packets (2 dig), & data itself in the packet.	08
2.	Implementation flow control algorithms, CRC, VRC, LRC	06
3.	Implement CSMA/CD between two machines	06
4.	Implement Token ring between 3 machines.	06
5.	Study of switches, Hubs, Routers, and gateway.	04

Text Book(s):

Title	Author/s	Publication
Data Communication and Networking	Behrouz A. Forouzan	Tata McGraw Hill

Reference Book(s):

Title	Author/s	Publication
Computer Networks	Andrew S Tanenbaum	PHI Learning
Data and Computer Communications	William Stallings	Prentice Hall
TCP/IP Illustrated Volume-I	Kevin R. Fall, W. Richard Stevens	Addition Wesley
Internetworking with TCP/IP Volume-I	Douglas E. Comer	PHI

Web Material Link(s):

- http://www.tutorialspoint.com/computer_fundamentals/computer_networking.html
- https://nptel.ac.in/courses/106105080/
- https://www.udemy.com/new-2016-networking-fundamentals-for-beginners/
- https://www.cisco.com/c/en_in/training-events/training-certifications/certifications.html

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 consist of the performance of practical which will be evaluated out of 10 marks for 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

SECE3011	**COMPUTER NETWORKS**
CO 1	Distinguish the working of network protocols, application and osi reference model and tcp/ip reference model.
CO 2	Explain various service provided by computer network and its uses.
CO 3	Describe concept of network interface and performance issues in the networks.
CO 4	Evaluate network tools for implementing network protocols.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction	2,4
2	Physical Layer	1,2,4
3	Data Link Layer	2,4
4	Medium Access SubLayer	1,2
5	Network Layer	2,3,6
6	Transport Layer	2,4
7	Application Layer	2,5

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT2031
Course Name: Operating System
Prerequisite Course(s): Programming for Problem Solving (SECE1050)

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 Management** Process Concept, process state, process control block, 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; Threads, Types of Threads, Multithreading	10	20
3.	**Inter Process Communication** Race Conditions, Critical Regions, Mutual exclusion with busy waiting, sleep and wakeup, semaphores, mutexes, monitors, message passing, barriers; Classical IPC Problems: The dining philosopher problem, The readers and writers problem.	06	14
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, LRU; Allocation of frames, Thrashing.	12	25
2.	**File Management** Introduction; Files: naming, structure, types, access,attributes, operations; Directories: single level, hierarchical, path names, directory operations; File Allocation Methods: Contiguous Allocation, Linked Allocation, Indexed Allocation	06	13
3.	**Disk Management** Disk structure, Disk arm Scheduling Algorithms: FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK,; Disk Free Space Management, RAID	05	12

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

SEIT2031	**OPERATING SYSTEM**
CO 1	Understand the basic principles of operating system.
CO 2	Illustrate the concepts of operating systems services and its components.
CO 3	Evaluate the performance of operating system algorithms.
CO 4	Apply various operating system algorithms on real life problems.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction	1, 2, 4
2	Processes and Threads Management	1, 2, 3, 5, 6
3	Inter Process Communication	2, 3, 4, 5
4	Deadlocks	2, 3, 4, 6
5	Memory Management	1, 2, 3, 4, 6
6	File Management	1, 2, 3
7	Disk Management	1, 2, 3, 4, 5

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT3010
Course Name: Software Engineering
Prerequisite Course(s): Basics of Object-Oriented Programming and UML

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	01	04	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- study the pioneer of Software Development Life Cycle, Development models and Agile Software Development.
- study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
- learn the process of improving the quality of software work products.
- gain the techniques and skills on how to use modern software testing tools to support software testing projects.
- expose Software Process Improvement and Reengineering.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Software Engineering** Study of Different Models, Software Characteristics Components, Applications, Layered Technologies, Processes, Methods and Tools, Generic View of Software Engineering, Process Models- Waterfall model, Incremental, Evolutionary process models- Prototype, Spiral, and Concurrent Development Model.	07	15
2.	**Requirements Engineering** Problem Recognition, Requirement Engineering tasks, Processes, Requirements Specification, Use cases, and Functional specification, Requirements validation, Requirements Analysis, Modeling – different types.	06	15

3.	**Structured System Design** Design Concepts, Design Model, Software Architecture, Data Design, Architectural Styles and Patterns, Architectural Design, Alternative architectural designs, Modeling Component level design and its modeling, Procedural Design, Object Oriented Design.	05	05
4.	**User Interface Design** Concepts of UI, Interface Design Model, Internal and External Design, Evaluation, Interaction, and Information Display Software.	02	05
5.	**Planning a Software Project** Scope and Feasibility, Effort Estimation, Schedule and staffing, Quality Planning, Risk management- identification, assessment, control, project monitoring plan, Detailed Scheduling.	03	10
	Section II		
Module No.	Content	Hours	Weightage in %
1.	**Quality Assurance** Quality Control, Assurance, Cost, Reviews, Software Quality Assurance, Approaches to SQA, Reliability, Quality Standards-ISO9000 and 9001.	04	10
2.	**Coding and Unit Testing** Programming principles and guidelines, Programming practices, Coding standards, Incremental development of code, Management of code evaluation, Unit testing- proceduralunits, classes, Code Inspection, Metrics – size measure, complexity metrics, Cyclomatic Complexity, Halstead measure, Knot Count, Comparison of Different Metrics.	07	15
3.	**Testing** Concepts, Psychology of testing, Levels of testing, Testing Process- test plan, test case design, Execution, Black-Box testing – Boundary value analysis – Pairwise testing- state-based testing, White-Box testing – criteria and test case generation and tool support, Metrics – Coverage analysis-reliability.	07	15
4.	**Software Project Management** Management Spectrum, People –Product – Process- Project, W5HH Principle, Importance of Team Management.	02	05
5.	**Case Tools and Study** Introduction to CASE Building Blocks of CASE, Integrated CASE Environment.	02	05

List of Tutorial:

Sr. No.	Name of Tutorial	Hours
1.	To identify the role of the software in today's world across a few significant domains related to day to day life.	01
2.	To identify the problem related to software crisis for a given scenario.	01
3.	To identify the suitable software development model for the given scenario.	01
4.	To identify the various requirement development activities viz. elicitation, analysis, specification and verification for the given scenarios.	01
5.	To identify the various elicitation techniques and their usage for the Banking case study.	01
6.	To classify the requirement into functional and non-functional requirements.	01
7.	Identify the elements in software Requirements Specification document.	01
8.	To verify the requirements against the quality attributes.	01
9.	Identify the elements and relationship by analyzing the class diagram of Shop Retail Application case study.	01
10.	Identify the design principle that is being violated in relation to the given scenario.	01
11.	To identify the usage of stubs or drivers in the context of an integration testing scenario.	01
12.	Identify the different types of performance testing.	01
13.	To identify the usage of regression testing.	01
14.	To understand usage of software metrics.	01
15.	Project Work: Understand importance of SDLC approach & various processes.	01

Text Book(s):

Title	Author/s	Publication
Fundamentals of Software Engineering	Rajib Mall	PHI Learning
Software engineering: A Practitioner's Approach	Roger Pressman	McGraw Hill Education

Reference Book(s):

Title	Author/s	Publication
Software Engineering – An Engineering Approach	James F. Peters & Witold Pedrycz	Wiley
Software Engineering – Principles and Practice	Waman Jawadekar	McGraw Hill Education

Web Material Link(s):

- https://nptel.ac.in/courses/106101061/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, whichwill be converted to 30 marks.

- Faculty evaluation consists of 10 marks as per the guidelines provided by the coursecoordinator.
- End Semester Examination consists of 60 marks.

Practical:

- Continuous Evaluation consists of the performance of practical which will be evaluated out of 10 marks for 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

SEIT3010	**SOFTWARE ENGINEERING**
CO 1	Cite the process of requirement gathering, classification ,specification and validation in software engineering process.
CO 2	Demonstrate an ability to design the software by applying the software engineering design principles.
CO 3	Discover system design patterns, agile methodologies for development of software using uml and scrum.
CO 4	Devise project planning, cost estimation, quality management techniques.
CO 5	Assess software testing process to analyze the functionality of application.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction to Software Engineering	1,2
2	Requirements Engineering	2,3
3	Structured System Design	2,3
4	User Interface Design	2,3,4
5	Planning a Software Project	2,3,4
6	Quality Assurance	1,2
7	Coding and Unit Testing	2,3,4
8	Testing	2,3,4
9	Software Project Management	2,3
10	Case Tools and Study	3,4,5

THIRD YEAR B. TECH.

P P SAVANI UNIVERSITY															
SCHOOL OF ENGINEERING															
TEACHING & EXAMINATION SCHEME FOR THIRD YEAR B.TECH. COMPUTER SCIENCE ENGINEERING PROGRAMME AY: 2021-22															
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	
5	SECE3020	Theory of Computation	CE	3	0	1	4	4	40	60	0	0	50	0	150
	SECE4031	Internet of Things	CE	2	4	0	6	4	40	60	40	60	0	0	200
	SEIT3032	Design & Analysis of Algorithms	IT	3	2	0	5	4	40	60	20	30	0	0	150
	SEIT4013	Data Science	IT	3	2	0	5	4	40	60	20	30	0	0	150
	CFLS3021	Foreign Language-II	CFLS	2	0	0	2	2	40	60	0	0	0	0	100
	SEPD3050	Integrated Personality Development Course-II	SEPD	2	0	0	2	1	100	0	0	0	0	0	100
	SECE3920	Summer Training	CE	4			0	4	0	0	100	0	0	0	100
		Elective-I		2	2	0	4	3	40	60	20	30	0	0	150
						Total	**28**	**26**							**1100**
6	SECE4022	Cloud Computing & Applications	CE	3	2	0	5	4	40	60	20	30	0	0	150
	SECE4042	Artificial Intelligence	CE	3	2	0	5	4	40	60	20	30	0	0	150
	SEIT3052	Full Stack Development	IT	2	4	0	6	4	40	60	40	60	0	0	200
	SECE3910	Project-I	CE	3			3	3	0	0	100	100	0	0	200
	SEPD3020	Corporate Grooming & Etiquette	SEPD	1	2	0	3	2	0	0	50	50	0	0	100
	SECE3490	Online NPTEL Course		3			3	3	100	0	0	0	0	0	100
		Elective-II		2	2	0	4	3	40	60	20	30	0	0	150
						Total	**29**	**23**							**1050**

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

TEACHING & EXAMINATION SCHEME FOR THIRD YEAR B.TECH. COMPUTER SCIENCE ENGINEERING PROGRAMME AY: 2021-22
(ELECTIVE COURSES)

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	
5	SECE3511	Programming with .NET	CE	2	2	0	4	3	40	60	20	30	0	0	150
	SECE3520	Service Oriented Architecture	CE	2	2	0	4	3	40	60	20	30	0	0	150
	SECE3590	Service Oriented Computing	CE	2	2	0	4	3	40	60	20	30	0	0	150
	SEIT3510	System Analysis & Design	IT	2	2	0	4	3	40	60	50	0	0	0	150
	SEIT3560	Data Visualization	IT	2	2	0	4	3	40	60	20	30	0	0	150
	SEIT3541	Advanced Java Technology	IT	2	2	0	4	3	40	60	20	30	0	0	150
6	SECE3531	Wireless Network & Mobile Computing	CE	2	2	0	4	3	40	60	20	30	0	0	150
	SECE3541	Software Testing & Quality Assurance	CE	2	2	0	4	3	40	60	20	30	0	0	150
	SEIT3531	Image Processing	IT	2	2	0	4	3	40	60	20	30	0	0	150
	SEIT3550	Augmented Reality & Virtual Reality	IT	2	2	0	4	3	40	60	20	30	0	0	150

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE3020
Course Name: Theory of Computation
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	01	04	40	60	00	00	50	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand the basics of formal languages and automata.
- design grammars and automata for different formal languages.
- develop the logic building to solve computational problems.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Review of Mathematical Preliminaries** Principle of Mathematical Induction, Proof by Contradiction, Introduction to Formal Languages and Automata, Alphabets, Strings, and their properties, Languages, Determinism and Non-determinism	05	10
2.	**Finite Automata** Introduction to Transition systems, Description of Finite Automata, String acceptability by Finite Automata, Construction of NFA, NFA with epsilon-moves, The Equivalence between DFA, NFA epsilon-NFA, Minimization of FA, Union, Intersection and Complement of FA, Finite Automata with output- Moore and Mealy Models, The transformation procedure between Moore and Mealy Machine.	10	20
3.	**Regular Expression and Regular Language** Regular Expressions, Identities for RE, Construction of RE equivalent to FA using Arden's Theorem. Construction of FA equivalent to RE, Kleen's Theorem, Pumping Lemma for Regular languages, Properties of Regular Languages and FA: Closure and Decision properties, Limitations of FA.	08	20
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Grammar** Definition, Chomsky hierarchy, Context Free Grammar-	10	20

	Definition, Derivation, sentential form, parse tree, Ambiguous Grammar Removing ambiguity from grammar, Left Recursion, Left Factoring, Language generated by grammar, Construction of Grammar, Simplification of CFGs, Normal Forms for CFG: Chomsky Normal Form, Greibach Normal Form, Decision Properties of CFG Regular Grammar- Definition: Left Linear Grammar, Right Linear Grammar, The Conversion from RG to FA and FA to RG, The Equivalence between LLG and RLG.		
2.	**Push Down Automata, DCFL AND NCFL** Definition, Description of PDA, Acceptance by PDA, Operations on PDA, Construction of PDA, Equivalence between CFG and PDA, Deterministic PDA and Nondeterministic PDA. String Parsing by DPDA, Pumping lemma for CFL, Closure properties of DCFL and NCFL, Decision property of CFL.	06	15
3.	**Turing Machine** Definition, Description of TM, Representation of TM, Language Acceptability by TMs, Construction of TM, Variants of TM: Multi-tape Turing Machines and NTM, Universal TM, The Model of LBA and Relationship between LBA and CSL, RS and RES, Closure properties of RS and RES.	06	15

List of Tutorial(s):

Sr. No	Name of Tutorial	Hour
1.	Problems based on proofs	01
2.	Problems based on identify the class language	01
3.	Problems based on DFA	01
4.	Problems based on minimal state automata	01
5.	Problems based on finite automata	01
6.	Problems based on Moore and Mealy machine	01
7.	Problems based on regular expressions and regular sets	01
8.	Problems based on pumping lemma	01
9.	Problems based on closure property	01
10.	Problems based on CNF and GNF	01
11.	Problems based on context-free grammar and language	01
12.	Problems based on PDA	01
13.	Problems based on TM	01
14.	Problems based on decidability	01
15.	Problems based on string/language validity	01

Text Book(s):

Title	Author/s	Publication
Theory of Computer Science: Automata, Languages, and Computation	By K.L.P. Mishra and N. Chandrasekaran	3rd Edition, PHI Learning Private Ltd.

Reference Book(s):

Title	Author/s	Publication
Introduction to Automata theory, languages and Computation	By John E. Hopcroft, Rajiv Motwani and Jeffery D. Ullman	3rd Edition, Pearson.
Introduction to Languages and the Theory of Computation	By John C. Martin	4th Edition, McGraw Hill.

Web Material Link(s):

- http://nptel.ac.in/courses/106104028/
- http://www.eecs.wsu.edu/~ananth/CptS317/Lectures/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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.

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 completion of the course, the students will be able to

SECE3020	THEORY OF COMPUTATION
CO 1	Recognize the basic concepts of finite automata theory & languages and classify decidable and undecidable formal languages.
CO 2	Identify and apply formal mathematical methods to prove properties of languages, grammars and automata.
CO 3	Apply this basic knowledge of theory of computation in the computer field to solve computational problems
CO 4	Analyse the grammar, its types, simplification and normal form.
CO 5	Simulate abstract models of computing and check their power to recognize the languages.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Review of Mathematical Preliminaries	1, 2, 3, 4
2	Finite Automata	1, 2, 3, 5, 6
3	Regular Expression and Regular Language	1, 2, 3, 5, 6
4	Grammar	1, 2, 3, 5, 6
5	Push Down Automata, DCFL AND NCFL	1, 2, 3, 4, 5
6	Turing Machine	1, 2, 3, 5, 6

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE4031
Course Name: Internet of Things
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	04	00	04	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

- learn how to interface sensors and Actuators with embedded IoT devices
- select connectivity and communication IoT protocols
- implement IoT applications

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Introduction to Internet of things, end-to-end IoT Architecture, Requirement of IoT challenges and issues of IoT , selection of hardware and software, case studies of IoT applications.	02	06
2.	**Embedded IoT Devices** Choosing criteria for embedded IoT devices, Enlist MCU based and MPU based IoT devices, Comparison between Aruino Uno, NodeMCU and ESP32, Architecture of ESP8266, variants of ESP8266, Arduino C, GPIO programming.	05	20
3.	**Sensors & Actuators** Types of sensors, working principles of actuators, Interfacing & Programming of digital, analog, protocol based sensors and actuators	04	12
4.	**Networking IoT platform** Raspberry Pi and its variant, Raspberry Pi programming, Choosing a right board, IoT gateway, Tools, Sensing IoT Environments.	04	12
Section II			
Module No.	Content	Hours	Weightage in %
1.	**RFID and iBeacons** Introduction to RFID and iBeacon, Hardware & Software, Hardware used for IoT RFID, Connection to Serve, Data on RFID Server and Classic distributed the problem.	04	14
2.	**IoT connectivity protocols** Networks layer protocols: RPL and 6LowPAN, WiFi,	04	14

	Bluetooth, BLE, LORAwan, NFC, cellular, zegbee, and Ethernet		
3.	**IoT communication protocol: MQTT** Existing cloud platforms, Various application layer IoT protocols, MQTT protocol, Building online server using MQTT, data exchange and storage in cloud, User Interface development.	04	14
4.	**IoT Security** IOT Security, Dangers, Assigning values to Information, Security Components, Key Management, Update Management.	03	08

List of Practical:

Sr. No	Name of Practical	Hours
1.	Getting started with Arduino IDE, add ESP8266 and ESP32 in the Arduino IDE. GPIO Interfacing and programming	04
2.	Digital on/off sensor (PIR and IR) Interfacing programming	04
3.	Analog sensors Interfacing (Accelerometer and gyroscope) & programming	04
5.	Interfacing and programming of actuators	04
6.	Walk through existing library for ESP8266. Configure ESP8266 in station and access mode.	02
7.	Development of an offline server using http protocol	04
8.	Development of an online server	04
9.	Experimenting with existing cloud platforms	04
10.	Development of Android applications suitable for IoT	04
11.	Exchange information using MQTT protocol	04
12.	Getting started with Raspberry Pi and OS Installation	04
13.	Experimenting with Raspberry Pi using Python	04
14.	Dashboard development using visual programming: NodeRED	06
15.	IoT based mini project	08

Text Book(s):

Title	Author/s	Publication
Beginning Arduino (2nd Edition)	Michael McRoberts	TIA
Raspberry Pi IoT Projects	John C. Shovic	Apress

Reference Book(s):

Title	Author/s	Publication
Mastering Internet of Things: Design and create your own IoT applications using Raspberry Pi 3	Peter Waher	Packt

Web Material Link(s):

- https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/
- https://www.tutorialspoint.com/internet_of_things/
- https://www.tutorialspoint.com/arduino/
- https://pythonprogramming.net/introduction-raspberry-pi-tutorials/

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 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

SECE4031	**Internet of Things**
CO 1	Demonstrate fundamentals of iot architecture, hardware, and software.
CO 2	Associate skills to program development boards, embedded iot devices & sensors.
CO 3	Interpret iot protocols to securely upload sensor data and control devices.
CO 4	Design iot applications for wireless communications with cloud platforms.
CO 5	Construct real life solutions of internet of things.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction to IoT	2
2	Embedded IoT Devices	2,3
3	Sensors & Actuators	2,3,4
4	Networking IoT Platform	2,3,4,5
5	RFID and iBeacons	1,2,3,6
6	IoT connectivity protocols	1,2,3,4
7	IoT communications protocol: MQTT	1,2,3
8	IoT Security	1,2,3,4

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT3032
Course Name: Design and Analysis of Algorithms
Prerequisite Course(s): Programming for Problem Solving (SECE1050), and Data Structures (SECE2031)

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
- develop logic building and problem-solving skills.
- understand how to calculate time complexity and space complexity of any algorithm.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in%
1.	**Fundamental concept of Algorithm Design & Analysis** Algorithm: characteristics, specifications, Writing Pseudo-Code, Frequency count and its importance in analysis of an algorithm, Asymptotic Notations: Time complexity & Space complexity of an algorithm, Big 'O'& 'Ω' notations, Best, Worst and Average case analysis of an algorithm, Analysis of searching algorithms: sequential, binary search, Analysis of sorting methods: bubble, insertion, selection, heap sort, Analysis of each sorting technique for best, worst and average case, Concept of Internal & External sorting.	06	15
2.	**Divide and Conquer Algorithmic Design Method** Divide and conquer: basic algorithm and characteristics, Binary Search: method and analysis of binary search for best, worst and average case for searches, Quick Sort, Merge Sort: method and analysis of algorithms, Finding the largest and smallest number in a list, Matrix Multiplication.	06	15
3.	**Greedy Method** The Greedy Method: basic algorithm and characteristics, Fractional Knapsack Problem solving using greedy method, Optimal merge patterns and optimal storage on tapes, Job sequencing with deadlines, Huffman Coding: greedy method, Minimum cost spanning trees: Prim's and Kruskal's Algorithm, Single source shortest path.	06	10
4.	**Dynamic Programming Method** Dynamic Programming Method: basic algorithm and characteristics, 0/1 Knapsack Problem solving using DP	05	10

	method, Multistage graphs, Optimal binary search trees, Travelling salesperson problem.		
Section II			
Module No.	Content	Hours	Weightage in%
1.	**Backtracking Method** Backtracking Method: basic algorithm and characteristics, Solving n-queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycle (TSP).	06	15
2.	**Branch and Bound technique** Branch and bound: basic algorithm and characteristics, solving n-queens using branch & bound, FIFO Branch and Bound & Least Cost Branch & Bound, Least Cost Search, 15-puzzle, Solving Travelling salesperson problem using branch & bound.	08	15
3.	**String Matching** Introduction, The naive string-matching algorithm, The Rabin-Karp algorithm, String Matching with finite automata, The Knuth-Morris-Pratt algorithm.	04	12
4.	**Introduction to NP-Completeness** The class P and NP, Polynomial reduction, NP- Completeness Problem, NP-Hard Problems. Travelling Salesman problem, Hamiltonian problem, Approximation algorithms.	04	08

List of Practical:

Sr No	Name of Practical:	Hours
1.	Implementation and Time analysis of Bubble sort.	02
2.	Implementation and Time analysis of Selection sort.	02
3.	Implementation and Time analysis of Insertion sort.	02
4.	Implementation and Time analysis of Merge sort.	02
5.	Implementation and Time analysis of Quick sort.	02
6.	Implementation and Time analysis of searching algorithm.	04
7.	Implementation of a dynamic programming.	04
8.	Implementation of shortest path algorithm.	02
9.	Implementation of graph traversal technique.	02
10.	Implementation of Minimum Cost Spanning Tree.	02
11.	Implementation of backtracking.	02
12.	Implementation of Rabin-Karp algorithm.	02
13.	Implementation of greedy algorithm.	02

Text Book:

Title	Author/s	Publication
Fundamentals of Computer Algorithms	Ellis Horowitz, Sarataj Sahni, S.Rajasekaran	Universities Press

Reference Book(s):

Title	Author/s	Publication
Introduction to Algorithms	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein	PHI Learning
Algorithm Design	Michael Goodrich, Roberto Tamassia.	Wiley Student Edition

Web Material Link(s):

- http://www.personal.kent.edu/~rmuhamma/Algorithms/algorithm.html
- https://nptel.ac.in/courses/106101060

Course Evaluation:
Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 performance of practical, which will be evaluated out of 10 marks per each practical and average of the entire practical will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance consists of 15 marks during End Semester Exam.
- External viva consists of 15 marks in End Semester Exam.

Course Outcome(s):

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

SEIT3032	Design and Analysis of Algorithms
CO 1	Illustrate various concept of algorithms.
CO 2	Analyze and design algorithms to appreciate the impact of algorithm design in practice.
CO 3	Compute how asymptotic notation is used to provide a rough classification of algorithms.
CO 4	Design time and space efficient algorithms using different techniques.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Fundamental concept of Algorithm Design & Analysis	1, 2,4
2	Divide and Conquer Algorithmic Design Method Divide and Conquer Algorithmic Design Method	1, 2, 3
3	Greedy Method	1, 2, 3
4	Dynamic Programming Method	2, 3, 4
5	Backtracking Method	2, 3, 4
6	Branch and Bound technique	2, 3, 4
7	String Matching	2,3,4
8	Introduction to NP-Completeness	3,4,5

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT4013
Course Name: Data Science
Prerequisite Course(s): SECE2011 - Database Management System (SECE2011), Data Structures (SECE2031), and Data Warehouse & Data Mining (SECE3031)

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

- study fundamentals of data analytics and data science pipeline.
- apply statistical methods, regression techniques, and machine learning algorithms to make sense out of both large and small data sets.
- understand various Data Visualization techniques and their applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Data Science** Introduction, Terminology, Data Science Process, Data Science Toolkit, Types of Data, Examples and Applications	06	10
2.	**Data collection and management** Introduction, Sources of Data, Data Collection and APIs, Exploring and Fixing Data, Data Storage and Management, Using Multiple Data Sources	07	15
3.	**Statistics for Data Science** Terminology and Concepts of Probability, Introduction to Statistics, Central Tendencies and Distributions, Variance, Outliner Analysis(Box Plot), Distribution Properties and Arithmetic, Inferential Statistics, Introduction to Testing of Hypothesis, Chi-squared test, ANOVA test	10	25
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Machine Learning Algorithm** Linear Regression, Logistic Regression, Decision Tree, Naïve Bayes, Support Vector Machines, Random Forest, Radial Bases Functions -Appropriate problems for Algorithms	10	25
2.	**Data Visualization** Introduction, Types of Data Visualization, Data for Visualization: Data Types, Data Encodings, Retinal Variables,	07	15

	Mapping Variables to Encodings, Visual encodings, Applications of Data Science, Technologies for Visualization.		
3.	Recent Trends in Various Data Collection and Analysis Techniques, Application Development Methods used in Data Science	05	10

List of Practical:

Sr. No	Name of Practical	Hours
1.	Basics of Python for Data Analysis • Why learn Python for data analysis? • Python 2.7 v/s 3.4 • How to install Python? • Running a few simple programs in Python	04
2.	Python libraries and data structures • Python Data Structures • Python Iteration and Conditional Constructs • Python Libraries	06
3.	Exploratory analysis in Python using Pandas • Introduction to series and data frames • Analytics of dataset- Loan Prediction Problem	06
4.	Data Munging in Python using Pandas	04
5.	Building a Predictive Model in Python • Logistic Regression • Decision Tree • Random Forest	10

Text Book(s):

Title	Author/s	Publication
Data Mining: Concepts and Techniques	Jiawei Han, Micheline Kamber and Jian Pei	Morgan Kaufmann
Doing Data Science: Straight Talk from the Frontline	Cathy O'Neil and Rachel Schutt	O'REILLY
Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data	EMC Education Services	Wiley

Reference Book(s):

Title	Author/s	Publication
Introduction to Data Science: Big Data, Machine Learning, and More Using Python Tools	Arno D. B. Meysman Davy Cielen and Mohamed Ali	Manning Publications
The Data Science Handbook	Field Cady	Wiley
Data Science	John D. Kelleher and Brendan Tierney	MIT Press
Practical Data Science with R	Nina Zumel and John Mount	Manning Publication

Web Material Link(s):

- https://www.edureka.co/blog/what-is-data-science/
- https://www.analyticsvidhya.com/blog/2016/01/complete-tutorial-learn-data-science-python-scratch-2/

- https://www.ngdata.com/top-tools-for-data-scientists/
- https://towardsdatascience.com/intro-to-data-science-part-2-data-wrangling-75835b9129b4
- https://www.allerin.com/blog/top-5-sources-of-big-data
- https://www.tutorialspoint.com/excel_data_analysis/data_analysis_overview.htm
- https://www.tutorialspoint.com/statistics/data_collection.htm
- https://docs.bokeh.org/en/latest/

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 out of 30 marks.
- Submission of assignment which consists of 5 questions to be answered under each module and it consists of 10 marks.
- 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 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 completion of the course, the students will be able to

SEIT4013	Data Science
CO 1	Define the basic terminologies of data science.
CO 2	Examine knowledge of statistical data analysis utilized in business decision making.
CO 3	Recommend statistical methods for hypotheses testing and inference problem.
CO 4	Prepare data analysis based solutions for real world business problems with help of data visualization.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction to Data Science	1, 2, 4
2	Data collection and management	2, 3, 5, 6
3	Statistics for Data Science	1, 4, 5, 6
4	Machine Learning Algorithm	1, 3, 5, 6
5	Data Visualization	3, 4, 5, 6

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE3920
Course Name: Summer Training
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
- have first-hand experience the real time situations in industrial scenario.
- get familiar with engineering applications in industrial spectrum
- learn to adapt themselves in professional scenario

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 students will be able to

SECE3920	Summer Training
CO 1	Study, analysis and describe about the surrounding industrial environment.
CO 2	Describe use of advanced tools and techniques industry.
CO 3	Interact with industrial personnel and follow engineering practices and discipline prescribed in industry.
CO 4	Develop awareness about general workplace behavior and build interpersonal and team skills.
CO 5	Prepare professional work reports and presentations.

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 Computer Engineering

Course Code: SECE4022
Course Name: Cloud Computing & Applications
Prerequisite Course(s): Computer Networks (SECE3011), and Operating System (SEIT2031)

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	05	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand the principles and paradigm of Cloud Computing
- understand the Service Model with reference to Cloud Computing
- appreciate the role of Virtualization Technologies
- gain ability to design and deploy Cloud Infrastructure
- understand cloud security issues and solutions

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Cloud Computing** Overview, Roots of Cloud Computing, Layers and Types of Cloud, Desired Features of a Cloud, Benefits and Disadvantages of Cloud Computing, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks	05	10
2.	**Cloud Architecture, Services and Applications** Exploring the Cloud Computing Stack, connecting to the Cloud, Infrastructure as a Service, Platform as a Service, Saas Vs. Paas, Using PaaS Application Frameworks, Software as a Service, Cloud Deployment Models, Public vs Private Cloud, Cloud Solutions, Cloud ecosystem, Service management, Identity as a Service, Compliance as a Service	05	10
3.	**Virtualization, Abstraction and Cloud Platform** Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hypervisors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Hypervisors	07	15
4.	**Cloud Infrastructure and Cloud Resource Management** Architectural Design of Compute and Storage Clouds, Layered Cloud Architecture Development, Design Challenges, Inter Cloud Resource Management, Resource Provisioning and Platform Deployment, Global Exchange of Cloud Resources. Administrating the Clouds, Cloud Management Products, Emerging Cloud	06	15

	Management Standards		
Section II			
Module	Content	Hours	Weightage in %
1.	**Cloud Security** Security Overview, Cloud Security Challenges and Risks, Software-as-a- Service Security, Cloud computing security architecture: Architectural Considerations, General Issues Securing the Cloud, Securing Data, Data Security, Application Security, Virtual Machine Security, Identity and Presence, Identity Management and Access Control, Autonomic Security Establishing Trusted Cloud computing, Secure Execution Environments and Communications, , Identity Management and Access control Identity management, Access control, Autonomic Security Storage Area Networks, Disaster Recovery in Clouds	06	15
2.	**AWS Programming, Management Console and Storage** Basic Understanding APIs - AWS programming interfaces, Web services, AWS URL naming, Matching interfaces and services, Elastic block store - Simple storage service, Define the AWS Cloud and its value proposition, Identify aspects of AWS Cloud economic, List the different cloud architecture design principles, Security and Compliance, Define the AWS shared responsibility model, Define AWS Cloud security and compliance concepts, Identify AWS access management capabilities, Identify resources for security support	09	20
3.	**AWS Technology, Billing and Pricing** Define methods of deploying and operating in the AWS Cloud, Define the AWS global infrastructure, Identify the core AWS services, identify resources for technology support, Compare and contrast the various pricing models for AWS, Recognize the various account structures in relation to AWS billing and pricing, Identify resources available for billing support	07	15

List of Practical:

Sr. No.	Name of Practical	Hours
1	Write pros and cons of Cloud Computing.	04
2	Summarize Cloud service models with real time examples.	04
3	Define Virtualization. Also list and explain different Hypervisors.	04
4	Discuss performance evaluation of service over cloud.	04
5	Software study on Hadoop, MapReduce and HDFS.	04
6	Create an AMI for Hadoop and implementing short Hadoop programs on the Amazon Web Services platform.	06
7	Create a scenario that use Amazon S3 as storage on cloud.	04

Text Book(s):

Title	Author/s	Publication
Cloud Computing Bible	Barrie Sosinsky	John Wiley & Sons

Reference Book(s):

Title	Author/s	Publication
Amazon Web Services for Dummies	Bernard Golden	Dummies
Amazon Web Services in Action	Michael Wittig and Andreas Wittig	Dreamtech Press
Building Applications in the Cloud: Concepts, Patterns and Projects	Christopher M. Moyer	Pearson Addison-Wesley Professional
Cloud Computing Design Patterns	Thomas Erl	Prentice Hall

Web Material Link(s):

- CloudSim 3.0.3
- http://www.cloudbus.org/
- https://aws.amazon.com/
- http://aws.amazon.com/documentation/
- http://docs.aws.amazon.com/IAM/latest/UserGuide/getting-started.html

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 out of 30 marks.
- Faculty Evaluation consists of 10 marks as per guidelines provided by Course Coordinator.
- End Semester Examination consists of 60 marks Exam.

Practical:

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

Course Outcome(s):

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

SECE4022	Cloud Computing & Applications
CO 1	Describe various cloud computing features, challenges through various models and services.
CO 2	Apply different approaches of cloud computing system for efficient data storage with minimal cost.
CO 3	Identify various management related services of aws.
CO 4	Distinguish various security and compliance related issues with aws.
CO 5	Deploy applications over commercial cloud computing infrastructures such as amazon.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction to Cloud Computing	1, 2
2	Cloud Architecture, Services and Applications	1, 2
3	Virtualization, Abstraction and Cloud Platform	1, 2, 3
4	Cloud Infrastructure and Cloud Resource Management	1, 2, 3
5	Cloud Security	1, 2, 3
6	AWS Programming, Management Console and Storage	1, 2, 3, 4
7	AWS Technology, Billing and Pricing	3, 4, 5, 6

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE4042
Course Name: Artificial Intelligence
Prerequisite Course(s): Data Structures (SECE2031), and Mathematical Methods for Computation (SESH2051)

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	05	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand basics of AI
- develop roles in future and also introduce the intelligence of machine
- design AI

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**What is AI?** What is an AI Technique? The AI Problems and applications, Major areas of Artificial Intelligence, History of AI	04	10
2.	**Problems, State Space Search & Heuristic Search Techniques** Defining the Problems as a State Space Search, Production Systems: control & search strategies, Depth first and Breadth first search, Hill Climbing, Best first search, A* algorithm	08	20
3.	**Knowledge Representation Issues** Representations and Mappings, Approaches to Knowledge Representation, Using Propositional logic and Predicate Logic, Resolution, Semantic network, Frame based knowledge	06	10
4.	**Representing Knowledge Using Rules** Procedural Versus Declarative Knowledge, Forward Reasoning, Backward Reasoning. Symbolic Reasoning, Under Uncertainty: Introduction to Non Monotonic Reasoning, Logics for Non-monotonic Reasoning	05	10
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Uncertain Reasoning and alternatives** Probability and Bayes' Theorem, Certainty Factors and Rule-Base Systems, Bayesian Networks, Dempster Shafer Theory, Fuzzy sets, Fuzzy Logic, Fuzzy systems, Hidden Markov model	08	20
2.	**Game Theory** Introduction to Game playing, The Minimax search procedure, Alpha-Beta procedure, Refinements, Iterative Deepening	05	10
3.	**Natural Language Processing**	05	10

	Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing, Spell Checking.		
4.	**Connectionist Models** Introduction to Hopfield Network, Learning in Neural Network, Application of Neural Networks, Recurrent Networks, Introduction to multilayer Neural networks	04	10

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Overview of Artificial Intelligence systems.	02
2.	Write a program to implement BFS (for 8 puzzle problem or Water Jug problem or any AI search problem)	02
3.	Write a program to implement DFS (for 8 puzzle problem or Water Jug problem or any AI search problem)	02
4.	Write a program to Implement A* Algorithm.	04
5.	Explore different python packages which are applicable in AI.	04
6.	Write a program to construct a Bayesian network from given data.	04
7.	Write a program to infer from the Bayesian network.	04
8.	Hidden Markov model implementation using python.	04
9.	Character recognition application using python.	02
10.	NLP application using python.	02

Reference Books for AI:

Title	Author/s	Publication
Artificial Intelligence	By Elaine Rich And Kevin Knight	(2nd Edition) Tata McGraw-Hill
Artificial Intelligence: A Modern Approach	Stuart Russel, Peter Norvig, PHI	

Web links:

- https://nptel.ac.in/courses/106106126/
- https://www.edureka.co/post-graduate/machine-learning-and-ai?utm_source=google&utm_medium=cpc&utm_campaign=ET-PGPINML-05-Search-AI-High-Intent-Minus-18-24&gclid=EAIaIQobChMI55v6_uC55wIVjx0rCh001wW5EAAYAyAAEgJcyfD_BwE

Course Evaluation:

Theory:

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

Practical:

- Continuous Evaluation Consist of Performance of Practical which should be evaluated out of 10 for each practical and average of the same will be converted to 10 Marks.
- Internal Viva component of 10 marks.
- Practical performance/quiz/test of 15 Marks during End Semester Exam.
- Viva/Oral performance of 15 Marks during End Semester Exam.

Course Outcome(s):

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

SECE4042	Artificial Intelligence
CO 1	Identify ai limitations, strengths and human centered problems.
CO 2	Employ basic ai principles learning and representation of knowledge.
CO 3	Recognize the importance of ai techniques to design efficient systems.
CO 4	Develop real world solutions based on artificial intelligence.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	What is AI?	1, 2, 4
2	Problems, State Space Search & Heuristic Search Techniques	1, 2, 3, 5
3	Knowledge Representation Issues	2, 3, 4, 5
4	Representing Knowledge Using Rules	2, 3, 4
5	Uncertain Reasoning and alternatives	2, 3, 4, 6
6	Game Theory	2, 3, 5
7	Natural Language Processing	2,3,4
8	Connectionist Models	2, 3, 5

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT3052
Course Name: Full Stack Development
Course(s): Basic of Web Development

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	04	00	04	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

- Develop Interactive web applications with both front-end and back-end technologies.
- Understanding of various aspects of web technologies with various data operation with MongoDB.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction and Web Design** Introduction to Internet, WWW and Web 2.0, Web protocols and Web servers, Web Design Principles and Web site structure	02	5
2.	**HTML5** Introduction to HTML, Browsers and HTML, Editor's Offline and Online, Tags, Attribute and Elements Doctype Element, Comments, Headings, Paragraphs and Formatting Text, Lists and Links, Images and Tables.	03	10
3.	**CSS3** Introduction CSS, Applying CSS to HTML, Selectors, Properties and Values, CSS Colors and Backgrounds, CSS Box Model, CSS Margins, Padding, and Borders, CSS Text and Font Properties, CSS General Topics	03	10
4.	**JavaScript and jquery** Introduction to JavaScript, Applying JavaScript (internal and external), Understanding JS Syntax, Introduction to Document and Window Object, Variables and Operators, Data Types and Num Type Conversion, Math and String Manipulation, Objects and Arrays, Date and Time, Conditional Statements, Switch Case, Looping in JS, Functions, JavaScript Objects, JavaScript Forms, JavaScript HTML DOM, JavaScript BOM, JavaScript Type Conversion, JavaScript RegExp, JavaScript Errors, JavaScript	07	15

	Debugging, JavaScript Hoisting, JavaScript Strict Mod, Basics of jQuery, jQuery syntaxes, jQuery selectors, events, effects, Access/Manipulate web browser elements using jQuery, jQuery HTML, jQuery Traversing, jQuery AJAX & Misc.		
SECTION II			
Module No.	Content	Hours	Weightage in %
1.	**Bootstrap** Introduction to Bootstrap, Bootstrap Basics, Bootstrap Grids, Bootstrap Themes, Bootstrap CSS, Bootstrap JS	02	10
2.	**Frontend with ReactJS** Introduction, Templating using JSX, Components, State and Props, Lifecycle of Components, Rendering List and Portals, Error Handling, Routers,Redux and Redux Saga, Immutable.js, Service Side Rendering, Unit Testing, Webpack	06	20
3.	**Backend with NodeJS** Introduction to Node.js, Node Package Manager, REPL Terminal, Node.js Webserver – Server and Clients, Creating a simple server, Rendering HTML, Rendering JSON Data, Routing	05	15
4.	**MongoDB** SQL and NoSql Concepts, Create and Manage MongoDB, Migration of Data into MongoDB, MongoDB with PHP, MongoDB with NodeJS, Services Offered by MongoDB	02	15

List of Practical:

Sr No	Name of Practical	Hours
1.	Design Wireframes for your project based on Web Design Principles.	4
2.	Formatting web pages with CSS (Inline CSS, Document level CSS and External CSS.	6
3.	Browser interaction and form validations (Web browser environments, forms and validations, image sliders) [Image slider plugins of jQuery, Client-side validation of Registration & Login	8
4.	Design web application using Bootstrap principles.	6
5.	Make interactive web pages with reactJS concepts.	10
6.	Design web application with back end of NodeJS.	10
7.	Implement basic data operations in web application with MongoDB.	6
8.	Develop Complete Web application as a mini project.	10

Text Book(s):

Title	Author/s	Publication
Black Book, Web Technologies,	Kogent Learning Solutions Inc	Dreamtech Press
Full Stack Web Development For Beginners	Riaz Ahmed	Atlantic publisher

Reference Book(s):

Title	Author/s	Publication
Black Book, HTML 5	DT Editorial Services	Dreamtech Press
Developing Web Applications	Ralph Moseley and M. T.	Wiley-India

	Savaliya	
jQuery Cookbook	Cody Lindley	O'Reilly Media
Head First jQuery - A Brain-Friendly Guide	Ryan Benedetti, Ronan Cranley	O'Reilly Media

Web Material Link(s):

- https://www.w3schools.com/whatis/whatis_fullstack.asp
- https://www.youtube.com/watch?v=nu_pCVPKzTk (Free code camp)
- https://www.javatpoint.com/how-to-be-a-full-stack-developer
- https://www.tutorialspoint.com/the-full-stack-web-development/index.asp

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.
- Mini Project Contains 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 the completion of the course, the student will be able to

SEIT3052	**Full Stack Development**
CO 1	Understand and compare the fundamentals of Web hosting and domain name services.
CO 2	Understand various non-browser specific web design principles.
CO 3	Understand the need and be able to develop HTML/XHTML and CSS pages with valid structure as well as content.
CO 4	Understand and be able to develop JavaScript/jQuery code to access the DOM structure of web document and object properties.
CO 5	Develop dynamic web pages with usage of server-side scripting NodeJS and MongoDB.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction to Web Designing	2,4
2	HTML5	2,3,6
3	CSS3	2,3,6
4	JavaScript and jQuery	1,3,6
5	Bootstrap	1,4,6
6	ReactJS	1,3,6
7	NodeJS	1,2,3,5

8	Database Connectivity with MongoDB	2,4,5

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE3910
Course Name: Project-I
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	04	00	04	00	00	100	100	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand the current trend or technology.
- aware of future technologies.
- try to learn new technologies and apply them as much as possible.

Outline of the Seminar:

Sr. No	Seminar Guidelines
1.	Selection of Title
2.	Literature Review
3.	Gap Identification
4.	Proposed Scheme
5.	Implementation of the proposal
6.	Report Writing
7.	Presentation & Question-Answer

Detailed Guideline(s):

Sr. No	Content	Hours	Weightage in %
1.	**Selection of Title** Select a topic according to the specialization of students or future technology. After selecting the topic and proposed title, get approval from the concerned faculty.	06	10
2.	**Literature Review** Study of various technology or area to select a topic of the seminar.	12	10
3.	**Gap identification and Proposal** Students must identify the gaps in the existing research and design a proposal which will help in overcome the same.	10	20
4.	**Implementation** Students must implement their proposal in any of the programming languages.	20	35
5.	**Report Writing** The report must be prepared as per suggested guidelines consisting of Preamble, Objectives, Scope, Introduction, Conclusions, Recommendations and Annexure.	07	15
6.	**Presentation & Question-Answer** At the end of the semester, the student/group of students shall	05	10

	give a presentation of their work followed by a viva-voce examination.		

Course Evaluation:

Sr. No.	Evaluation criteria	Marks
1.	Selection of the topic related field (Within first 30 Days of commencement of semester)	40
2.	Initial Presentation of the topic (Within 31 to 40 Days of commencement of semester)	40
3.	An actual work carried out (Within 41 to 60 Days of commencement of semester)	40
4.	Report writing as per guidelines	40
5.	Final Presentation & Question-Answer session	40
	Grand Total:	**200**

The entire evaluation will be converted equivalent to 200 Marks.

Course Outcome(s):

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

SECE3910	MINOR PROJECT
CO 1	Analyze user requirements and implement innovative ideas for social and environmental benefits.
CO 2	Apply new technologies and design techniques concerned for devising a solution for a problem statement.
CO 3	Apply project management skills like task scheduling, teamwork, working in confine deadlines etc., for successfully development of the project.
CO 4	Prepare reports and presentations to communicate technical information.

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE3490
Course Name: Online NPTEL Course
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	00	03	100	00	00	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s)of the Course:

To help the learners to

- Learn new subjects as per recent trends in the industry from national experts.

Course Content:

Performance analysis will be based on any one of the following subjects:

1. Deep Learning
2. Computer Graphics
3. Computer Vision
4. Design Engineering
5. Neural Networks
6. Applied Natural Language Processing
7. Social Networks
8. Virtual Reality
9. Augmented Reality
10. Real time systems
11. Big Data
12. Advanced graph theory
13. Theory of computation
14. Design And Engineering Of Computer Systems
15. Ethical Hacking
16. UI & UX
17. Data Analytics
18. Data Visualization
19. Algorithms For Big Data
20. Compiler Design

Or any other NPTEL course; available time to time.

Course Evaluation:

Practical:

- Continuous Evaluation as per the guidelines of NPTEL assignments and tests.
- The NPTEL score will be directly fetched and converted out of 100.

Course Outcome(s):

After the completion of the course, the following course outcomes will be able to:

SECE3490	**ONLINE NPTEL COURSE**
CO 1	Inculcate mode of self-learning.
CO 2	Exposure to relevant and newest tools and technologies.
CO 3	Value addition when the student is applying for jobs.
CO 4	Use NPTEL program for GATE and high studies preparation.
CO 5	Facilitate students to attain certificate and to make them employable in the industry or pursue higher education program.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE3511
Course Name: Programming with .NET
Prerequisite Course(s): Introduction to Computer Programming (SECE1020)

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- understand the .NET framework and its applications.
- understand the basics of C#.
- understand ASP.NET web services and web service security.

Course Content:

Section – I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to .NET Framework** .NET Overview, NET framework, course mechanics, CLR, Assemblies (monolithic vs. component-based applications), Execution Model, Client-Side vs. Server-Side Programming.	05	16
2.	**Basics and Console Applications in C#** Name Spaces, Constructors, Destructors, Function Overloading, Inheritance, Operator Overloading, Modifier Properties, Indexers, Attributes, Reflection API, Console Applications, Generating Console Output, Processing Console Input.	05	16
3.	**C#.NET** Language Features and Creating .NET Projects, Namespaces Classes and Inheritance, Namespaces Classes and Inheritance, C, Exploring the Base Class Library, Debugging and Error Handling, Data Types, Exploring Assemblies and Namespaces, String Manipulation, Files and I/O, Collections.	05	18
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Windows Forms and Controls in details** The Windows Forms Model, Creating Windows Forms Windows Forms Properties and Events, Windows Form Controls, Menus, Dialogs, Tool Tips, Printing - Handling Multiple Events, GDI+, Creating Windows Forms Controls.	04	14
2.	**ASP.NET** Introduction to ASP.NET, Working with Web and HTML Controls, Using Rich Server Controls, Login controls, Overview of ASP.NET Validation Controls, Using the Simple Validations, Using the Complex Validators Accessing Data	04	12

	using ADO.NET, Using the Complex Validators Accessing Data using ADO.NET, Configuration Overview, ASP.NET state management, tracing, caching, error handling, security, deployment.		
3.	**Managing State** Preserving State in Web Applications and Page-Level State, Using Cookies to Preserve State, ASP.NET Session State, Storing Objects in Session State, Configuring Session State, Setting Up an Out-of-Process State Server, Storing Session State in SQL Server, Using Cookieless Session IDs, Application State Using the DataList and Repeater Controls, Overview of List-Bound Controls, Creating a Repeater Control and DataList Control.	07	24

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction to .NET.	04
2.	Working with .NET and C#.	02
3.	Write C# code to convert infix notation to postfix notation.	02
4.	Write a C# code to convert the following currency conversion. Dollar to Rupee, Euro to Rupee, Pound to Rupee.	02
5.	Working with ASP.NET.	02
6.	Write a program to Enable-Disable Textbox and change the width of Textbox programmatically in ASP.NET.	02
7.	Write a program to increase and decrease the font size.	02
8.	Session and Cookie.	04
9.	Write ASP.NET program to Store Objects in Session State and Storing Session State in SQL Server.	04
10.	Write a C# code to Perform Celsius to Fahrenheit Conversion and Fahrenheit to Celsius conversion.	02
11.	Simple Object Access Protocol (SOAP) and Web Services.	04

Text Book(s):

Title	Author/s	Publication
Professional C#4.0 and .Net 4	Christian Nagel, Bill Evjen, Jay Glynn, K. Watson, M. Skinner	Wrox Publication
C# The Basics	Vijay Mukhi.	BPB Publications

Reference Book(s):

Title	Author/s	Publication
ASP.NET Complete Reference.	Matthew Macdonald and Robert Standefer	McGraw Hill Education

Web Material Link(s):

- https://teamtreehouse.com/learn/csharp
- https://www.asp.net/aspnet/videos
- https://www.asp.net/web-forms/videos/aspnet-35

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 marks for 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 completion of the course, the students will be able to

SECE3511	**Programming with .NET**
CO 1	Describe the Microsoft .net framework and asp.net page structure.
CO 2	Construct windows and web application with variety of gui controls.
CO 3	Integrate the database connectivity using inbuilt data access tools such as ado.net.
CO 4	Prepare and deploy secure web application and web services.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction to .NET Framework	1,2
2	Basics and Console Applications in C#	1,2,4
3	C#.NET	1,2
4	Windows Forms and Controls in details	2,3,4
5	ASP.NET	1,2
6	Managing State	2,5,6

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE3520
Course Name: Service Oriented Architecture
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	02	00	03	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- explain the underlying principles of Service Oriented Architecture.
- describe and understand different terminologies used in Service Oriented Architecture.
- apply the different concepts of SOA to build different applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Fundamental SOA, Characteristics of contemporary SOA, Misperception timeline, Continuing evolution of SOA, Roots of SOA Service-orientation and object-orientation, Web Services, Key Principles of SOA.	03	10
2.	**Enterprise architectures** Integration versus interoperation, J2EE, .NET, Model Driven Architecture, Concepts of Distributed Computing, XML.	04	20
3.	**Basic Concepts** Web services framework, Services (Web services: Definition, Architecture, and standards), Service descriptions with WSDL, Messaging with SOAP, UDDI.	08	20
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Principles of Service-Oriented Architecture** Message Exchange Pattern, Coordination, Atomic Transactions, Business Activities, Orchestration, Choreography, WS-Addressing, WS-Reliable Messaging, WS-Policy (including WS-Policy Attachments and WS-Policy Assertions), WS-Metadata Exchange, WS-Security (including XML-Encryption, XML-Signature, and SAML).	07	20
2.	**Principles of Service-Oriented Computing** RPC versus Document Orientation, Service Life Cycle, Service Creation, Service Design and Build, Service Deployment, Publish Web service using UDDI, Service Discovery, Service Selection, Service Composition, Service Execution, and Monitoring, Service Termination.	08	30

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Develop DTD and XSD for University Information System having Exam Enrollment from the beginning of Semester, along with Exam Registration and Marks submission by Teachers to University from Various Colleges and Results in Sheets Generation by University on Online Report.	02
2.	Develop Mark sheet XML Document and display Mark sheet based on CSS and XSL presentation Format.	04
3.	Develop Java Based Program using JAXP or XML API in reading XML file for Students Information and Display HTML Table.	02
4.	Develop Java Based Web Service using REST and SOAP-Based web service in NetBeans for University Course List and Search Course based Course Title and Course ID.	04
5.	Create DTD file for student information and create a valid well-formed XML document to store student information against this DTD file.	02
6.	Create XMS schema file for student information and create a valid well-formed XML document to store student information against this DTD file.	04
7.	Create web calculator service in .NET Beans and create Java client to consume this web service.	02
8.	Develop same web service using JX-WS.	04
9.	Create web calculator service in .NET and Create java client to consume web service developed using Apache AXIS.	02
10.	Using WS –GEN and WS-Import develop the java web service & call it by Java Client.	04

Text Book(s):

Title	Author/s	Publication
Service Oriented Architecture: Concepts, Technology, and Design	Thomas Erl	Pearson education

Reference Book(s):

Title	Author/s	Publication
Applied SOA	Michael Rosen, Boris L, Kevin S., Marc J. B.	Wiley Publication.
SOA based Enterprise Integration	Waseem Roshen	TMH Publication

Web Material Link(s):

- https://www.service-architecture.com/articles/web-services/service-oriented_architecture_soa_definition.html

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 marks for 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 completion of the course, the students will be able to

SECE3520	Service Oriented Architecture
CO 1	Explain the difference between monolithic architecture versus service oriented architecture (soa).
CO 2	Practice real life examples and identify the underlying principles of soa.
CO 3	Implement and integrate service oriented architecture in the development cycle of web service based applications.
CO 4	Understand advanced concepts such as service composition, orchestration and choreography.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1,2
2	Enterprise architectures	1,2,3
3	Basic Concepts	1,2,3
4	Principles of Service-Oriented Architecture	1,2,4
5	Principles of Service-Oriented Computing	1,2,3,4

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE3590
Course Name: Service Oriented Computing
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	02	00	03	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- explain the underlying principles of Service Oriented Architecture.
- describe and understand different terminologies used in Service Oriented Architecture.
- apply the different concepts of SOA to build different applications.

Course Content:

Section I			
Module No.	**Content**	**Hours**	**Weightage in %**
1.	**Introduction** Introduction to distributed Computing and Web services architectures and standards, Fundamental SOA, Key Principles of SOA.	04	15
2.	**Enterprise architectures** Integration versus interoperation, J2EE, .NET, Model Driven Architecture, Concepts of Distributed Computing, XML.	04	15
3.	**Basic Concepts** Web services framework, Services (Web services: Definition, Architecture, and standards), Service descriptions with WSDL, Messaging with SOAP, UDDI.	07	20
Section II			
Module No.	**Content**	**Hours**	**Weightage in %**
1.	**Principles of Service-Oriented Architecture** Message Exchange Pattern, Coordination, Atomic Transactions, Business Activities, Orchestration, Choreography, WS-Addressing, WS-Reliable Messaging, WS-Policy (including WS-Policy Attachments and WS-Policy Assertions), WS-Metadata Exchange, WS-Security (including XML-Encryption, XML-Signature, and SAML).	07	20
2.	**Principles of Service-Oriented Computing**	08	30

	RPC versus Document Orientation, Service Life Cycle, Service Creation, Service Design and Build, Service Deployment, Publish Web service using UDDI, Service Discovery, Service Selection, Service Composition, Service Execution, and Monitoring, Service Termination.		

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Develop DTD and XSD for University Information System having Exam Enrolment from the beginning of Semester, along with Exam Registration and Marks submission by Teachers to University from Various Colleges and Results in Sheets Generation by University on Online Report.	02
2.	Develop Mark sheet XML Document and display Mark sheet based on CSS and XSL presentation Format.	04
3.	Develop Java Based Program using JAXP or XML API in reading XML file for Students Information and Display HTML Table.	02
4.	Develop Java Based Web Service using REST and SOAP-Based web service in NetBeans for University Course List and Search Course based Course Title and Course ID.	04
5.	Create DTD file for student information and create a valid well-formed XML document to store student information against this DTD file.	02
6.	Create XMS schema file for student information and create a valid well-formed XML document to store student information against this DTD file.	04
7.	Create web calculator service in .NET Beans and create Java client to consume this web service.	02
8.	Develop same web service using JX-WS.	04
9.	Create web calculator service in .NET and Create java client to consume web service developed using Apache AXIS.	02
10.	Using WS –GEN and WS-Import develop the java web service & call it by Java Client.	04

Text Book(s):

Title	Author/s	Publication
Service Oriented Architecture: Concepts, Technology, and Design	Thomas Erl	Pearson education

Reference Book(s):

Title	Author/s	Publication
Applied SOA	Michael Rosen, Boris L, Kevin S., Marc J. B.	Wiley Publication.
SOA based Enterprise Integration	Waseem Roshen	TMH Publication

Web Material Link(s):

- https://www.service-architecture.com/articles/web-services/service-oriented_architecture_soa_definition.html

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 marks for 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 completion of the course, the students will be able to

SECE3590	SERVICE ORIENTED COMPUTING
CO 1	Explain the difference between monolithic architecture versus service-oriented architecture (soa).
CO 2	Practice real life examples and identify the underlying principles of soa.
CO 3	Implement and integrate service-oriented architecture in the development cycle of web service-based applications.
CO 4	Understand advanced concepts such as service composition, orchestration and choreography.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1,2
2	Enterprise architectures	1,2,3
3	Basic Concepts	1,2,3
4	Principles of Service-Oriented Architecture	1,2,4
5	Principles of Service-Oriented Computing	1,2,3,4

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT3510
Course Name: System Analysis and Design
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	02	00	03	40	60	50	00	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- gather data to analyze and specify the requirements of a system.
- build general and detailed models that assist programmers in implementing a system.

Course Content:

Section – I			
Module No.	Content	Hours	Weightage in %
1.	**Data and Information** Types of information – operational, tactical, strategic and statutory, why do we need information systems? management structure, requirements of information at different levels of management.	05	16
2.	**Systems Analysis and Design Life Cycle** Requirements determination, requirements specifications, feasibility analysis, final specifications, hardware and software study, system design, system implementation, system evaluation, system modification. Role of systems analyst, attributes of a systems analyst, tools used in system analysis.	05	16
3.	**Information gathering** Strategies, methods, case study, documenting study, system requirements specification – from narratives of requirements to classification of requirements as strategic, tactical, operational and statutory.	05	18
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Feasibility analysis** Deciding project goals, examining alternative solutions, cost, benefit analysis, quantifications of costs and benefits, payback period, system proposal preparation for managements, parts and documentation of a proposal, tools for prototype creation.	04	14
2.	**Tools for systems analysts** Data flow diagrams, case study for use of DFD, good conventions, leveling of DFDs, leveling rules, logical and physical DFDs, software tools to create DFDs.	04	12
3.	**Data oriented systems design**	04	14

	Entity relationship model, E-R diagrams, relationships cardinality and participation, normalizing relations, various normal forms and their need, some examples of relational data base design.		
4.	**Structured systems analysis and design** Procedure specifications in structured English, examples and cases, decision tables for complex logical specifications, specification-oriented design vs procedure-oriented design.	03	10

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Prepare a Context level DFD diagram and as many sublevel DFDs by identifying the processes, the entities and arrows to show how the information is passed from one process to another.	06
2.	Prepare a Data Flow Diagram that is drawn for a Food Ordering System. It should contain a process that represents the system. It should also show the participants who will interact with the system	06
3.	Prepare an E-R Diagram showing the relationships one-to-one, one-to-many and many-to-many listing assumptions to justify your answer.	06
4.	The owner is thinking to add a 24-automated rental machine to facilitate his customers to rent any movie at any time of the day, 365 days of the year but before taking his decision he would like to see the response of his customers of how much they would welcome such a facility. As a systems analyst you currently do not have any customer response and you are required to prepare a questionnaire of your own choice i.e. open, closed, bipolar, etc. to gather a fair customer response regarding a24-automated rental machine.	06
5.	Case Study on feasibility analysis.	06

Text Book(s):

Title	Author/s	Publication
System Analysis and Design	Allen Dennis, Barbara Haley Wixom, Roberta M. Roth	Wiley
Modern System Analysis and Design	Jeffery A. Hoffer, Joey F. George, Joseph H. Valacich, Prabin K. Panigrahi	Pearson
Analysis and Design of Information systems	V. Rajaraman	PHI publication

Reference Book(s):

Title	Author/s	Publication
System Analysis and Design Methods	Jeffery L. Whitten, Lonnie D. Bentley.	McGraw Hill Education

Web Material Link(s):

- https://nptel.ac.in/courses/106108102/
- https://www.oreilly.com/library/view/systems-analysis
- https://www.w3computing.com/systemsanalysis/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 per each practical. At the end of the semester, the average of the entire practical will be converted to 30 marks.
    - Internal submission consists of viva and presentation of the case study document/report prepared as per guidelines of the course coordinator to be evaluated out of 20 marks.

Course Outcome(s):

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

SEIT3510	System Analysis and Design
CO 1	Evaluate business problems and represent with uml design concepts.
CO 2	Formulate software requirement specification, written in clear and concise business language.
CO 3	Develop the software requirement specification document from business clients.
CO 4	Illustrate project management skills like planning, scheduling work, team management.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Data and Information	1,2
2	Systems Analysis and Design Life Cycle	2,4,5
3	Information gathering	2,4
4	Feasibility analysis	3,4
5	Tools for systems analysts	3,4,5
6	Data oriented systems design	2,3,6
7	Structured systems analysis and design	3,4,6

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT3560
Course Name: Data Visualization
Prerequisite Course (s): NIL

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	50	00	20	30	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Study important approaches in the field of data visualization and its techniques.
- Understand why visualization is an important part of data analysis.
- Develop skills to both design and critique visualizations.

Course Content:

Section I			
Module No.	**Content**	**Hours**	**Weightage in %**
1.	**Introduction** What is visualization, the visualization process, Types of Data: numerical data, non-numerical data, continuous data, sampled data, discrete data, etc., Data visualization foundation	04	25
2.	**Visualization Techniques** Visualization techniques for spatial data: 1D, 2D and 3D, Dynamic data, Visualizing Point, Line and Area data, Visualization techniques for Multivariate data, Visualizing graphs, texts and documents	04	25
Section II			
Module No.	**Content**	**Hours**	**Weightage in %**
3.	**Data Visualization using Tableau** **Introduction to Tableau:** data import and management, data types and operations, working with metadata, Filters in Tableau **Charts**: Bar chart, Line chart, Pie chart, Scatter chart, Gantt chart, Histogram, Motion chart, Box chart, Tree map, etc.	04	25
4.	**Advanced Data Visualization** Making charts interactive and animated, Calculations in Tableau, Advance Visual Analytics, Dashboard and Stories.	03	25

List of Practical:

Sr. No	Name of Practical	Hours
1.	Getting familiar with Tableau Interface.	02
2.	Data import and management within Tableau.	02
3.	Create visualization charts/dashboards from structured data.	04
4.	Create visualization charts/dashboards from semi-structured data.	04
5.	Implement Interactive charts.	04
6.	Implement Animated charts.	04
7.	Performing different Calculations in Tableau.	02
8.	Develop a complete Information Dashboard using all the features	04
9.	Creating Advance Visual Analytics dashboards.	04

Text Book(s):

Title	Author/s	Publication
Interactive Data Visualization Foundation, Techniques and Applications	Mathew Ward, Georges Grinstein, Daniel Keim	A K Peters 2010
Practical Tableau	Ryan Sleeper	O'Reilly

Reference Book(s):

Title	Author/s	Publication
Tableau Your Data! Fast and Easy Visual Analysis with Tableau Software	Daniel G. Murray	Wiley
Handbook of Data Visualization	Chun-houh Chen, Wolfgang Hardle, Antony Unwin	Springer

Web links:

- https://www.coursera.org/learn/datavisualization

Course Evaluation:

Theory

- Continuous Evaluation consists of two tests of 30 marks and 1 hour of duration and average of the same will be converted to 30 marks.
- Faculty evaluation consists of 20 marks as per the guidelines provided by Course Coordinator.

Practical

- Continuous Evaluation will be cumulative of practical performances, activities, presentations, viva and submissions consisting of 20 marks.
- Practical performance/quiz/test consists of 15 marks during End Semester Exam.
- Viva/Oral performance of 15 marks during End Semester Exam.

Course Outcome(s):

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

SEIT3560	Data Visualization
CO 1	Understand Concepts and Foundation of Data Visualization.
CO 2	Analyze the different Visualization Techniques.
CO 3	Introduce and performing hands on the Platform for Data Visualization: Tableau.

CO 4	Explore the advance dashboards of the Tableau Platform.

Level of Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction	1
2	Visualization Techniques	2
3	Data Visualization using Tableau	3
4	Advanced Data Visualization	2,3

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT3541
Course Name: Advance Java Technology
Prerequisite Course: Object Oriented Programming with Java (SEIT1030)

Teaching & Examination Scheme:

Teaching Scheme (Hours/Week)				Examination Scheme (Marks)						
Theory	Practical	Tutorial	Credit	Theory		Practical		Tutorial		Total
				CE	ESE	CE	ESE	CE	ESE	
2	2	0	3	40	60	20	30	0	0	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand J2EE architecture.
- construct web application using servlets, Java Server pages.
- learn advanced java programming concepts like hibernate, Enterprise java beans, etc.

Course Content:

Section I			
Module	**Content**	**Hours**	**Weightage in %**
1.	**Client Server Technology** Introduction to Single Tier Architecture, Two Tier Architecture, Multitier Architecture, HTTP protocol: Request and Response, Web Container, Web Server, Overview of J2EE, J2EE Architecture, J2EE Technology.	05	10
2.	**Servlets Programming** Introduction, Servlet Implementation, Servlet configuration, Servlet life cycle, servlet session, Context and Collaboration, Web Archive files, Deployment Descriptor, Deployment Configuration.	05	20
3.	**Java Server Page** **JSP:** Overview, lifecycle, Architecture, **JSP Elements:** Directives, Scripting, Action tags, Implicit Objects, Comments, Custom Tags, page, **Scope:** page, request, session, JSP Exception Handling.	05	20
Section II			
Module	**Content**	**Hours**	**Weightage in %**
1.	**JDBC** Introduction to java database programming, JDBC driver types, Steps to connect JDBC, JDBC statement interface, JDBC prepared statement interface, JDBC callable statement interface, Transaction management, Java beans.	05	15
2.	**Web Services** Introduction, Web Service Technology, J2EE for web service, developing web services.	03	10

3.	**Hibernate** Introduction, Hibernate Architecture, component of Hibernate, Hibernate query Language, Hibernate O/R mapping.	03	15
4.	**Java Web Frameworks: Spring MVC** Overview of Spring, Spring Architecture, bean life cycle, XML Configuration on Spring, Aspect – oriented Spring, Managing Database, Managing Transaction	04	10

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to client-server architecture	02
2.	Study and implementation of servlet programming	06
3.	Study and implementation of java server page	06
4.	Study and implementation of java database connectivity	06
5.	Study and implementation of web service	04
6.	Study and implementation of hibernate	04
7.	Study and implementation of Spring Framework	02

Text Book(s):

Title	Author/s	Publication
Complete Reference J2EE	James Keogh	Mc Graw Hill

Reference Book(s):

Title	Author/s	Publication
Spring in Action 3rd edition	Craig walls	Manning
JDBC™ API Tutorial and Reference	Maydene Fisher, Jon Ellis, Jonathan Bruce	Addison Wesley

Web Material Link(s):

- https://www.javatpoint.com/servlet-tutorial/
- https://www.javatpoint.com/jsp-tutorial/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 marks for 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 completion of the course, the students will be able to

SEIT3541	ADVANCE JAVA TECHNOLOGY
CO 1	Implement Networking and Data base connectivity in Java for given application.
CO 2	Design and implement webpage with dynamic content and server-side web application using Servlet and JSP.
CO 3	Apply the different web services on dynamic web-based applications.
CO 4	Analyze and Implement database independent application using ORM (Object Relation Mapping) Hibernate.
CO 5	Use web application framework and apply Model-View-Controller architecture to build complex client-server applications.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Client Server Technology	1,2,4,6
2	Servlet Programming	2,4,5,6
3	Java Server Pages	2,4,5,6
4	JDBC	1, 2, 3, 5, 6
5	Web Service	2,4,5,6
6	Hibernate	2,5,6
7	Spring Framework	2,3,6

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE3531
Course Name: Wireless Network and Mobile Computing
Prerequisite Course(s): Computer Networks (SECE3011)

Teaching & Examination Scheme:

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

CE: Continuous Evaluation, ESE: End Semester Exam

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

- explain the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in Wireless Communication Networks.
- learn the basics of Wireless voice and data communication technologies.
- build knowledge on various Mobile Computing Algorithms.
- build skills in working with Wireless application Protocols to develop mobile content applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Mobile Computing Architecture** Types of Networks, Architecture for Mobile Computing, 3-tier Architecture, Design Considerations for Mobile Computing, Applications. **Wireless Transmission:** Signals, Antennas Signal propagation, Multiplexing, Modulation, Cellular Systems. **Medium Access Control:** Motivation for a specialized MAC, SDMA, FDMA, TDMA, CDMA.	03	05
2.	**Wireless Networks – 1** GSM and SMS, Global Systems for Mobile Communication (GSM and Short Service Messages SMS), GSM Architecture, Protocols, Call routing in GSM, Handover, Security, Introduction to SMS, SMS Architecture, SM MT, SM MO, SMS as Information bearer, applications.	04	15
3.	**Wireless Networks – 2** GPRS, GPRS and Packet Data Network, GPRS Network Architecture, GPRS Network Operations, Data Services in GPRS, Applications for GPRS, Billing and Charging in GPRS.	04	15
4.	**Wireless Networks –3** 3G,4G, and 5G Networks, WiMAX, Third Generation Networks, Fourth Generation Networks, Vision of 5G,3G vs. 4G vs. 5G, Features and Challenges, Introduction to WiMAX.	04	15
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Mobile network layer**	04	10

	Mobile IP, Dynamic Host Configuration protocol, Mobile ad-hoc networks **Mobile Transport layer:** Traditional TCP, classical TCP improvements, TCP over 3G/4G wireless networks		
2.	**Mobile OS and Computing Environment** Smart Client Architecture, The Client: User Interface, Data Storage, Performance, Data Synchronization, Messaging. The Server: Data Synchronization, Enterprise Data Source, Messaging. Mobile Operating Systems, The Development Process,	04	15
3.	**Building Mobile Internet Applications** Thin client: Architecture, the client, Middleware, Messaging Servers, Processing a Wireless request, Wireless Applications Protocol (WAP) Overview, Wireless Languages: Markup Languages, HDML, WML, HTML, cHTML, XHTML, VoiceXML.	04	15
4.	The architecture of future Networks, Wireless Sensor Network, IoT	03	10

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Setup & Configuration of Wireless Access Point (AP)	04
2.	Implementation of Wireless Network with a number of nodes and different parameters using Simulator.	04
3.	Study of WLAN: Ad Hoc & Infrastructure Mode	04
4.	GSM modem study and SMS client-server application	04
5.	Mobile Internet and WML	04
6.	Design and Program Income Tax and Loan EMI Calculator for Mobile Phones	04
7.	Implementation of Mobile Network using Network Simulator (NS2)	06

Text Book(s):

Title	Author/s	Publication
Mobile Communications	Schiller	Pearson
Wireless Communications & Networks	William Stallings	Pearson

Reference Book(s):

Title	Author/s	Publication
Principles of Mobile Computing	UIWE Hansman, Other Merk, Martin-S-Nickious, Thomas Stohe	Springer international Edition
Mobile Computing	Ashok K. Teludkar	TMH
Mobile AdHoc Networks	Chai K.Toh	Prentice Hall
Mobile Computing	Sipra DasBit,Biplab K. Sikdar	PHI,2009

Web Material Link(s):

- http://alphace.ac.in/downloads/notes/cse/10cs831.pdf

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 marks for 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 completion of the course, the students will be able to

SECE3531	**Wireless Network and Mobile Computing**
CO 1	Associate the fundamentals of wireless communications with real world applications.
CO 2	Discuss security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.
CO 3	Demonstrate basic skills for cellular networks design.
CO 4	Develop the knowledge of tcp/ip extensions for mobile and wireless networking.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Mobile Computing Architecture	1,2
2	Wireless Networks – 1	1,2
3	Wireless Networks – 2	2,3,4
4	Wireless Networks –3	2,3,4
5	Mobile network layer Mobile Transport layer	2,4
6	Mobile OS and Computing Environment	3,6
7	Building Mobile Internet Applications	3,6
8	The architecture of future Networks, Wireless Sensor Network, IoT	3,6

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE3541
Course Name: Software Testing & Quality Assurance
Prerequisite Course(s): Software Engineering (SEIT3010)

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	02	00	03	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- identify correctness, completeness and quality of developed Software.
- identify the importance of software testing in Software Development Life-Cycle.
- gain knowledge about various types of software testing.
- train students to create good test cases and improve the quality of software.
- study software testing process and various automated software testing tools.
- develop an application and test it using any automated testing tool.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Basic of software testing & Terminology** Software Development & Software Testing Life Cycle- role and activities, Necessity and Objectives of testing, Quality Concepts, Quality Control, McCall's factor model, Different Software Development Model, Object– oriented testing, Web testing, GUI testing, Elements of Software quality assurance, Quality Assurance Activities, Statistical Quality Assurance, Software Reliability, SQA plan, Testing Standards:-IEEE, CMM, ANSI	5	10
2.	**Levels of Testing** Verification and Validation Model, Techniques of Verification:-Peer Review, Walkthrough, Inspection, FTR, Unit testing, Integration testing, Function Testing, System testing**,** Installation Testing, Usability Testing, Regression testing, Performance testing**:-**Load Testing**,** Stress Testing**,** Security testing**,** Volume testing, Acceptance testing**:-**Alpha testing, Beta testing, Gamma testing.	6	20
3.	**Testing Methods** Black Box methods**: -**Equivalence partitioning**,** Boundary-value analysis**,** Error guessing, graph-based testing methods, Decision Table Testing. White Box methods**: -**Statement coverage**,** Decision coverage**,** Condition coverage, Path testing, Data flow testing.	4	20
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Testing Tools**	4	15

	Features of test tool, Guidelines for selecting a tool, Tools and skills of tester, Static testing tools, Dynamic testing tools, Advantages and disadvantages of using tools, Introduction to open source testing tool.		
2.	**Test Planning & Documentation** Development plan and quality plan objectives, Testing Strategy: -type of project, type of software, Test Management, Strategic Management, Operational Test Management, Managing the Test Team, Test Plans, Test Case, Test Data, Risk Analysis.	6	15
3.	**Defect Management and Test Reporting** Defect Classification, Defect Management Process, Defect Management Tools, Defect life cycle, Defect Reporting, Test reporting, Qualitative and quantitative analysis, Fagan Inspection.	5	20

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Study of manual and automated Testing	02
2.	Introduction to open source testing tool	04
3.	Recording test in analog and context sensitive mode	02
4.	Synchronizing test	02
5.	Checking GUI Objects	02
6.	Checking Bitmap Objects	02
7.	Creating data driven test	02
8.	Maintaining test script	02
9.	Project (Creating test report in Bugzilla)	10
10.	Developing test cases for a particular task	02

Text Book(s):

Title	Author/s	Publication
Software testing principles, Techniques and Tools	M.G.Limaye	Tata McGraw Hill
Software testing	Ron Pattorn	Tech Publications
Software Engineering- a practitioner's approach	Roger Pressman	McGraw Hill

Reference Book(s):

Title	Author/s	Publication
Software testing	Rex Black,	Wrox Publications
Software testing techniques	Boris Bezier	Dreamtech Publications
Effective Methods for Software Testing	William E. Perry	Wiley Publications

Web Material Link(s):

1. https://nptel.ac.in/courses/106105150/
2. https://www.tutorialspoint.com/software_testing/software_testing_qa_qc_testing.htm
3. https://www.softwaretestinghelp.com/web-application-testing/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 marks for 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 completion of the course, the students will be able to

SECE3541	Software Testing & Quality Assurance
CO 1	Interpret and utilize software testing to develop quality software based on widely used development lifecycle models.
CO 2	Categorize and identify a list of testing methodologies to diagnose software for an effective software development process.
CO 3	Illustrate the use of open source software testing tools to review the system.
CO 4	Compose test cases from client's software requirements.
CO 5	Recognize the importance of test planning to design effective test management process.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction to Basic of software testing & Terminology	1, 2
2	Levels of Testing	2, 3, 4
3	Testing Methods	2, 4
4	Testing Tools	3, 4
5	Test Planning & Documentation	2, 4, 6
6	Defect Management and Test Reporting	3, 4, 6

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT3531
Course Name: Image Processing
Prerequisite Course(s): Computer Graphics & Multimedia (SECE2051)

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	02	00	03	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 the fundamentals of image processing.
- apply various processes on images for image understanding.
- understand the design aspects and realization of image processing applications.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction and Digital Image Fundamentals** Digital Image Fundamentals, Human visual system, Image as a 2D data, Image representation – Grayscale and Color images, image sampling and quantization.	03	15
2.	**Image enhancement in the Spatial domain** Basic gray level Transformations, Histogram Processing Techniques, Spatial Filtering, Low pass filtering, High pass filtering.	05	15
3.	**Filtering in the Frequency Domain:** Preliminary Concepts, Extension to functions of two variables, Image Smoothing, Image Sharpening, Homomorphic filtering.	03	10
4.	**Image Restoration and Reconstruction:** Noise Models, Noise Reduction, Inverse Filtering, MMSE (Wiener) Filtering.	04	10
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Color Image Processing:** Color Fundamentals, Color Models, Pseudo color image processing.	02	10
2.	**Image Compression** Fundamentals of redundancies, Basic Compression Methods: Huffman coding, Arithmetic coding, LZW coding, JPEG Compression standard.	03	10
3.	**Morphological Image Processing** Erosion, dilation, opening, closing, Basic Morphological Algorithms: hole filling, connected components, thinning, skeleton.	02	10
4.	**Image Segmentation** point, line and edge detection, Thresholding, Regions Based segmentation, Edge linking and boundary detection, Hough transform.	04	10
5.	**Object Recognition and Case studies**	04	10

	Object Recognition- patterns and pattern classes, recognition based on decision-theoretic methods, structural methods, case studies – image analysis, Application of Image processing in process industries.		

List of Practical:

Sr. No.	Name of Practical	Hours
1.	Introduction to Image Processing Toolbox.	04
2.	Read an 8bit image and then apply different image enhancement techniques: (a) Brightness improvement (b) Brightness reduction (c) Thresholding (d) Negative of an image (e) Log transformation (f) Power Law transformation.	02
3.	Implement different interpolation techniques using MATLAB/ Scilab.	02
4.	Read an image, plot its histogram then do histogram equalization and comment about the result.	02
5.	(a) Implement Gray level slicing (intensity level slicing) in to read cameraman image. (b) Read an 8bit image and to see the effect of each bit on the image. (c) Read an image and to extract 8 different planes i.e. 'bit plane slicing."	04
6.	Implement various Smoothing spatial filter	02
7.	Read an image and apply (1) Gaussian 3x3 mask for burring (2) High pass filter mask with different masks (3) Laplacian operator with center value positive and negative (4) High boost filtering.	02
8.	Write a program to implement various low pass filters and high pass filter in the frequency domain.	02
9.	Write a program for erosion and dilation, opening & closing using inbuilt and without inbuilt function.	02
10.	Implement and study the effect of Different Mask (Sobel, Prewitt, and Roberts)	02
11.	Implement various noise models and their Histogram	02
12.	Implement inverse filter and Wiener filter over image and comment on them	02
13.	Implement Image compression using DCT Transform	02

Text Book(s):

Title	Author/s	Publication
Digital Image Processing	Rafael C. Gonzalez, Richard E. Woods	Pearson Education
Fundamentals Digital Image Processing	Jain Anil K.	Prentice Hall India Learning

Reference Book(s):

Title	Author/s	Publication
Image Processing, Analysis and Machine Vision	Milan Sonka, Vaclav Hlavac, Roger Boyle	CL Engineering
Biomedical Image Analysis	Rangaraj M. Rangayyan	CRC Press
Digital Image Processing	William K. Pratt	John Wiley & Sons

Web Material Link(s):

- https://nptel.ac.in/courses/106105032/

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 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 completion of the course, the students will be able to

SEIT3531	Image Processing
CO 1	Integrate knowledge of mathematics for image understanding and analysis.
CO 2	Design and analyze different techniques/processes for image understanding.
CO 3	Choose the appropriate hardware and software tools (contemporary) for image inspection.
CO 4	Illustrate the case studies of various algorithms for image processing.
CO 5	Formulate the model with help of image processing and various neural networks.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction and Digital Image Fundamentals	1,2
2	Image enhancement in the Spatial domain	1,2
3	Filtering in the Frequency Domain:	2,4
4	Image Restoration and Reconstruction:	2,3,5
5	Color Image Processing:	2,5
6	Image Compression	2,4
7	Morphological Image Processing	2,4,5
8	Image Segmentation	4,5
9	Object Recognition and Case studies	3,6

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT3550
Course Name: Augmented Reality and Virtual Reality
Prerequisite Course(s): Nil

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	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

- use Augmented Reality (AR) and Virtual Reality (VR) technologies to enhance the experience
- use Augmented Reality to create immersive content, while integrating immersive technologies to help advance the sophistication.

Course Content:

Section -I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Augmented Reality (AR)** History of AR - Augmented reality characteristics, Difference between Augmented Reality and Virtual Reality, AR technological components, Technologies used in AR, Feature Extraction, Hardware component, AR devices, Importance of AR, Real world uses of AR – AR types, Software tools available for AR.	04	10
2.	**AR Hardware and Software** Sensory hardware; Limitations and interactions; AR and VR together; Introduction to AR headset and smart glasses; Various AR software available; Introduction to Spark AR; Create a face detection app	04	13
3.	**Technology Integration and Implementation of AR** Technology use and integration in industrial settings, Assistive training to faculty members, Planning and administration for implementation, AR implications.	03	12
4.	**Augmented Reality and Virtual Reality for Micro Learning** Micro learning techniques, Utilizing VR for learning, VR for Practical online assessment, VR info graphics, Virtual case considerations, Utilizing AR for learning, Accessible learning, sensible data elevated learner engagement, VR technology, Components of VR, VR Hardware, VR applications, Civil Engineering, Real Estate, Biology and Medicine, Virtual Mall, VR	04	15

	in Education, Virtual Laboratory, Factory Planning, Automobile Industry.		
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Tools and Applications of Augmented Reality** Tools available for Augmented Reality and Recognition, Software Tools, Google Poly, Unity, software approaches, recognition types, native software solutions, AR Kit, AR Core software development kit, Cloud services, AR business applications, weather prediction, market prediction, smart cities	06	20
2.	**Exploring where is AR Helpful** Introduction; Engaging teaching in classroom; Interactive movies; Healthcare; Measurement in various scales; AR as a marketing tool	04	15
3.	**Future of AR** AR and VR together; Future of interactions in AR and AI; Future of AR as location-based experiences; Future of AR hardware; Intelligent Virtual Wardrobe trial; Spatial journalism	05	15

List of Practical:

Sr No	Name of Practical	Hours
1.	Introduction to Spark and the Fundamentals Function	04
2.	Create a Face Detection App using spark.	08
3.	Introduction to Unity and its installation.	04
4.	Introduction to AR foundation; Installing AR foundation SDK; SDK setup	10
5.	Introduction to C-sharp and its Basics	04

Text Book(s):

Title	Author/s	Publication
Innovating with Augmented Reality: Applications in Education and Industry	Taylor & Francis Group	CRC Press,
Understanding Virtual Reality: Interface, Application and Design	William R Sherman and Alan B Craig	Morgan Kaufmann Publishers

Reference Book(s):

Title	Author/s	Publication
Designing Virtual Systems: The Structured Approach"	Gerard Jounghyun Kim	WILEY
"3D User Interfaces, Theory and Practice	Doug A Bowman, Ernest Kuijff, Joseph J LaViola	Addison Wesley

Web Material Link(s):

- https://nptel.ac.in/courses/106/106/106106138/

- https://www.coursera.org/learn/introduction-virtual-reality

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

SEIT3550	**Augmented Reality and Virtual Reality**
CO 1	Describe how VR systems work and list the applications of VR.
CO 2	Understand the design and implementation of the hardware that enables VR systems to be built.
CO 3	Describe how AR systems work and list the applications of AR and Understand and analyze the hardware requirement of AR.
CO 4	Analyze and understand the working of various state of the art AR devices and Acquire knowledge of mixed reality.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction to Augmented Reality (AR)	2,4
2	AR Hardware and Software	2,3,4
3	Technology Integration and Implementation of AR	2,4.5
4	Augmented Reality and Virtual Reality for Micro Learning	1,2,5
5	Tools and Applications of Augmented Reality	1,2
6	Exploring where is AR Helpful	2,5
7	Future of AR	2,3,4

FOURTH YEAR B. TECH.

P P SAVANI UNIVERSITY																
SCHOOL OF ENGINEERING																
TEACHING & EXAMINATION SCHEME FOR FOURTH YEAR B.TECH. COMPUTER SCIENCE ENGINEERING PROGRAMME AY: 2021-22																
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		
7	SECE4013	System Software	CE	3	2	0	5	4	40	60	20	30	0	0	150	
	SECE4061	Machine Learning	CE	3	2	0	5	4	40	60	20	30	0	0	150	
	SEIT4031	Advanced Web Technologies	IT	2	4	0	6	4	40	60	40	60	0	0	200	
	SECE4920	Project-II	CE	3			3	3	0	0	100	100	0	0	200	
	SEPD4010	Creativity, Problem Solving & Innovation	SEPD	3	0	0	3	3	100	0	0	0	0	0	100	
	SECE4950	Project/Summer Internship	CE	5			0	5	0	0	100	0	0	0	100	
		Elective-III		2	2	0	4	3	40	60	20	30	0	0	150	
						Total	**26**	**26**							**1050**	
8	SECE4930	Project/Training	CE	18			18	18	0	0	200	300	0	0	500	
						Total	**18**	**18**							**500**	
						Grand Total	**207**	**180**							**7250**	

P P SAVANI UNIVERSITY

SCHOOL OF ENGINEERING

TEACHING & EXAMINATION SCHEME FOR FOURTH YEAR B.TECH. COMPUTER SCIENCE ENGINEERING PROGRAMME AY: 2021-22 (ELECTIVE COURSES)

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	
7	SECE4560	Natural Language Processing	CE	2	2	0	4	3	40	60	20	30	0	0	150
	SEIT4512	Information Security	IT	2	2	0	4	3	40	60	20	30	0	0	150
	SEIT4521	Blockchain Technology	IT	2	2	0	4	3	40	60	20	30	0	0	150
	SEIT4530	Cyber Security	IT	2	2	0	4	3	40	60	20	30	0	0	150

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE4013
Course Name: System Software
Prerequisite Course(s): SECE3020 - Theory of Computation
SECE2031 - Operating System,
SEIT3032 - Design and Analysis of Algorithm.

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 the design concepts of various system software like Assembler, Linker, Loader and Macro pre-processor, Utility Programs such as Text Editor and Debugger
- understand the execution process of High-level language programs.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Introduction, Software, Software Hierarchy, Systems Programming, Machine Structure, Interfaces, Address Space, Computer Languages, Tools, Life Cycle of a Source Program, Different Views on the Meaning of a Program, System Software Development, Recent Trends in Software Development, Levels of System Software	03	10
2.	**Overview of Language Processors** Programming Languages and Language Processors, Language Processing Activities, Program Execution, Fundamental of Language Processing, Symbol Tables; Data Structures for Language Processing: Search Data structures, Allocation Data Structures	06	15
3.	**Assemblers** Elements of Assembly Language Programming, Design of the Assembler, Assembler Design Criteria, Types of Assemblers, Two-Pass Assemblers, One-Pass Assemblers, Single pass Assembler for Intel x86, Algorithm of Single Pass Assembler, Multi-Pass Assemblers, Advanced Assembly Process, Variants of Assemblers Design of two pass assembler	06	15
4.	**Macro and Macro Processors** Introduction, Macro Definition and Call, Macro Expansion, Nested Macro Calls, Advanced Macro Facilities, Design of a Macro Pre-processor, Design of a Macro Assembler, Functions of a Macro Processor, Basic Tasks of a Macro Processor, Design Issues of Macro Processors, Features, Macro Processor Design	08	10

	Options, Two-Pass Macro Processors, One-Pass Macro Processors		
Section II			
Module No.	Content	Hours	Weightage in %
1.	**Linkers and Loaders** Introduction, Relocation of Linking Concept, Design of a Linker, Self-Relocating Programs, Linking in MSDOS, Linking of Overlay Structured Programs, Dynamic Linking, Loaders, Different Loading Schemes, Sequential and Direct Loaders, Compile-and-Go Loaders, General Loader Schemes, Absolute Loaders, Relocating Loaders, Practical Relocating Loaders, Linking Loaders, Relocating Linking Loaders, Linkers v/s Loaders	06	20
2.	**Scanning and Parsing** Programming Language Grammars, Classification of Grammar, Ambiguity in Grammatical Specification, Scanning, Parsing, Top Down Parsing, Bottom up Parsing, Language Processor Development Tools, LEX, YACC	06	10
3.	**Compilers** Causes of Large Semantic Gap, Binding and Binding Times, Data Structure used in Compiling, Scope Rules, Memory Allocation, Compilation of Expression, Compilation of Control Structure, Code Optimization	06	10
4.	**Interpreters & Debuggers** Benefits of Interpretation, Overview of Interpretation, the Java Language Environment, Java Virtual Machine, Types of Errors, Debugging Procedures, Classification of Debuggers, Dynamic/Interactive Debugger	04	10

List of Practical:

Sr. No	Name of Practical	Hours
1.	Write a program to read data from file and count the frequency of each word.	02
2.	Implement a symbol table routine to determine whether an identifier lexeme has previously seen & store a new lexeme into symbol table	04
3.	Implement One pass assembler.	02
4.	Implement Two pass assembler.	04
5.	Write a program to implement Macro processor.	02
6.	Implement a lexical analyzer that reads the input one character at a time and returns to the parser the token it has found.	04
7.	Write a program to left factor the given grammar	04
8.	Write a program to remove the Left Recursion from a given grammar.	04
9.	Implement recursive descent or predictive parser.	02
10.	Implement operator precedence or LR parser.	02

Text Book(s):

Title	Author/s	Publication
Compilers-Principles, Techniques and Tools	Aho. A.V., Sethi. R. & Ullman. J. D.	Pearson, 2006

Reference Book(s):

Title	Author/s	Publication

System Software -An Introduction to System Programming	Leland L. B.	3rd Ed, Addision Wesley, reprint, 2003
Compiler Construction-Principles and Practice	Louden, K. C	1st Ed, Thomson, 1997
System Programming and Operating System	Dhamdhere. D. M.,	2nd Ed,TMH,1999
Compiler Design in C,	Houlb A. I.,	PHI, EEE, 1995

Web Material Link(s):

- https://nptel.ac.in/courses/106/108/106108052/
- https://www.youtube.com/watch?v=Qkwj65l_96I

Course Evaluation:

Theory:

- Continuous Evaluation Consist of two Tests of 30 Marks and 1 Hour of duration and finally the total will be converted to 30.
- Faculty Evaluation consists of 10 marks as per guidelines provided by Course Coordinator.
- End Semester Examination will consist of 60 marks.

Practical:

- Continuous Evaluation Consist of Performance of Practical which should be evaluated out of 10 for each practical in the next turn and average of the same will be converted to 10 Marks.
- Internal Viva component of 10 Marks.
- Practical performance/quiz/test of 20 Marks during End Semester Exam.
- Viva/Oral performance of 10 Marks during End Semester Exam.

Course Outcome(s):

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

SECE4013	**SYSTEM SOFTWARE**
CO 1	Explain and classify different methodologies, concepts and approaches to system software programming.
CO 2	Identify elements of language processors with various data structures used in development of one pass and multi pass assemblers.
CO 3	Examine macro processor, its usage and compare various loading and linking schemes.
CO 4	Build various system programs using language processor development tools such as yacc and lex.
CO 5	Design code optimization based solution for the given system problems by applying various techniques of compiler, interpreter and debugger.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction	1
2	Overview of Language Processor	1,2
3	Assemblers	2,4
4	Macro and Macro Processors	2,4
5	Linkers and Loaders	2,4

6	Scanning and Parsing	2,4,6
7	Compilers	2,4
8	Interpreters & Debuggers	2,4,5

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE4061
Course Name: Machine Learning
Prerequisite Course (s): Data Structures (SECE2031), Design and Analysis of Algorithms (SEIT3032), and Mathematical Methods for Computation (SESH2051)

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	02	00	03	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:

To help learners to

- Master the concepts of supervised and unsupervised learning, recommendation engine, and time series modeling.
- Implement models such as support vector machines, kernel SVM, naive Bayes, decision tree classifier, random forest classifier, logistic regression, K-means clustering and more in Python.
- Comprehend the theoretical concepts and how they relate to the practical aspects of Machine Learning.

Course Content:

Section I			
Module	**Content**	**Hours**	**Weightage in %**
1.	**Introduction to Artificial Intelligence and Machine Learning** Learning Problems, designing a learning system, Issues with machine learning. Concept Learning, Version Spaces and Candidate Eliminations, Inductive bias.	04	10
2.	**Supervised learning** Decision Tree Representation, Appropriate problems for Decision tree learning, Algorithm, Hypothesis space search in Decision tree learning, inductive bias in Decision tree learning, Issues in Decision tree learning, Radial Bases, Functions, Case Based Reasoning.	06	20
3.	**Artificial Neural networks and genetic algorithms** Neural Network Representation, Appropriate problems for Neural Network Learning, Perceptrons, Multilayer Networks and Back Propagation Algorithms, Remarks on Back Propagation Algorithms. Case Study: face Recognition.	05	20
Section II			
Module	**Content**	**Hours**	**Weightage in %**

1.	**Bayesian Learning** Bayes Theorem, Bayes Theorem and Concept Learning, Maximum Likelihood and Least squared Error Hypothesis, Maximum likelihood hypothesis for Predicting probabilities, Minimum Description Length, Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naive Bayes Classifier. Case Study: Learning to classify text.	06	20
2.	**Unsupervised learning** Unsupervised learning, Applications, challenges, K- Nearest Neighbour Learning Locally Weighted Regression, SVM, Apriori Algorithm, EM Algorithm.	05	25
3.	**Overview** Typical application areas, such as Recommender System.	04	10

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction	02
2.	Classifying with distance measures	02
3.	Constructing Decision trees	02
4.	Classification using Decision Trees	02
5.	K-means	02
6.	Classification with k-Nearest Neighbours	02
7.	Random Forest	02
8.	Support vector machines	02
9.	Expectation Maximization	02
10.	Page Rank	04
11.	Naive Bayes Classification	04
12.	CART	04

Text Book(s):

Title	Author/s	Publication
Machine Learning	Tom M Mitchell	McGraw Hill

Reference Book(s):

Title	Author/s	Publication
Pattern Recognition and Machine Learning	Christopher Bishop	Springer-Verlag New York Inc.
Real-World Machine Learning	Henrik Brink, Joseph Richards, Mark Fetherolf	DreamTech
Machine Learning in Action	Peter Harrington	DreamTech

Web links:

- https://nptel.ac.in/courses/106/105/106105152/
- https://in.mathworks.com/campaigns/offers/machine-learning-with-matlab.html?gclid=EAIaIQobChMIrv2dqpOh5wIVkoiPCh0t9g8CEAAYASAAEgKl-fD_BwE&ef_id=EAIaIQobChMIrv2dqpOh5wIVkoiPCh0t9g8CEAAYASAAEgKl-

fD_BwE:G:s&s_kwcid=AL!8664!3!281794527296!b!!g!!%2Bmachine%20%2Blearning&s_eid=psn_57384022552&q=+machine%20+learning

- https://wqu.org/programs/datascience/?utm_source=datawrkz&utm_medium=search&utm_campaign=datascience&gclid=EAIaIQobChMIr_TK5ZOh5wIVzQorCh0YdQBvEAAYASAAEgLb5PD_BwE

Course Evaluation:

Theory

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, and average at 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 performance of practical which will be evaluated out of 10 marks for each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/drawing/test consists of 15 marks during End Semester Exam.
- Viva/ Oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):

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

SECE4061	**MACHINE LEARNING**
CO 1	Recognize basic problem with hypothesis and version spaces.
CO 2	Understand and apply the features of machine learning on real world problems.
CO 3	Identify and utilize various algorithms of supervised and unsupervised learning.
CO 4	Recall the concept of neural networks, Bayesian analysis from probability models and methods.
CO 5	Illustrate fundamental concepts of genetic algorithm.

Level of Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction to Artificial Intelligence and Machine Learning	1, 2
2	Supervised learning	1, 2, 3, 5
3	Artificial Neural networks and genetic algorithms	2, 4, 5
4	Bayesian Learning	2, 3, 4
5	Unsupervised learning	2, 3, 4
6	Overview	2, 3, 5

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT4031
Course Name: Advanced Web Technologies
Prerequisite Course(s): NIl

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	04	00	04	40	60	40	60	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

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

- Understanding MVC architecture in Web based applications, with Advanced PHP concepts and Laravel Framework along with Node.js and Angular js.
- Give basic understanding of cURL methods, MVC Framework, Unit Testing, Web Services, API, Node Servers and routing.

Course Content:

Section I			
Module No.	Content	Hours	Weightage in %
1.	**PHP** Introduction to PHP and its syntax, combining PHP and HTML, understanding PHP code blocks like Arrays, Strings, Functions, looping and branching, file handling, processing forms on server side, cookies and sessions.	05	15
2.	**Object Oriented PHP** Object Oriented Programming with PHP – Classes, Properties, Methods, Constructor, Destructor, Getter and Setter, Encapsulation, Inheritance, Data Abstraction, Polymorphism.	04	08
3.	**Advance PHP** Web Scraping using cURL, Regular Expression, Mail function, Web Services & APIs	06	12
Section II			
Module No.	Content	Hours	Weightage in %
1.	**PHP MVC Framework – Laravel** Introduction to Laravel and MVC, Environment Setup, Routes, Namespaces, Controllers, Views, Request Response, Redirections, Forms, Session, Cookie, Database Connectivity and CRUD operations	07	20

2.	**PHP & MySQL** Introduction to PHP MyAdmin, connection to MySQL server from PHP, execution of MySQL queries from PHP, receiving data from database server and processing it on webserver using PHP.	05	15
3.	**Web Sockets** Introduction to Web sockets, Web socket URIs, Web socket APIs, Opening Handshake, Data Framing, Sending and Receiving Data, Closing the Connections, Error Handling, Web socket Security	03	15

List of Practical:

Sr No	Name of Practical	Hours
1.	Develop a web application in PHP using various concepts of object oriented programming like Class, Object, Inheritance, Function, Overloading, Constructor and Destructor.	10
2.	Develop a web scraper to mine structured data from any website according to given application.	10
3.	Develop a web application in PHP to demonstrate the use of third party APIs like weather, sports, stock market, etc.	10
4.	Develop a small project using Laravel framework.	10
5.	Develop a small project in with database connectivity	8
6.	Develop web application as a Mini Project	12

Text Book(s):

Title	Author/s	Publication
PHP: The Complete Reference	Steven Holzner	Tata McGraw Hill

Reference Book(s):

Title	Author/s	Publication
Laravel: Up and Running	Matt Stauffer	O'Reilly Media
Node.js in Action	Mike Cantelon, Marc Harter, T.J. Holowaychuk, and Nathan Rajlich.	Manning publications

Web Material Link(s):

- https://learninglaravel.net/
- https://www.tutorialspoint.com/laravel/
- https://laravel.com/
- https://nodejs.org/en/
- https://www.w3schools.com/nodejs/

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 outof 10 marks per each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Mini Project 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 the completion of the course, the student will be able to

SECE2040	COMPUTER ORGANIZATION
CO 1	Apply Object Oriented concepts in developing PHP applications.
CO 2	Use various third party APIs and advance concepts of PHP to develop Applications.
CO 3	Create and deploy scalable web based system using Laravel.
CO 4	Develop whole application with database connectivity.

Level of Bloom's Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	PHP	2,3,6
2	Object Oriented PHP	2,3,6
3	Advanced PHP	2,4,6
4	PHP MVC Framework – Laravel	1,3,6
5	PHP & MySQL	1,3,6
6	Web Sockets	2,5,6

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE4920
Course Name: Project-II
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			03	00	00	100	100	00	00	200

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help students to
- understand the current trend or technology.
- aware of future technologies.
- try to learn new technologies and apply them as much as possible.

Outline of the Seminar:

Sr. No	Seminar Guidelines
1.	Selection of Title
2.	Literature Review
3.	Gap Identification
4.	Proposed Scheme
5.	Implementation of the proposal
6.	Report Writing
7.	Presentation & Question-Answer

Detailed Guideline(s):

Sr. No	Content	Hours	Weightage in %
1.	**Selection of Title** Select a topic according to the specialization of students or future technology. After selecting the topic and proposed title, get approval from the concerned faculty.	06	10
2.	**Literature Review** Study of various technology or area to select a topic of the seminar.	12	10
3.	**Gap identification and Proposal** Students must identify the gaps in the existing research and design a proposal which will help in overcome the same.	10	20
4.	**Implementation** Students must implement their proposal in any of the programming languages.	20	35
5.	**Report Writing** The report must be prepared as per suggested guidelines consisting of Preamble, Objectives, Scope, Introduction, Conclusions, Recommendations and Annexure.	07	15
6.	**Presentation & Question-Answer**	05	10

	At the end of the semester, the student/group of students shall give a presentation of their work followed by a viva-voce examination.		

Course Evaluation:

Sr. No.	Evaluation criteria	Marks
1.	Selection of the topic related field (Within first 30 Days of commencement of semester)	40
2.	Initial Presentation of the topic (Within 31 to 40 Days of commencement of semester)	40
3.	An actual work carried out (Within 41 to 60 Days of commencement of semester)	40
4.	Report writing as per guidelines	40
5.	Final Presentation & Question-Answer session	40
	Grand Total:	**200**

The entire evaluation will be converted equivalent to 200 Marks.

Course Outcome(s):

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

SECE4920	PROJECT-II
CO 1	Distinguish and analyze the issues related to various existing system.
CO 2	Experiment on problem with the help of latest technologies.
CO 3	Utilize and implement knowledge in the application development.
CO 4	Facilitate society with recent technological advancement.

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE4950
Course Name: PROJECT / SUMMER INTERNSHIP
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	03	00	00	100	00	00	00	100

CE: Continuous Evaluation, ESE: End Semester Exam

Objective(s) of the Course:
To help learners to
- have first-hand experience the real time situations in industrial scenario.
- get familiar with engineering applications in industrial spectrum
- learn to adapt themselves in professional scenario

Outline of the Course:

Sr. No	Content
1.	Selection of Company / Project
2.	Learning and implementation.
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 students will be able to

SECE4950	PROJECT / SUMMER INTERNSHIP
CO 1	Apply fundamental and disciplinary concepts and methods in ways appropriate to their principal areas of study.
CO 2	Determine the challenges and future potential for his/her internship organization in particular and the sector in general.
CO 3	Test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.
CO 4	Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
CO 5	Analyze the functioning of internship organization and recommend changes for improvement in processes.

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

Department of Computer Engineering

Course Code: SECE4930
Course Name: Project/Training
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	23	00	23	00	00	200	300	00	00	500

CE: Continuous Evaluation, ESE: End Semester Exam

Outline of the Course:

Project

- The project will be aligned with the aims of the engineering programme and its areas of specialization and shall be based on the recent trends in technology.
- The student shall carry out a comprehensive project at relevant academic / R&D / industrial organization.
- The student is required to submit a project report based on the work carried out.

Training

- The aim of this course is to use the internship experience to enable students to develop their engineering skills and practices.
- The student will be placed in industry/organization for 12 to 18 weeks and assessed for academic credit.
- The students may select industry on their own or one which is offered by institute.
- Students are expected to experience a real-life engineering workplace and understand how their engineering and professional skills can be utilized in industry.
- The student is required to submit a project report based on the work carried out.

Course Outcome(s):

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

SECE4930	**PROJECT/TRAINING**
CO 1	Support the theoretical learning with practice and integrate knowledge for engineering applications
CO 2	Adapt to real time industry exposure and experience
CO 3	Solve challenging projects for commercial, societal and environment benefit.
CO 4	Explain the importance of planning, documentation, punctuality and work ethics.
CO 5	Document the work which is carried out in proper format with industry standards.

P P Savani University
School of Engineering

Department of Computer Engineering

Course Code: SECE4560
Course Name: Natural Language Processing
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	02	00	03	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- comprehend the key concepts of NLP which are used to describe and analyze language
- illustrate computational methods to understand language phenomena of word sense
- design and develop applications with natural language capabilities.

Course Content:

Section I			
Module	Content	Hours	Weightage in %
1.	**Introduction** Introduction to NLP, History of NLP, Advantages of NLP, Disadvantages of NLP, Components of NLP, Applications of NLP, Phases of NLP, Challenges in NLP, NLP Libraries	07	25
2.	**Language Modelling and Text Representation** Unigram Language Model, Bigram, Trigram, N-gram, Applications of Language Modeling, Bag of Word Model, Skip gram, Continuous Bag-Of-Words, Embedding representations for words Lexical Semantics, Feature Weighing Techniques, Parts of Speech Tagging, Morphology.	08	25
Section II			
Module	Content	Hours	Weightage in %
1.	**Word Sense Disambiguation** Word Sense Disambiguation, Knowledge Based and Supervised Word Sense Disambiguation, Introduction to WordNet.	07	25

2.	**Text Analysis, Summarization and Machine Translation** Sentiment Mining, Text Classification, Text Summarization, Information Extraction, Named Entity Recognition, Relation Extraction, Question Answering in Multilingual Setting; NLP in Information Retrieval, Cross-Lingual IR, Machine Translation, MT Approaches, Direct Machine Translations, Rule-Based Machine Translation, Knowledge Based MT System, Statistical Machine Translation (SMT)	08	25

List of Practical:

Sr. No	Name of Practical	Hours
1.	Introduction to NLP and related packages in Python	02
2.	Text Normalization	02
3.	Part of Speech tagging experiments	02
4.	Root word conversion (stemming and Lemmatization)	04
5.	Morphological analysis of text	02
6.	N-gram analysis of text	02
7.	Implementation of Bag of word model with different weighing techniques	02
8.	Implementation of word sense disambiguation models	02
9.	WordNet usage based experiment	04
10.	Named Entity Recognition experiment	04
11.	Text Classification based experiment	04

Reference Book(s):

Title	Author/s	Publication
Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition,	Jurafsky, David, and James H. Martin	PEARSON
Foundations of Statistical Natural Language Processing.	Manning, Christopher D., and HinrichSchütze.	Cambridge, MA: MIT Press
Natural Language Understanding.	James Allen.	The Benjamin/Cummings Publishing Company Inc..
Handbook of natural language processing.	Dale, R., Moisl, H., & Somers, H.,	CRC Press.

Web material link:

- https://nptel.ac.in/courses/106/105/106105158/
- http://www.nptelvideos.in/2012/11/natural-language-processing.html

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 hour of duration, which 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 performance of practical which will be evaluated out of 10 marks for each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/drawing/test consists of 15 marks during End Semester Exam.
- Viva/ Oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):

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

SECE4560	**Natural Language Processing**
CO 1	Extract information from text automatically using concepts and methods from natural language processing (NLP) including stemming, n-grams, POS tagging, and parsing.
CO 2	Develop speech-based applications that use speech analysis (phonetics, speech recognition, and synthesis)
CO 3	Analyze the syntax, semantics, and pragmatics of a statement written in a natural language.
CO 4	Write scripts and applications in Python to carry out natural language processing using libraries such as NLTK, Gensim, and spaCY.
CO 5	Design NLP-based AI systems for question answering, text summarization, and machine translation.

Level of Revised Bloom's Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction	1,2
2	Language Modelling and Text Representation	3,4
3	Word Sense Disambiguation	3,4
4	Text Analysis, Summarization and Machine Translation	4,5,6

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT4512
Course Name: Information Security
Prerequisite Course(s): SESH2051- Mathematical Methods for Computation
SECE3011 - Computer Networks

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	02	00	03	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- understand cryptography theories, algorithms and systems.
- understand the various key distribution and management schemes.
- understand how to deploy hashing techniques to secure data in transits across different networks.

Course Content:

Section – I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction** Symmetric Cipher Model, Cryptography and Cryptanalysis, Types of Security, Security Services, Security Attacks and Security Mechanisms, Substitution and Transposition techniques	03	07
2.	**Classical Encryption Techniques** Substitution Ciphers, Permutation/Transposition Ciphers, Play Fair and Hill Ciphers, Polyalphabetic Ciphers, OTP and Machine Ciphers	03	07
3.	**Stream Ciphers and Block Ciphers** Block Cipher structure, Data Encryption standard (DES) with example, strength of DES, Design principles of block cipher, AES with Structure, its Transformation Functions, Key Expansion, Example and Implementation	03	15
4.	**Multiple encryption and triple DES** Electronic Code Book, Cipher Block Chaining Mode, Cipher Feedback Mode, Output Feedback Mode, Counter Mode	02	06
5.	**Public Key Cryptosystems** Requirements and Cryptanalysis, RSA algorithm, its computational aspects and security, Diffie-Hillman Key Exchange algorithm, Man-in-Middle attack	04	15
Section – II			
Module No.	Content	Hours	Weightage In %

1.	**Key Management and Distribution** Symmetric key distribution using symmetric and asymmetric encryptions, distribution of public keys, X.509 certificates, Public key infrastructure	03	10
2.	**Cryptographic Hash Functions** Simple hash functions, its requirements and security, Hash functions based on Cipher Block Chaining, Secure Hash Algorithm (SHA)	03	10
3.	**Message Authentication Codes** Requirements of MAC and security, MACs based on Hash Functions, Macs based on Block Ciphers	03	10
4.	**Digital Signature, its Properties** Requirements and security, various digital signature schemes (Elgamal and Schnorr), NIST digital Signature algorithm	03	10
5.	**Advanced Topics** – Intruders, Virus, Trojans, Malware, Ransomware, Requirements of Security in Various area of Computer Science	03	10

List of Practical:

Sr. No	Name of Practical	Hours
1.	Write a program to implement ceaser cipher	2
2.	Write a program to implement the Playfair cipher	2
3.	Write a program to implement the columnar transposition cipher	2
4.	Write a program to implement rail fence transposition cipher	2
5.	Write a program to implement Vernam cipher	2
6.	Write a program to implement n-gram Hill Cipher.	2
7.	Write a program to implement the Vigenere Cipher	2
8.	Write a program that implements the Extended Euclidean Algorithm to find inverse of a given number in the Galois field.	2
9.	Write a program to implement DES Cipher	4
10.	Write a program to implement AES Cipher	4
11.	Write a program to implement RSA Cryptosystem	4
12.	Demonstration of Wireshark for Packet Capturing	2

Text Book(s):

Title	Author/s	Publication
Cryptography and Network Security: Principles and Practice, 5/e	William Stallings	Prentice Hall

Reference Book(s):

Title	Author/s	Publication
Cryptography and Network Security	Behrouz A. Forouzan	McGraw-Hill
Network Security: Private Communications in a Public World, 2nd edition	Kaufman, Perlman and Speciner	Prentice Hall
Handbook of Applied Cryptography	Menezes, van Oorschot and Vanstone	CRC Press
Computer Security, 3/e	Gollmann	Wiley

Web Material Link(s):

- https://nptel.ac.in/courses/106/106/106106129/
- http://www.omnisecu.com/security/index.php

Course Evaluation:
Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 performance of practical which will be evaluated out of 10 marks for each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/drawing/test consists of 15 marks during End Semester Exam.
- Viva/ Oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):

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

SEIT4512	INFORMATION SECURITY
CO 1	Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of symmetric cipher models.
CO 2	Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication.
CO 3	Apply the knowledge of cryptographic techniques and different digital signature algorithms to achieve authentication and create secure applications.
CO 4	Apply the knowledge of cryptographic utilities and authentication mechanisms to design secure applications.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction	1, 2
2	Classical Encryption Techniques	1, 2, 3
3	Stream Ciphers and Block Ciphers	1, 2, 3
4	Multiple encryption and triple DES	2, 3, 4
5	Public Key Cryptosystems	2, 3, 4
6	Key Management and Distribution	3,4,5
7	Cryptographic Hash Functions	2,3,4
8	Message Authentication Codes	1,2,3
9	Digital Signature, its Properties	2,3,4
10	Advanced Topics	4,5

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT4521
Course Name: Blockchain Technology
Course Prerequisite(s): Data Structures (SECE2031)

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	02	00	03	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 blockchain and its applications.
- analyze IBM's strategy in blockchain platform.
- understand security in blockchain based networks.

Course Content:

Section I			
Module No	Content	Hours	Weightage in %
1.	**Introduction to Blockchain** Blockchain types, Public key cryptography, Hashing, Digital Signature, Business networks, Assets, Ledgers, Transactions and Contracts, the problem with existing networks, how blockchain solves this problem, Requirements of a blockchain for business.	05	10
2.	**Blockchain Networks** Overview of active networks, TradeLens - Improving global trade, IBM Food Trust - Supply Chain Transparency, IBM World Wire - Global Payments, Decentralised and Trusted Identity, Further Examples by Industry, Key Players for Blockchain Adoption	05	20
3.	**IBM and Blockchain** How IBM can help with a Blockchain Project, IBM's Blockchain strategy, the IBM Blockchain Platform, The Linux Foundation's Hyperledger Project, Hyperledger Fabric, Continuing your Blockchain Journey	05	20
Section II			
Module No	Content	Hours	Weightage in %
1	**Blockchain composed** What is Hyperledger Composer, Components and Structure of Composer, An example Business Network: Car Auction Market, Extensive, Familiar, Open Tool Set	05	10
2.	**Blockchain fabric development** Participants and Components Overview, Developer Considerations	05	20
3.	**Blockchain architecture** Administrator (operator) Considerations, Security: Public vs.	05	20

	Private Blockchains, Architect Considerations, Network Consensus Considerations		

List of Practical:

Sr No	Name of Practical	Hours
1.	Demo - Vehicle Lifecycle Demo: Transfer assets in blockchain	04
2.	Demo of Hyperledger Composer	04
3.	Create a Hyperledger Composer solution	06
4.	Write your first blockchain application	08
5.	Build your own network	08

Text Book:

Title	Author/s	Publication
Blockchain Basics – A Non-Technical Introduction in 25 Steps.	Daniel Drescher	Apress

Reference Book:

Title	Author/s	Publication
Mastering Blockchain	Imran Bashir	Packt
The Business Blockchain – Promise, practice, and application of the next internet technology.	William Mougayar	Wiley

Web Material Link(s):

- https://www.udemy.com/course/blockchain-and-bitcoin-fundamentals/
- https://cognitiveclass.ai/courses/blockchain-course
- https://www.coursera.org/courses?query=blockchain

Course Evaluation:

Theory:

- Continuous Evaluation Consists of Two Tests; evaluation of each test consists of 15 marks. The duration of each test is 60 minutes.
- Students have to appear for a quiz/group discussion, which consists of 10 marks.
- End Semester Examination will consist of 60 Marks.

Practical:

- Continuous Evaluation consists of performance of practical, which should 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 of 15 Marks during End Semester Exam.
- Viva/Oral performance of 15 Marks during End Semester Exam.

Course Outcome(s):

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

SEIT4521	Blockchain Technology
CO 1	Analyse the importance of blockchain in several industries by performing extensive case studies.
CO 2	Construct blockchain based applications with the help of different frameworks and tools.
CO 3	Design crypto currency related applications by utilizing blockchain technology concepts.
CO 4	Evaluate the performance metrics of blockchain applications using python

	based analytics.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	Content	RBT Level
1	Introduction to Blockchain	1,2,4
2	Blockchain Networks	2,3,4
3	IBM & Blockchain	2,4,5
4	Blockchain Composed	1,3,6
5	Blockchain fabric development	2,6
6	Blockchain architecture	1,2,3,6

P P Savani University
School of Engineering

Department of Information Technology

Course Code: SEIT4530
Course Name: Cyber Security
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	02	00	03	40	60	20	30	00	00	150

CE: Continuous Evaluation, ESE: End Semester Exam

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

- identify and classify various cybercrimes with respect to organizational weaknesses in order to mitigate the security risk and estimate the impact on society and world.
- interpret and apply Indian IT laws in various legal issues.

Course Content:

Section – I			
Module No.	Content	Hours	Weightage in %
1.	**Introduction to Cyber Security** Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats: - Cyber Warfare-Cyber Crime-Cyber Terrorism-Cyber Espionage, need for a Comprehensive Cyber Security Policy, need for a Nodal Authority, Need for an International convention on Cyberspace, Security Standards.	03	10
2.	**Cyber Security Vulnerabilities and Cyber Security Safeguards** Cyber Security Vulnerabilities-Overview, vulnerabilities in Software, System Administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness, Cyber Security Safeguards- Overview, Access Control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection System, Response, Scanning, Security Policy, Threat Management	06	20
3.	**Securing Web Application, Services and Servers** Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges	03	10
4.	**Intrusion Detection and Prevention** Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information	03	10

	Management, Network Session Analysis, System Integrity Validation		
Section – II			
Module No.	Content	Hours	Weightage In %
1.	**Cryptography and Network Security** Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls-Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec	05	17
2.	**Cyberspace and the Law** Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013	05	17
3.	**Cyber Forensics** Introduction to Cyber Forensics, Handling Preliminary analysis, Investigating Investigations, Controlling an Investigation, conducting disk-based Information-hiding, Scrutinizing E-mail, Validating E-mail Header information, Tracing Internet access, Tracing Memory in real-time.	05	16

List of Practical:

Sr. No	Name of Practical	Hours
1.	TCP scanning using NMAP	2
2.	Port scanning using NMAP	2
3.	TCP / UDP connectivity using Netcat	2
4.	Network vulnerability using OpenVAS	4
5.	Web application testing using DVWA	2
6.	Manual SQL injection using DVWA	4
7.	XSS using DVWA	4
8.	Automated SQL injection with SqlMap	4
9.	Write a program to create and simulate an attack. Then explain how to avoid it.	6

Text Book(s):

Title	Author/s	Publication
Cybersecurity for Beginners	Raef Meeuwisse	Cyber Simplicity Ltd

Reference Book(s):

Title	Author/s	Publication
Cyber Security	Nina Godbole, SunitBelapure	Wiley India, New Delhi
Anti-Hacker Tool Kit,4th Edition	Mike Shema	McGrawHill Publication
The Indian Cyber Law	Suresh T. Vishwanathan;	Bharat Law House New Delhi
Handbook of Applied Cryptography	Menezes, van Oorschot and Vanstone	CRC Press

Computer Security, 3/e	Gollmann	Wiley

Web Material Link(s):

- https://nptel.ac.in/courses/106105031/
- https://www.javatpoint.com/cyber-security-tutorial

Course Evaluation:

Theory:

- Continuous Evaluation consists of two tests each of 30 marks and 1 Hour of duration, which 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 performance of practical which will be evaluated out of 10 marks for each practical and average of the same will be converted to 10 marks.
- Internal viva consists of 10 marks.
- Practical performance/quiz/drawing/test consists of 15 marks during End Semester Exam.
- Viva/ Oral performance consists of 15 marks during End Semester Exam.

Course Outcome(s):

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

SEIT4530	**Cyber Security**
CO 1	Examine implications of cyber frauds and cybercrimes on end user and national infrastructure.
CO 2	Illustrate various aspects of cyber security, cybercrimes and its related laws in indian and global act.
CO 3	Develop security and privacy based modern applications to protect people and to prevent cybercrimes.
CO 4	Employ the knowledge of advanced security technologies to ensure security.

Level of Revised Bloom's Taxonomy in Assessment:

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create

Module No	**Content**	**RBT Level**
1	Introduction to Cyber Security	1, 2
2	Cyber Security Vulnerabilities and Cyber Security Safeguards	2, 3
3	Securing Web Application, Services and Servers	2,4
4	Intrusion Detection and Prevention	2,4
5	Cryptography and Network Security	2,3,4
6	Cyberspace and the Law	1, 3, 4
7	Cyber Forensics	2,3,4,6