

Pimpri Chinchwad Education Trust's  
**Pimpri Chinchwad College of Engineering**  
SECTOR NO. 26, PRADHIKARAN, NIGDI, PUNE 411044

An Autonomous Institute Approved by AICTE and affiliated to SPPU, Pune

**DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES**  
**Department of Information Technology**



**Curriculum Structure and Syllabus**  
**of**  
**FY B Tech Information Technology**  
**(Course 2023)**

"Knowledge Brings Freedom"



**Effective from Academic Year 2023-24**

## Institute Vision

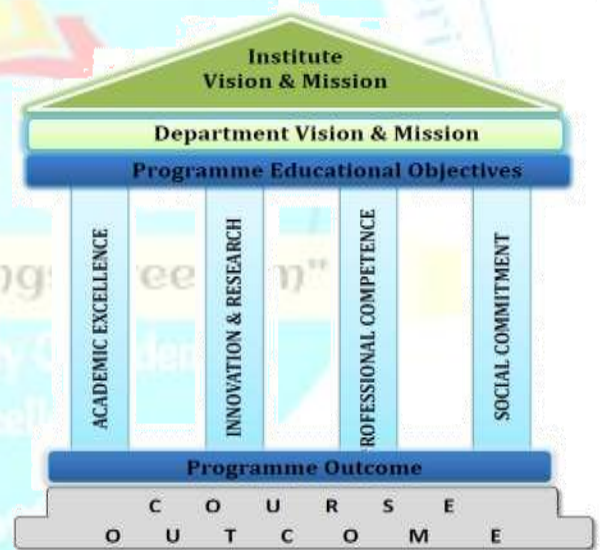
To be one of the top 100 Engineering Institutes of India in coming five years by offering exemplarily Ethical, Sustainable and Value Added Quality Education through a matching ecosystem for building successful careers.

## Institute Mission

1. Serving the needs of the society at large through establishment of a state-of-art Engineering Institute.
2. Imparting right Attitude, Skills, Knowledge for self-sustenance through Quality Education
3. Creating globally competent and Sensible engineers, researchers and entrepreneurs with ability to think and act independently in demanding situations

## Quality Policy

We at PCCOE are committed to impart Value Added Quality Education to satisfy the applicable requirements, needs and expectations of the Students and Stakeholders. We shall strive for academic excellence, professional competence and social commitment in fine blend with innovation and research. We shall achieve this by establishing and strengthening state-of- the-art Engineering and Management Institute through continual improvement in effective implementation of Quality ManagementSystem.



## LIST OF ABBREVIATIONS IN CURRICULUM STRUCTURE

Sr. No.	ABBREVIATION	TYPE OF COURSES
1	BSC	Basic Science Course
2	ESC	Engineering Science Course
3	VSEC	Vocational and Skill Enhancement Course
4	AEC	Ability Enhancement Course
5	PCC	Programme Core Course
6	CC	Co-curricular Courses
7	HSMC	Humanities/ Social Sciences/Management Courses
8	B.Tech	Bachelor of Technology
9	L	Lecture
10	P	Practical
11	T	Tutorial
12	H	Hours
13	CR	Credits
14	CIE	Continuous Internal Evaluation /Examination
15	IE	Internal Evaluation
16	MTE	Mid Term Evaluation
17	ETE	End Term Evaluation
18	TW	Term work
19	OR	Oral
20	PR	Practical
21	LS	Life Skills
22	UHV	Universal Human Values
23	Eng.	English
24	Jap.	Japanese
25	Ger.	German
26	IKS	Indian Knowledge system

## First Year B.Tech Information Technology: Semester-I

Course Code	Course Type	Course Name	Teaching Scheme						Evaluation Scheme							
			L	P	T	H	CR			IE	MTE	ETE	TW	PR	OR	Total
							TH	PR/Tut	Total							
BSH21A01	BSC	Linear Algebra & Univariate Calculus	2	-	1	3	2	1	3	20	30	50	-	-	-	100
BSH21A04	BSC	Engineering Chemistry	3	-	-	3	3	-	3	20	30	50	-	-	-	100
BSH21A05	BSC	Engineering Chemistry Laboratory		2		2		1	1				50			50
BIT21B01	ESC	Digital Electronics and Logic Design	3			3	3		3	20	30	50	-	-	-	100
BIT21B02	ESC	Discrete Mathematics	3			3	3		3	20	30	50	-	-	-	100
BIT21B03	ESC	Digital Electronics Laboratory		2		2		1	1				50			50
BIT21G01	VSEC	Python Programming Laboratory		4		4		2	2				100			100
BSH21H01 /02/03/04	AEC	AEC-1 (Eng/Ger/Jap/Business story telling)	1	2		3	1	1	2	30		20				50
BSH21K01	CC	Life Skill 1		4		4		2	2				100			100
<b>Total</b>			<b>12</b>	<b>14</b>	<b>1</b>	<b>27</b>	<b>12</b>	<b>8</b>	<b>20</b>							<b>750</b>

## First Year B.Tech Information Technology: Semester-II

Course Code	Course Type	Course Name	Teaching Scheme						Evaluation Scheme							
			L	P	T	H	CR			IE	MTE	ETE	TW	PR	OR	Total
							TH	PR/Tut	Total							
BSH22A06	BSC	Multivariate Calculus	2		1	3	2	1	3	20	30	50	-	-	-	100
BSH22A02	BSC	Engineering Physics	3			3	3		3	20	30	50	-	-	-	100
BSH22A03	BSC	Engineering Physics Laboratory		2		2		1	1				50	-		50
BIT22B01	ESC	Principles of Programming Languages	3			3	3		3	20	30	50	-	-	-	100
BIT22B02	ESC	Programming Laboratory		4		4		2	2				50	50	-	100
BIT22C01	PCC	Data Communication	2			2	2		2	20		30		-	-	50
BIT22G01	VSEC	Web Development Laboratory		4		4		2	2				100			100
BSH22H05	IKS	Indian Knowledge system	2	-	-	2	2	-	2	30	-	20	-	-	-	50
BSH22K01	CC	Life skill 2		4		4		2	2				100			100
<b>Total</b>			<b>12</b>	<b>14</b>	<b>1</b>	<b>27</b>	<b>12</b>	<b>8</b>	<b>20</b>							<b>750</b>

# Curriculum Structure

**First Year B.Tech**

**Information Technology**

**Semester I**

"Knowledge Brings Freedom"

Progress Credibility Confidence  
Optimism Excellence

Since 1999



<b>Program: B. Tech. (Information Technology)</b>				<b>Semester: I</b>			
<b>Course: Linear Algebra &amp; Univariate Calculus</b>				<b>Code: BSH21A01</b>			
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial*</b>	<b>Credit</b>	<b>IE</b>	<b>MTE</b>	<b>ETE</b>	<b>Total</b>
<b>2</b>	<b>-</b>	<b>1</b>	<b>3</b>	<b>20</b>	<b>30</b>	<b>50</b>	<b>100</b>
<b>Prior Knowledge:</b>							
1. Elementary Mathematics. 2. Elementary Calculus is essential							
<b>Course Objectives:</b> This course aims at enabling students,							
1. To familiarize with concepts and techniques in Calculus and Matrices. 2. To get acquainted with Mathematical Modeling of physical systems using differential equations. 3. To acquire techniques of advanced level mathematics and its applications that would enhance analytical thinking power.							
<b>Course Outcomes:</b> After learning the course, the students will be able to:							
1. Apply the concept of rank to solve Electrical Circuits problems and Find Eigenvalues and Eigenvectors. 2. Represent Fourier series for the periodic time domain continuous and discrete function into signal form. 3. Use Successive differentiation & Taylor's and Maclaurin's theorems for expansion of a function in infinite series and evaluate the limits of indeterminate forms with L'Hospital rule. 4. Develop and solve models related to Orthogonal Trajectories, Electrical Circuits and One dimensional heat flow using differential equations.							
<b>Unit</b>	<b>Description</b>						<b>Duration (Hrs.)</b>
1	<b>Matrices:</b> Rank, System of linear equations with applications in Electrical circuits, Linear dependence and independence, Linear transformations, Eigenvalues, Eigen vectors.						8
2	<b>Fourier Series:</b> Definition, Dirichlet's conditions, full range Fourier series, Harmonic analysis, and application to engineering.						7
3	<b>Differential Calculus:</b> L' Hospital rule, Taylor's series, Maclaurin's series, Successive differentiation and Leibnitz theorem.						7
4	<b>Differential Equations:</b> Exact differential equations, differential equations reducible to Exact form, Applications of Differential Equations: Orthogonal trajectories, Kirchoff's law of Electrical circuits (L-R and R-C circuits) , One-dimensional conduction of heat (steady state).						8
<b>Total</b>						<b>30</b>	
<b>* Tutorial will be conducted in batches as 1Hr/week/batch</b>							
<b>Sr. No.</b>	<b>List of Tutorials</b>						
1	Rank, System of linear equations,						
2	Applications in Electrical circuits						
3	Linear dependence and independence, Linear transformations						
4	Eigenvalues, Eigen vectors						
5	Full range Fourier series						
6	Full range Fourier series						
7	Harmonic analysis						

8	Application to engineering
9	L' Hospital rule, Taylor's series
10	Maclaurin's series, Successive differentiation
11	Successive differentiation, Leibnitz theorem
12	Exact differential equations,
13	Differential equations reducible to Exact
14	Orthogonal trajectories, Kirchoff's law of Electrical circuits
15	One-dimensional conduction of heat

**Text Books:**

- 1) Higher Engineering Mathematics by B.V. Ramana , 34e, Tata McGraw-Hill.
- 2) Linear Algebra & Univariate Calculus by Team Mathematics, PCCoE, Pune, 1e, Techknowledge Publication.

**Reference Books:**

- 1) Advanced Engineering Mathematics by Erwin Kreyszig, 9e, Wiley Eastern Ltd.
- 2) Higher Engineering Mathematics by H. K. Dass , 22e, S. Chand Publication, Delhi.
- 3) Advanced Engineering Mathematics by S.R.K. Iyengar, Rajendra K. Jain, 4e, Alpha Science International, Ltd.
- 4) Advanced Engineering Mathematics, by Peter V. O'Neil, 7e, Thomson Learning.
- 5) Advanced Engineering Mathematics by M. D. Greenberg, , 2e, Pearson Education.
- 6) Higher Engineering Mathematics by B. S. Grewal, 43e, Khanna Publication, Delhi.

**E-sources:****NPTEL Course lectures links:**

<https://www.youtube.com/watch?v=4QFsiXfgbzM&list=PLbRMhDVUMngeVrxtbBz-n8HvP8KAWBpI5>

"Knowledge Brings Freedom"

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Program: B. Tech. (Information Technology)				Semester: I			
Course: Engineering Chemistry				Code: BSH21A04			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
3	-	-	3	20	30	50	100
<b>Prior Knowledge:</b> 1. Structure of water. 2. Volumetric analysis. 3. Electromagnetic radiations. 4. Classification and properties of polymers. 5. Fossil and derived fuels. 6. Corrosion and its effects. 7. Electrochemical series.							
<b>Course Objectives:</b> This course aims at enabling students, 1. To familiarize students with instrumental methods for qualitative and quantitative analysis and explore the importance of green chemistry. 2. To lead students to investigate the advancement in engineering materials, batteries and structural elucidation by spectroscopy. 3. To build consciousness about the recent development in alternate energy sources and corrosion control. 4. To develop experimental skills and thereby forge their conceptual lucidity.							
<b>Course Outcomes:</b> After learning the course, the students will be able to: 1. Analyse the water quality, interpret techniques of water purification and compare green over traditional synthesis of polycarbonate. 2. Apply basic principles of various electro-analytical techniques for qualitative and quantitative analysis and understand battery technology. 3. Apply the principles, instrumentation of UV & IR spectroscopy for structural elucidation. 4. Perceive the fuel quality and understand the scope of derived alternate fuels 5. Relate the preventive methods of corrosion to real-life problems. 6. Interpret the chemical structure, properties and synthesis of various polymers and nanomaterials and their uses.							
Unit	Description						Duration (Hrs.)
1	<b>Water Technology and Green Chemistry:</b> a) Hardness of water, its types, units of hardness and hardness calculation. Chemical analysis of water by determination of hardness by EDTA method. Alkalinity of water and its determination. Numerical on EDTA method and alkalinity. Disadvantages of hard water in boilers. Water softening techniques: Permutit and Ion exchange method. Dissolved oxygen (DO), biological oxygen demand (BOD) and Chemical oxygen demand (COD). b) Introduction of Green Chemistry: Definition, goals, principles and green synthesis of Polycarbonate.						9



2	<p><b>Instrumental Analysis and battery technology.</b></p> <p>a) Electrochemistry: fundamentals of an electrochemical cell, EMF of cell, reference and indicator electrodes and Nernst Equation.</p> <p>b) Basic principles, instrumentation and applications of :-</p> <p>i) Conductometry: Introduction, Kohlrausch's law, measurement of conductance and conductometric titrations of strong acid versus strong base, strong acid versus weak base and weak acid versus strong base.</p> <p>ii) pH-metry: theory of buffers and preparation, standardization of pH-meter, titration of weak acid versus strong base, simple and differential plots.</p> <p>iii) Potentiometry: Introduction, principle and application: potentiometric titration of Fe<sup>2+</sup> versus Ce<sup>4+</sup> along with simple and differential plots.</p> <p>Battery technology and Fuel Cell: introduction and types of batteries, construction, working and applications of Lithium ion battery, charging and discharging reactions at respective electrodes. H<sub>2</sub>- O<sub>2</sub> fuel cell.</p>	7
3	<p><b>Spectroscopic techniques: Ultra Violet and Infrared spectroscopy</b></p> <p>a) UV Spectroscopy: nature of electromagnetic radiation and its characteristics. Interaction of matter with UV radiations leading to different electronic transitions. Beer's &amp; Lambert's law, their derivations and applications. Instrumentation of UV - Visible spectrophotometer. Terms used in UV spectroscopy-chromophore, auxochrome, bathochromic shift (red shift), hypochromic shift (blue shift), hyper chromic and hypochromic effect.</p> <p>b) IR spectroscopy: principle, types of vibrations (stretching and bending), Different regions of IR spectrum such as fundamental group region, finger print region and aromatic region. Applications of IR spectroscopy.</p>	8
4	<p><b>Fuels and combustion</b></p> <p>a) Fuels: definition, calorific value and its units. Calorific value (CV), gross calorific value (GCV), net calorific value (NCV). Determination of calorific value - Bomb calorimeter, Boy's calorimeter and numerical.</p> <p>i) Solid fuels: coal, proximate and ultimate analysis of coal, numerical based on analysis of coal. ii) Liquid fuels: composition of petroleum, refining of petroleum. Synthesis, properties, advantages and disadvantages of Power alcohol and Biodiesel. iii) Gaseous fuels: Hydrogen gas as a future fuel, production by steam reforming of methane and by electrolysis of water. Challenges in storage and transportation of H<sub>2</sub> gas.</p> <p>b) Combustion: chemical reactions, calculations on air requirement for combustion.</p>	8
5	<p><b>Corrosion and Corrosion control</b></p> <p>a) Corrosion: introduction, types of corrosion, mechanism of atmospheric corrosion and wet corrosion. Galvanic series. Factors affecting corrosion: nature of metal and nature of environment. Different types of corrosion: Pitting corrosion, concentration cell corrosion, stress corrosion and soil corrosion.</p> <p>b) Corrosion control: methods of prevention of corrosion - cathodic and anodic protection, metallic coatings and its types - anodic and cathodic coatings. Method to apply metallic coatings - hot dipping, cladding, electroplating and cementation.</p>	6

6	<p><b>Chemistry of Polymers and Novel Carbon Compounds</b></p> <p>a) Polymers: definition, classification of polymers on the basis of thermal behaviour, properties of polymers: degree of polymerization, crystallinity, Tg &amp; Tm and factors affecting Tg. Polymerization and its types. Advanced polymeric materials: Structure, properties and applications of liquid crystal polymer – Kevlar, conducting polymers - Polyacetylene, electroluminescent polymer – PPV and biodegradable polymers – PHBV.</p> <p>b) Nanomaterials: definition, types of nanomaterials and properties of nanomaterials. Quantum dots: Types, properties and applications of QDs. Structure properties and applications of Graphene and Carbon Nano Tubes (CNTs).</p>	7
<b>Total</b>		<b>45</b>
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1) Engineering Chemistry by S.S. Dara, S.Chand Publications (2010).</li> <li>2) Engineering Chemistry by B.S. Chauhan, UnivScPress.(2015).</li> <li>3) A Text Book Of Engineering Chemistry by ShashiChawla, DhanpatRai&amp; Co. (2015).</li> <li>4) Spectroscopy of Organic Compounds by P. S. Kalsi, New Age International (2007).</li> <li>5) Nanotechnology: principles and practices by S.K. Kulkarni, Springer (2014).</li> <li>6) Instrumental methods of Chemical Analysis by GurdeepChatwal, Himalaya publishing house (1996).</li> <li>7) Engineering Chemistry by Jain and Jain, DhanpatRai Publishing Co.(2016).</li> <li>8) Engineering Chemistry by Wiley India (2012).</li> <li>9) Engineering Chemistry by O.G. Palanna, McGraw-Hill Education.</li> <li>10) Introduction to Nanoscience and Nanotechnology by K. K. Chattopadhyay, A. N. Banerjee. PHI Learning (2009).</li> </ol>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1) Hydrogen as a fuel by Ram D. Gupta, C.R.C.Publication (2009).</li> <li>2) Instrumental Methods of Analysis by H. H. Willard, L. L. Merritt, J. A. Dean, F. A. Settle, 6 th Edition, CBS Publisher.</li> <li>3) Organic Spectroscopy by William Kemp, 3 rd edition, , John Wiley and Sons, Palgrave publication.</li> <li>4) Polymer Science by V.R.Gowariker,, New Age International Publication (2015).</li> <li>5) Nanotechnology by T. Gregory, Springer Verlog New York (1999).</li> <li>6) Introduction to Nanotechnology by Charles P. Poole, Frank Owens, John Wiley &amp; Sons (2003)</li> <li>7) Engineering Chemistry by Wiley India Pvt.Ltd,First edition 2011.</li> </ol>		

<b>Program: B. Tech. (Information Technology)</b>				<b>Semester: I</b>			
<b>Course: Engineering Chemistry Laboratory</b>				<b>Code: BSH21A05</b>			
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>TW</b>	<b>Practical</b>	<b>Oral</b>	<b>Total</b>
-	2	-	1	50	-	-	50
<b>Prior Knowledge:</b> Nil							
<b>Course Objectives:</b> This course aims at enabling students, 1. To help students to procure conceptual clarity of Engineering Chemistry through laboratory experiments. 2. To develop experimental skills to acquire insight into societal and environmental issues.							
<b>Course Outcomes:</b> After learning the course, the students will be able to: 1. Analyze the quality of water for its hardness and alkalinity. 2. Apply various instrumental methods like pH-metry, conductometry, spectroscopy and electrochemical techniques for quantitative and qualitative chemical analysis. 3. Demonstrate the skill for determination of quality of coal by proximate analysis and synthesis of engineering materials. 4. Learn the chromatographic technique for separation of mixture of compounds. 5. Explore mini projects which are relevant to societal and environmental issues to develop research attitude.							
<b>Note:</b> First five experiments are mandatory. A student has to perform either next five experiments or mini project in lieu of experiments.							
<b>Sr. No.</b>	<b>I) List of Experiments</b>						
1	Determination of total hardness (by EDTA method) and alkalinity of given water sample.						
2	To determine the dissociation constant of a weak acid (acetic acid) using pH meter.						
3	Titration of mixture of strong acid with strong base using Conductivity meter and determine strength						
4	To determine the maximum wavelength of absorption of $\text{KMnO}_4$ , verify Beer's law and find concentration of the unknown sample.						
5	Structural elucidation of unknown compounds by applying principles of UV and IR spectroscopy.						
6	Proximate analysis of Coal.						
7	To determine the electrochemical equivalent (ECE) of Cu. formaldehyde resin.						
8	To prepare the Phenol						
9	Preparation of biodiesel.						
10	Chromatographic separation of ortho- and para nitro-phenol						
<b>Sr. No.</b>	<b>II) Topics for Mini project (Student has to choose one of the topics from list given below but not limiting to)</b>						
1	Synthesis of nano-materials.						
2	Determination of active ingredients from medicines / concentration of dyes in commercial beverages using UV-Spectrophotometer.						
3	Water audit of water samples						
4	One-pot synthesis of biologically active compounds.						
5	Microwave assisted chemical reactions.						
6	Study of corrosion of metals in a medium of different atmospheric conditions						
7	Soil analysis of agricultural soil samples.						
<b>Laboratory manual:</b>							
1. Vogel's Text book of Qualitative Chemical Analysis by J.Mendham, R.C,Denny, J.D.Barnes, M.J.K.Thomas, 6 e, Pearson Education Ltd.							
2. Applied Chemistry Theory and Practice by O.P.Virman and A.K.Narula, 2e, New age International (P) Ltd							

Program: B. Tech. (Information Technology)					Semester: I		
Course: Digital Electronics and Logic Design					Code: BIT21B01		
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
3	-	-	3	20	30	50	100
<b>Prior Knowledge:</b> 1.Algebra , 2. Basic Electronics is essential.							
<b>Course Objectives:</b> This course aims at enabling students, 1. To learn different levels of abstraction of computer systems from hardware perspective. 2. To understand basic digital design techniques. 3. To design combinational and sequential logic circuits.							
<b>Course Outcomes:</b> After learning the course, the students will be able to: 1. Illustrate basic binary arithmetic's. 2. Apply Boolean expressions and K-Maps to solve logic design. 3. Compare Combinational logic circuit using SSI & MSI chips. 4. Demonstrate Sequential circuits using flip flops. 5. Construct Asynchronous and Synchronous Counters. 6. Explain the functions & organization of Computer Architectures.							
Unit	Description						Duration (Hrs.)
1	<b>Number System and Codes</b> Number Systems: Binary, Octal, Hexadecimal and their conversions. Signed binary number representation, complement representation and arithmetic's. Codes: BCD, Excess-3, Gray code, Binary Code and their conversions.						8
2	<b>Boolean Algebra and Logic Minimization</b> Basic definitions, axiomatic definition of Boolean algebra, basic theorems and properties of Boolean algebra, Boolean functions, digital logic gates. Logic minimization: Representation of truth-table, SOP form, POS form, And reduction techniques: K-Maps up to 4 variables, don't care conditions.						9
3	<b>Combinational Logic Design</b> Design using SSI chips: Code Converters, Adders, Subtractors, n bit Binary adder (IC 7483). Introduction to MSI chips: Multiplexer (IC 74153), De-multiplexer (IC 74138), Decoder (74238), Encoder (IC 74147)						6
4	<b>Sequential Logic Design</b> <b>Introduction to sequential circuits:</b> Difference between combinational and sequential circuits; Memory element-Latch. Flip- Flops: Logic diagram, truth table & excitation table of SR, JK, D, T flip flops; Conversion from one FF to another						8
5	<b>Registers and Counters</b> Registers: SISO, SIPO, PISO, PIPO, Shift Registers. Counters: Asynchronous Counter, Synchronous Counter, BCD Counter, Modulus N counter ( IC7490)						8
6	<b>Introduction to Computer Organization</b> Computer organization & computer architecture: organization, functions & types of computer units- CPU (typical organization, Functions, Types), Memory (Types & their uses in computer), IO (types & functions) & system bus. (Address, data & control bus), ALU (ALU signals, functions & types). Types of Computer Architectures: Von Neumann & Harvard architecture, RISC and CISC Architectures.						6
<b>Total</b>							<b>45</b>



**Text Book:**

1. R.P.Jain, "Modern Digital Electronics", 5th Edition, ISBN 978-93-553-2177-0, Tata McGraw Hill.
2. Moris Mano, "Digital Logic and Computer Design", Pearson, ISBN 978-93-325-4252-5.

**Reference Books:**

1. John Yarbrough, Digital Logic applications and Design, Cengage Learning, ISBN – 13: 978-81-315-0058-3.
2. D. Leach, Malvino, Saha, —Digital Principles and Applications, Tata McGraw Hill, ISBN – 13:978-0-07- 014170-4.
3. Anil Maini, —Digital Electronics: Principles and Integrated Circuits, Wiley India Ltd, ISBN:978-81-265-1466-3.
4. Norman B & Bradley, —Digital Logic Design Principles, Wiley India Ltd, ISBN:978-81-265-1258- 4, 2000.





<b>Program: B. Tech. (Information Technology)</b>				<b>Semester: I</b>			
<b>Course: Discrete Mathematics</b>				<b>Code: BIT21B02</b>			
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>IE</b>	<b>MTE</b>	<b>ETE</b>	<b>Total</b>
3	-	-	3	20	30	50	100
<b>Prior Knowledge:</b> - 1. Basic Mathematics concepts is essential.							
<b>Course Objectives:</b> This course aims at enabling students, 1. To understand and apply the foundational mathematical concepts. 2. To solve problems with sets, propositions, permutations and combinations. 3. To learn relation and functions and its application. 4. To study how to model problems using graph and tree.							
<b>Course Outcomes:</b> After learning the course, the students will be able to: 1. Define mathematically fundamental data types and data structures. 2. Use logical notation to reason mathematically sets theory and propositions. 3. Compare relations and functions for solving computational problems. 4. Apply permutation and combination principles for problem solving. 5. Model and solve computer problems utilizing trees and graphs. 6. Recognize algebraic structures and apply their attributes.							
<b>Unit</b>	<b>Description</b>						<b>Duration (Hrs.)</b>
1	<b>Sets And Propositions</b> Sets: Sets, Combinations of Sets, Venn Diagram, Finite and Infinite Sets, Cartesian Product, Principle of Inclusion and Exclusion, Mathematical Induction. Propositions: Propositions, Logical Connectives, Conditional and Bi-conditional. Propositions, Logical Equivalence, Validity of Arguments by using Truth Tables, Predicates and Quantifiers, Applications of propositional logic.						8
2	<b>Relations &amp; Functions</b> Relations: Properties of Binary Relations, Closure of Relations, Equivalence Relations, Partitions Functions: Functions, Composition of Functions, Invertible Functions, Pigeonhole Principle, Applications of Relations and Functions						8
3	<b>Counting Principles</b> Rules of Sum and Product, Permutations, Combinations, Generation of permutations and combinations, Binomial Co-efficient, Discrete probability.						7
4	<b>Graph Theory</b> Graphs: Basic Terminologies, Multi-Graphs, Weighted Graphs, Sub Graphs, Isomorphic graphs, Complete Graphs, Regular Graphs, Bipartite Graphs, Paths, Circuits, Hamiltonian and Eulerian graphs, Planar Graphs, Graph Coloring.						7
5	<b>Trees</b> Trees: Tree Terminologies, Rooted Trees, Properties, Applications of Tree, Introduction to tree- General tree, Binary Search Tree, B-Tree, Spanning Trees, Tree Traversals- In-Order, Pre-Order and Post-Order.						8
6	<b>Algebraic Structures</b> Algebraic Structures: Introduction, need and applications of Algebraic Structures Semigroup, Monoid, Group, Abelian Group.						7
<b>Total</b>						<b>45</b>	

**Text Books:**

1. Kenneth H. Rosen. Discrete Mathematics and Its Applications, 7th Edition, McGraw Hill, 2012.
2. C. L. Liu and D. P. Mohapatra, "Elements of Discrete Mathematics", 4th Edition, McGraw-Hill.

**Reference Books:**

1. Bernard Kolman, Robert C. Busby, Sharon Cutler Ross, "Discrete mathematical structures", 6th edition, Prentice Hall of India.
2. Edgar G. Goodaire, Michael M. Parmenter, "Discrete Mathematics with Graph Theory", 3rd Edition, Pearson Education.
3. Lipschutz Seymour, "Discrete mathematics", 4th Edition, Tata McGraw-Hill.

**E sources:**

1. Introduction to Discrete Mathematics for Computer Science Specialization by Coursera, <https://www.coursera.org/specializations/discrete-mathematics>.
2. "Discrete Mathematics", Master Discrete Math for Computer Science and Mathematics Students by Udemy



<b>Program: B. Tech. (Information Technology)</b>						<b>Semester: I</b>	
<b>Course: Digital Electronics Laboratory</b>						<b>Code: BIT21B03</b>	
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>TW</b>	<b>Practical</b>	<b>Oral</b>	<b>Total</b>
-	2	-	1	50	-	-	50
<b>Prior Knowledge:</b> - Algebra, Basic Electronics are essential.							
<b>Course Objectives:</b> This course aims at enabling students, 1. To design & implement combinational and sequential circuits. 2. To learn simulation of digital systems.							
<b>Course Outcomes:</b> After learning the course, the students will be able to: 1. Demonstrate the Boolean Expressions using K Map to represent logic function. 2. Construct Combinational & Sequential logic circuits. 3. Illustrate simulation of basic Computer architecture functions.							
<b>Unit</b>	<b>Suggested List of Assignments</b>						
1	Implement Full Adder and Subtractor using						
2	Design and implement 4-bit BCD to Excess-3 code.						
3	Design and implement 1 digit BCD adder using IC7483.						
4	Design and implement following using multiplexer IC 74153						
5	Design and implement full Subtractor using decoder IC 74138.						
6	Design and implement 3 bits Up and 3 bit Down Asynchronous Counters using master slave JK flip-flop IC 7476.						
7	Design and implement 3 bits Up and 3 bit Down Synchronous Counters using master slave JK flip-flop IC 7476.						
8	Design and implement Modulo 'N' counter using IC7490. (N= 100 max).						
9	Design sequence generator using JK flip-flop to generate sequence 1101011.						
10	Design & simulate single bit ALU with four functions (AND, OR, XOR, ADD).						
<b>Text Books:</b> 1. R.P.Jain, "Modern Digital Electronics", 5th Edition, ISBN 978-93-553-2177-0, Tata McGraw Hill. 2. Moris Mano, "Digital Logic and Computer Design", Pearson , ISBN 978-93-325-4252-5.							
<b>Reference Books:</b> 1. John Yarbrough, Digital Logic applications and Design, Cengage Learning, ISBN – 13: 978-81-315-0058-3. 2. William Stallings, "Computer organization and architecture, designing for performance" ,Prentice Hall, Eighth edition.							
<b>Online References: Virtual Lab simulator Link:</b> 1. <a href="http://vlabs.iitkgp.ac.in/coa/">http://vlabs.iitkgp.ac.in/coa/</a> 2. <a href="https://de-iitr.vlabs.ac.in/exp/4bit-sipo-shift-register/index.html">https://de-iitr.vlabs.ac.in/exp/4bit-sipo-shift-register/index.html</a>							

<b>Program: B. Tech. (Information Technology)</b>				<b>Semester: I</b>			
<b>Course: Python Programming Laboratory</b>				<b>Code: BIT21G01</b>			
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>TW</b>	<b>Practical</b>	<b>Oral</b>	<b>Total</b>
-	4	-	2	100	-	-	100
<b>Prior Knowledge:</b> - Computer fundamentals are essential							
<b>Course Objectives:</b> This course aims at enabling students, 1. To develop basic python programs using fundamental programming constructs. 2. To build programming skills using Python.							
<b>Course Outcomes:</b> After learning the course, the students will be able to: 1. Demonstrate problem solving and basic programming skills in Python. 2. Apply decision control structures and loop control structures to develop program. 3. Implement code reusability using functions, modules and libraries. 4. Build programs using string operations.							
<b>Suggested List of Assignments</b>							
1	Write a program to calculate the salary of an employee given his basic pay (take input from user). Let HRA be 10 % of basic pay and TA be 5% of basic pay. Let employees pay professional tax as 2% of total salary. Calculate total salary and salary payable after deductions.						
2	Write a program to demonstrate operators in python.						
3	Write a program to accept marks of five courses of students and compute his/her result and decide grade. Student is passing if he/she scores marks equal to and above 40 in each course. If student scores aggregate greater than 75%, then the grade is Distinction. If aggregate is $60 \geq$ then the grade is First class. If aggregate is $50 \geq$ then the grade is Second class and if aggregate is $40 \geq$ then the grade is Pass class.						
4	Write a program to check whether the input number is Armstrong number or not. An Armstrong number is an integer with three digits such that the sum of the cubes of its digits is equal to the number itself. Ex. 371						
5	Teacher is doing the analysis of the internal examination of a student. She has conducted programming & problem solving course test with maximum marks 25 where students have to score at least 12 marks to clear the test. Now she wants to find top scorer, lowest scorer, total number of pass and fail students. Apply the logic and perform the given task using list.						
6	Write a program to accept number from 1 to 12 and print equivalent month of a year using						
7	Write a program to accept the number and Check for prime number using user-defined function.						
8	Write a program to accept the number and Compute a) square root of number, b) Square of number, c) Cube of number d) check for prime, d) factorial of number, e) prime factors using user-defined function.						
9	Trainer is conducting a session for all 20 employees. She has employee ids of all employees						
10	Write a program to accept the input string from user and find URL available in it.						
11	Consider you have created a website in which you are accepting details of users where you have to take password from the user. Write a program to accept password from user with following condition: 1. Minimum characters 6 and maximum are 12. 2. At least one digit and one character. 3. At least one special symbol (@, \$, #) .						
12	Implement any application using Python						

**Text Books:**

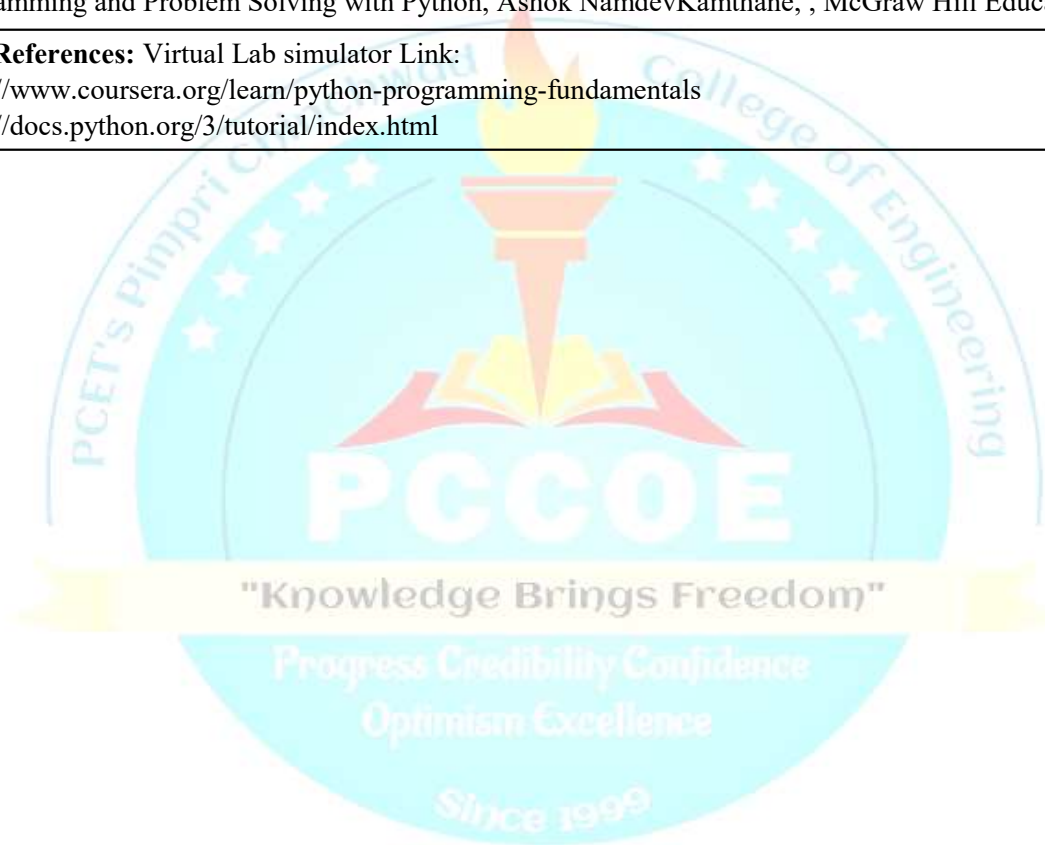
1. How to Solve it by Computer, R. G. Dromey, First edition, Pearson Education.
2. “Python Programming Using Problem Solving Approach”, ReemaThareja, Second edition Oxford University Press.
3. “Core Python Programming”, R. NageswaraRao, Second edition, Dreamtech Press.

**Reference Books:**

1. Head-First Python, 3rd edition Paul Barry, August 2023. Publisher(s): O'Reilly Media, Inc. ISBN: 9781492051299.
2. Problem Solving and Programming Concepts, Maureen Spankle, 9th edition, Pearson.
3. Python: The Complete Reference, Martin C, fourth edition Brown, McGraw Hill Education.
4. Programming and Problem Solving with Python, Ashok NamdevKamthane, , McGraw Hill Education

**Online References:** Virtual Lab simulator Link:

1. <https://www.coursera.org/learn/python-programming-fundamentals>
2. <https://docs.python.org/3/tutorial/index.html>





Program: B. Tech. (Information Technology)				Semester: I			
Course: HSMC-English				Code: BSH21H01			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
1	2	-	2	30	-	20	50
<b>Prior knowledge:</b> 1. Basic Knowledge of English grammar. 2. Basic Vocabulary, Listening and Speaking Skills							
<b>Course Objectives:</b> This course aims at enabling students, 1. To develop basic LSRW skills for effective communication. 2. To develop a sense of confidence among students to present themselves at professional as well as societal level. 3. To enhance the language competence.							
<b>Course Outcomes:</b> After learning the course, the students will be able to 1. Understand the role of effective listening skills, grammar and vocabulary in effective communication. 2. Formulate grammatically correct sentences and Enrich their vocabulary 3. Demonstrate reading skills to comprehend various documents 4. Communicate effectively and enhance their phonetic skills.							
Unit	Description						Duration
1	<b>Listening Skills:</b> Importance of Listening Skills, Listening and Hearing, Types of Listening: Active / Selective / Passive Listening, Barriers to Listening, Tips to Improve Listening Skills <b>Grammar &amp; Vocabulary:</b> Common Errors in Daily Discourse, Compound and Complex Sentences, Modal Auxiliaries. Processes of Word Formation, One Word Substitutions, Words often Confused, Usage of Business Phrases & Idioms.						3
2	<b>Writing Skills :</b> Elements of Effective Writing, Writing Styles (Formal & Informal), Paragraph Writing (Descriptive, Technical) <b>Professional Writing:</b> Job Application, Leave Application, Enquiry and Complaint Letter. Features of Technical Writing, Report Writing; Progress, Accident Report, Event Report.						4
3	<b>Reading Skills:</b> Importance of Reading, Scanning, Skimming, Reading between the Lines, Reading Comprehension: Factual / Expository / Informative texts, Case Studies, Reading Research Articles <b>Literary Reading:</b> 1 The Story of An Hour by Kate Chopin, 2 The Classical Student by Anton Chekhov 3 A Chameleon by Anton Chekhov.						4
4	<b>Speaking Skills:</b> Basic Sounds-IPA, Word Stress, Intonation, Language Functions (Requesting, Apologizing, Complaining, Complementing, Thanking, etc ) Art of Asking and Responding to Questions <b>Public Speaking:</b> Importance of Public Speaking, Art of Extempore& Presentations, Role Play, Delivering Welcome Speech, Vote of Thanks, Group Discussion.						4
						<b>Total</b>	<b>15</b>
Practical/Lab Sessions							
Lab Session	Activities						Duration (Hrs)
1	Listening 1: Listen to the audio and answer the questions (IELTS)						2
2	Listening 2 : Listen to the audio and Summarize (Ted Talks)						2
3	Grammar: Correct the sentences and understand the business usages.						2
4	Vocabulary: Different ways to improve vocabulary and activities						2

5	Writing Skills 1: Formal writing such as Job Application, Leave Application, Enquiry and Complaint Letter.	2
6	Writing Skills 2: Different Styles of writing and Paragraph Writing (Descriptive, Technical)	2
	Writing Skills 3: Technical Writing, Report Writing; Progress, Accident Report, Event Report.	2
8	Reading Activity 1: Communication Case Studies	2
9	Reading Activity 2: IELTS based Comprehension Skills	2
10	Reading Activity 3: Research Articles and Technical Documents	2
11	Reading Activity 4: Literary Reading and Discussion	2
12	Speaking Activity 1: IPA Pronunciation and Phonetics Exercises	2
13	Speaking Activity 2: Delivering speeches and Mastering the Art of Public Speaking	2
14	Speaking Activity 3: Preparing and Participating Group Discussions / Elevator Speeches	2
15	Speaking Activity 4: Oral/PPT Presentation with Q&A Session	2
<b>Total</b>		<b>30</b>
<b>Text Books:</b> Raymond Murphy, Essential English Grammar in Use, Cambridge University Press; 2015		
<b>Reference Books:</b>		
1. Michael Swan, Practical English Usage, Oxford, 3rd Edition; 2005		
2. David F. Beer, Writing and Speaking in the Technology Professions: A Practical Guide, Wiley-IEEE Press; 2nd Edition, 2003		
3. Sunita Mishra, C. Muralikrishna, Communication Skills for Engineers, Pearson Education; 2011		
4. Clifford Whitcomb, Leslie E. Whitcomb, Effective Interpersonal and Team Communication Skills for Engineers, Wiley-Blackwell; Nil edition, 2013.		
5. Krishnaswami, N and Sriraman, T, Creative English for Communication, Macmillan.		
Saran Freeman, Written Communication in English, Orient Longman.		
<b>E Sources -</b>		
1. <a href="https://www.google.com/url?q=https://onlinecourses.nptel.ac.in/noc19_hs19/&amp;sa=D&amp;source=editors&amp;ust=1654924489543365&amp;usg=AOvVaw0vWIA1-FXdmtGD4TbPCXo-">https://www.google.com/url?q=https://onlinecourses.nptel.ac.in/noc19_hs19/&amp;sa=D&amp;source=editors&amp;ust=1654924489543365&amp;usg=AOvVaw0vWIA1-FXdmtGD4TbPCXo-</a>		
2. <a href="https://www.google.com/url?q=https://onlinecourses.nptel.ac.in/noc19_hs22/&amp;sa=D&amp;source=editors&amp;ust=1654924489545718&amp;usg=AOvVaw1JiV6Z4RihjTKbm8Sd2HDC">https://www.google.com/url?q=https://onlinecourses.nptel.ac.in/noc19_hs22/&amp;sa=D&amp;source=editors&amp;ust=1654924489545718&amp;usg=AOvVaw1JiV6Z4RihjTKbm8Sd2HDC</a>		
3. <a href="https://takeielts.britishcouncil.org/take-ielts/prepare/free-ielts-practice-tests/listening/section-1">https://takeielts.britishcouncil.org/take-ielts/prepare/free-ielts-practice-tests/listening/section-1</a>		

<b>Program: B. Tech. (Information Technology)</b>				<b>Semester: I</b>			
<b>Course: HSMC-German</b>				<b>Code: BSH21H02</b>			
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>IE</b>	<b>MTE</b>	<b>ETE</b>	<b>Total</b>
<b>1</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>30</b>	<b>-</b>	<b>20</b>	<b>50</b>
<b>Prior Knowledge:</b> English Language							
<b>Course Objectives:</b> This course aims at enabling students, 1. To get familiar with the basics of German language and develop their interest in the language. 2. To get equipped with basic language skills, namely listening, speaking, reading, and writing for the purpose of socializing, providing and obtaining information. 3. To develop inter cultural competence and understanding of perceptions, gestures, family, and community dynamics.							
<b>Course Outcomes:</b> After learning the course, the students will be able to, 1. Demonstrate understanding of simple texts in German 2. Apply grammar rules to frame correct sentences in German 3. Communicate in a simple manner in German 4. Construct simple texts in German							
<b>Unit</b>	<b>Description</b>						<b>Duration (Hrs.)</b>
1	<b>Building Vocabulary, Developing Listening and Reading Skills</b> <ul style="list-style-type: none"> <li>● Self-introduction, things of day-to-day use, Hobbies &amp; Free time, Food &amp; Beverages, Clock time &amp; Daily Routine, Living &amp; Working in Germany, Weather and Healthcare</li> <li>● Listen and understand short conversations, announcements, voice mail in German</li> <li>● Read and comprehend from instruction boards, advertisements, simple texts, short messages, letters and emails in German B64:B67</li> </ul>						3
2	<b>German Grammar and Sentence Structure</b> <ul style="list-style-type: none"> <li>● Personal Pronouns: Singular and Plural</li> <li>● Verbs and Verb-Conjugation: regular, irregular, mixed, separable, modal auxiliaries</li> <li>● Types of Articles: definite, indefinite, negative, possessive</li> <li>● Cases: nominative, accusative, dative</li> <li>● Types of the sentences: declarative, interrogative, imperative</li> <li>● Basic German conjunctions: and, or, but, because</li> </ul>						4
3	<b>Speaking Skills</b> <ul style="list-style-type: none"> <li>● Spelling and pronunciation</li> <li>● Asking for and giving simple information</li> <li>● Requesting and responding to requests</li> <li>● Learning simple German dialogues and speaking with expression</li> <li>● Role play: Presenting a simple dialogue on given situation</li> </ul>						4
4	<b>Writing Skills</b> <ul style="list-style-type: none"> <li>● Building words and simple sentences</li> <li>● Filling up personal information in very simple forms (e.g. name, address, etc)</li> <li>● Using punctuation marks correctly in given texts</li> <li>● Correcting errors in given draft</li> <li>● Writing simple texts, short messages, letters and emails on given topics</li> </ul>						4
<b>Total</b>						<b>15</b>	

<b>Practical/Lab Sessions</b>		
<b>Lab Session</b>	<b>Activities</b>	<b>Duration (Hrs)</b>
1	<b>Vocabulary 1:</b> Exercises to recall and enhance vocabulary	2
2	<b>Listening 1:</b> Listen to the audio and repeat (phonetics)	2
3	<b>Listening 2:</b> Listen to the audio and select the correct option (A1 practice)	2
4	<b>Vocabulary 2:</b> Exercises to recall and enhance vocabulary	2
5	<b>Reading 1:</b> Read short texts and fill up the information in table	2
6	<b>Reading 2:</b> Read short texts and mark true or false (A1 practice)	2
7	<b>Reading 3:</b> Read short texts and answer the questions	2
8	<b>Grammar 1:</b> Solve simple grammar exercises	2
9	<b>Grammar 2:</b> Construct correct sentences by applying grammar rules	2
10	<b>Speaking 1:</b> Spell and pronounce the words correctly (A1 practice)	2
11	<b>Speaking 2:</b> Give your short introduction (A1 practice)	2
12	<b>Speaking 3:</b> Frame simple questions, requests and reply (A1 practice)	2
13	<b>Writing 1:</b> Fill up simple data in forms (A1 practice)	2
14	<b>Writing 2:</b> Correct errors in given draft	2
15	<b>Writing 3:</b> Write simple texts, short messages, emails and letters (A1 practice)	2
<b>Total</b>		<b>30</b>
<b>Text Books:</b>		
Netzwerk A1: Dengler, Rusch, Schmitz, Sieber, Ernst Klett Sprachen, Stuttgart Germany, Goyal Publishers & Distributors, Delhi, 2015		
<b>Reference Books:</b>		
1) Linie 1: Kaufmann, Moritz, Rodi, Rohrmann, Sonntag, Klett-Langenscheidt GmbH, München Germany, Goyal Publishers & Distributors, Delhi, 2018		
2) Tangram aktuell 1: Dallapiazza, Eduard von Jan, Schönherr, Max Hueber Verlag, Ismaning, Germany, Goyal Publishers & Distributors, Delhi, 2005		
<b>E-sources:</b>		
1) NPTEL Course lectures (IIT Madras) link: <a href="https://onlinecourses.nptel.ac.in/noc23_hs98/preview">https://onlinecourses.nptel.ac.in/noc23_hs98/preview</a>		
2) Udeemy Course lectures link: <a href="https://www.udemy.com/topic/german-language/free/">https://www.udemy.com/topic/german-language/free/</a>		



<b>Program: B. Tech. (Information Technology)</b>						<b>Semester: I</b>	
<b>Course: HSMC-Japanese</b>						<b>Code: BSH21H03</b>	
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>IE</b>	<b>MTE</b>	<b>ETE</b>	<b>Total</b>
<b>1</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>30</b>	<b>-</b>	<b>20</b>	<b>50</b>
<b>Prior Knowledge:</b> English/Marathi/Hindi language for learning Japanese language.							
<b>Course Objectives:</b> This course aims at enabling students							
<ol style="list-style-type: none"> <li>1. To be aware of Japanese scripts (Hiragana, Katakana) and basic Kanjis.</li> <li>2. To familiarize themselves with the Japanese language and use basic greetings in day-to-day life.</li> <li>3. To develop language skills namely listening, speaking, reading and writing skills for socializing, providing and obtaining information.</li> <li>4. To express themselves using basic sentences and develop cross cultural skills and understanding of gestures, family and community, perceptions.</li> </ol>							
<b>Course Outcomes:</b> After learning the course, the students will be able to							
<ol style="list-style-type: none"> <li>1. Understand Japanese scripts through oral and written communication</li> <li>2. Explore Japanese culture and etiquettes</li> <li>3. Express themselves by using simple sentences and responses to questions</li> <li>4. Develop language skills namely speaking, reading and writing skills for providing and obtaining information.</li> </ol>							
<b>Unit</b>	<b>Description</b>						<b>Duration (Hrs.)</b>
1	<b>Introduction: Hiragana Script.</b> <ul style="list-style-type: none"> <li>● Listening: Short video skit on self-introduction.</li> <li>● Speaking: Song of greetings.</li> <li>● Reading: Hiragana words</li> <li>● Writing: Japanese scripts (Hiragana)</li> <li>● Test on Hiragana</li> </ul>						3
2	<b>Katakana script</b> <ul style="list-style-type: none"> <li>● Listening: English words</li> <li>● Speaking: Song on body parts.</li> <li>● Reading: Katakana words</li> <li>● Writing: Locating countries on map, Wordhunt.</li> <li>● Grammar: Test on Katakana.</li> </ul>						4
3	<b>わたしはマイク. ミラーです。</b> <ul style="list-style-type: none"> <li>● Speaking: Self-introduction</li> <li>● Listening: Conversation based on L-1</li> <li>● Writing: Writing about yourself.</li> <li>● Reading: Lesson reading no.-1</li> <li>● Grammar: Introduction to 1. particles (は、か、も、か) 2. Verb (です、ではありません)</li> </ul>						4



4	<p>これからお世話になります。</p> <ul style="list-style-type: none"> <li>● Speaking: Greetings.</li> <li>● Listening: Conversation based on L-2</li> <li>● Writing: Numbers (0- 100) in Japanese.</li> <li>● Reading: Lesson reading no.2</li> <li>● Grammar: (past, negative form),</li> <li>● Introduction to 12, questioning words (なん、だれ、どなた).</li> <li>● 2. この、その、あの、どの 3. Particle の</li> <li>● Test on grammar</li> </ul>	4
<b>Total</b>		<b>15</b>
<b>Practical/Lab Sessions</b>		
Lab Session	Activities	Duration (Hrs)
1	<b>Speaking skill 1:</b> Japanese greetings	2
2	<b>Writing Skill 1:</b> Hiragana script	2
3	<b>Listening Skill 1:</b> Writing 'Hiragana' words	2
4	<b>Reading Skill 1:</b> Reading and recognizing 'Hiragana' words	2
5	<b>Writing Skill 2:</b> World map activity	2
6	<b>Reading Skill 2:</b> Reading 'Katakana' words	2
7	<b>Speaking Skill 2:</b> Self introduction	2
8	<b>Writing Skill 3:</b> Basic sentence formation using grammar.	2
9	<b>Reading Skill 3:</b> Chapter-1 reading	2
10	<b>Listening Skill 3:</b> Conversation in the office.	2
11	<b>Speaking Skill 3:</b> Dialogues between people of different nationality.	2
12	<b>Writing Skill 4:</b> Writing Japanese numbers using 'Hiragana' and 'Kanjis'.	2
13	<b>Reading Skill 4:</b> Chapter-2 reading	2
14	<b>Listening Skill 4:</b> Listening to Days of the week and dates of the month	2
15	<b>Speaking Skill 4:</b> Daily routine using verbs.	2
<b>Total</b>		<b>30</b>
<b>Textbook:</b>		
1. Minna no Nihongo Part I and II Publication: Goyal Publishers & Distributors Pvt. Ltd. , Author: Tsuruo Yoshiko (Compiled) , Edition: 2018		
2. Nihongo Shoho Publication: JALTAP , Author: JALTAP (With permission of Japan Foundation, Tokyo), Edition: April 2008		
<b>Reference Books:</b>		
1. Genki 1 Author: Eri Banno, Yoko Sakane, Yutaka Ohno, Chikako Shinagawa, and Kyoko Tokashiki. Publication: The Japan Times. Edition: 2011		
2. MOMO Author: Japan Foundation, New Delhi, Publication: Goyal Publisher & Distributors (P) Ltd., Edition: October 2007		
3. MOMO Japanese work book Japan Foundation, New Delhi, Publication: Goyal Publisher & Distributors (P) Ltd., Edition: October 2007		
4. MOMO Japanese workbook Japan Foundation, New Delhi, Publication: Goyal Publisher & Distributors (P) Ltd., Edition: October 2007		

<b>Program: B. Tech. (Information Technology)</b>						<b>Semester: I</b>	
<b>Course: HSMC-Business Storytelling</b>						<b>Code: BSH21H04</b>	
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>IE</b>	<b>MTE</b>	<b>ETE</b>	<b>Total</b>
<b>1</b>	<b>2</b>	<b>-</b>	<b>2</b>	<b>30</b>	<b>-</b>	<b>20</b>	<b>50</b>
<b>Prior Knowledge:</b> Basic competence of English language.							
<b>Course Objectives:</b> This course aims at enabling students, 1. To understand storytelling as one of the tools of influential communication. 2. To strengthen their creativity, critical thinking and social skills. 3. To use stories to face leadership, management and professional challenges.							
<b>Course Outcomes:</b> After learning the course, the students will be able to 1. Identify nuances of storytelling method as an influential communication 2. Demonstrate the ability to engage and inspire others through the development of narratives, tone and style 3. Apply storytelling techniques to communicate effectively in a business context 4. Develop stories to build, maintain professional relationships, deliver messages and motivate others toward action.							
<b>Unit</b>	<b>Description</b>						<b>Duration (Hrs.)</b>
1	<b>Concept and Scope:</b> What is a story? A Brief History & Importance of Storytelling, Basics of Storytelling - Entertainment, Engagement, Personalization, Critical Thinking, Observation Skills in Storytelling, Benefits of Storytelling, Storytelling in Engineering, Business Storytelling, Activity: Analysis of Steve Jobs Commencement Speech at Stanford (2005)						3
2	<b>Process of Storytelling:</b> Elements of a Story - Context and Relevance, Style and Detailing, Plot, and Characters, The Flow of the Story - Relevance - Action - Result, Know the Purpose - Inspire Action, Educate People, Showcase Values, Build Collaboration, Know your Audience - Educational, Social Background and Age, Developing Narratives: Characteristics of a Narrative, Data Visualization, Presenting a Word Picture, Triggering Emotions of the Audience, Choosing Media - Audio, Written, Oral and Digital Storytelling <b>Activity:</b> Analysis of a Short Story: 'The Three Hermits by Leo Tolstoy', The Last Painting by O' Henry						4
3	<b>Types of Stories</b> - Customer Story, Origin Story, Event Story, Product Stories, Storytelling Techniques for Presentations, Using Power Words Effectively, Using Narratives to Manage Conflicts, Using a Narrative to Interpret the Past and Shape the Future, Storytelling in Marketing, Story Strategies - Using Anchor Stories <b>Case studies</b> - Brand storytelling -Steve Jobs / Jack Maa - Product Presentation, Lido Anthony "Lee" Iacocca.						4

4	<b>Crafting a Story</b> Crafting a Story from a Picture/an Idea/Situation/Artifacts, Storyline - Beginning / Motive / Struggle / Achievement, Six-word Story - Memoirs to Being with, Detailing of Character and the Context, Delivering a Story – Tone / Emotions / Voice Modulation <b>Activity-</b> Developing and Delivering Presentation through Storytelling on the Given Situation/Context	4
<b>Total</b>		<b>15</b>
<b>Practical/Lab Sessions</b>		
<b>Lab Session</b>	<b>Activities</b>	<b>Duration (Hrs)</b>
1	Basic of Storytelling: Using Five Senses in storytelling activity and Elements of Storytelling	2
2	Analysis of a Short Story: ‘The Three Hermits by Leo Tolstoy’, and The Last Painting by O’ Henry.	2
3	Character Study: Create a detailed character profile of a fictional character, including their background, motivations, and personality traits. Write a short story or scene that showcases this character in action	2
4	Personal Storytelling: Write and present a short personal story that highlights a challenge you've faced and how you overcame it	2
5	Collaborative Storytelling: Partner with another student to create a collaborative story. Take turns writing alternating sections, focusing on maintaining a consistent tone and narrative flow.	2
6	Historical Business Story: Research and narrate a significant historical event or moment in a well-known business's journey, focusing on how storytelling played a role in shaping public perception	2
7	Social Impact Story: Develop a story that demonstrates how a business initiative or project positively impacted a community or addressed a social issue	2
8	Customer Success Story: Craft a narrative that showcases a customer's journey with your fictional business	2
9	Change Management Story: Design a narrative that communicates a change initiative within a company, addressing challenges, resistance, and the ultimate benefits of the change	2
10	Investor Pitch Story: Craft a persuasive story for a startup pitch. Highlight the problem, solution, market opportunity, and potential for growth in a captivating way	2
11	Leadership Story: Compose a story that illustrates effective leadership qualities and strategies. Highlight a leader's ability to motivate, inspire, and guide a team toward success	2
12	Cultural Storytelling: Explore how storytelling can bridge cultural gaps in a global business context. Share a story that demonstrates cultural sensitivity and understanding	2
13	Ethical Dilemma Story: Present a complex ethical dilemma faced by a business or individual. Use storytelling to explore various perspectives and potential solutions	2
14	Marketing Campaign Story: Design a storytelling-based marketing campaign for a specific product or service launch, incorporating different media and channels	2

15	Crisis Turnaround Story: Narrate a scenario where a business successfully navigated a crisis through strategic communication and storytelling, ultimately regaining trust and reputation.	2
<b>Total</b>		<b>30</b>
<b>Text Books:</b> 1. Kendall Haven, Story Smart, Libraries Unlimited, 2014		
<b>Reference Books:</b>		
1. Kendall Haven, Story Proof, Libraries Unlimited, 2007.		
2. Rob Biesenbach, Unleash the Power of Storytelling: Win Hearts, Change Minds, Get Results, Eastlawn Media, 2018.		
3. Yiannis Gabriel, Storytelling in Organizations: Facts, Fictions, and Fantasies, Oxford University Press, 2011.		
<b>E-resources:</b>		
1. The Art of Business Storytelling   AmeenHaque   Talks at Google , <a href="https://www.youtube.com/watch?v=77FUr6ZsWjY">https://www.youtube.com/watch?v=77FUr6ZsWjY</a>		
2. Marketing Storytelling - <a href="https://www.referralcandy.com/blog/storytelling-examples/">https://www.referralcandy.com/blog/storytelling-examples/</a>		
3. 5 examples of great storytelling from Jack Ma <a href="https://www.youtube.com/watch?v=3nHOxONWfEs">https://www.youtube.com/watch?v=3nHOxONWfEs</a>		
4. Six words story - Nicole Kahn <a href="https://www.youtube.com/watch?v=16sY1iLc2d4">https://www.youtube.com/watch?v=16sY1iLc2d4</a>		
5. Kevin Hart - Telling great stories <a href="https://www.youtube.com/watch?v=vn_L4OPU_rg">https://www.youtube.com/watch?v=vn_L4OPU_rg</a>		





<b>Program: B. Tech. (Information Technology)</b>						<b>Semester: I</b>	
<b>Course: Life Skills 1</b>						<b>Code: BSH21K01</b>	
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>TW</b>	<b>Practical</b>	<b>Oral</b>	<b>Total</b>
-	4	-	2	100	-	-	100
<b>Prior Knowledge:- Nil</b>							
<b>Course Objectives:</b>							
1. To equip them with essential skills and knowledge that complement their academic education, preparing them to excel not only as engineers but also as well-balanced individuals							
2. To develop students' vital life skills that promotes personal growth, resilience, and success in their academic journey and beyond							
<b>Course Outcomes:</b> Students will be able to							
1. Understand the true essence of happiness by being harmony with oneself.							
2. Explore skills to get along with others to create and maintain healthy relationships.							
3. Apply different ways of rational thinking.							
4. Develop emotional intelligence.							
<b>Unit</b>	<b>Description</b>						<b>Duration (Hrs.)</b>
1	<b>Happy You, Happy Life!</b> (i) Healthy Mind - Music Therapy, Yoga, Meditation, Happiness and Success. (ii) Self-Awareness - Know your personality, Develop your Self- Esteem, Johari Window, SWOT, Setting goals for yourself (SMART). (iii) Healthy Lifestyle - Nutrition, Significance of Physical Activity in Daily routine.						15
2	<b>Building Relationships</b> (i) People Skills - Networking, Developing Healthy Relationships, Collaboration, Reliability, Respectfulness, Open- Mindedness (ii) Effective Communication in Relationships-My Relationship Web, Relationship Recipe, Active Listening and Conflict Resolution (iii) Embracing Diversity: Respect for Different Perspectives and Cultures.						15
3	<b>The Reflective Engineer</b> (i) Critical Thinking - Fact or Fiction, Convergent & Divergent Thinking (ii) Creative Thinking - Imagination, Formulate and Articulate Ideas (iii) Perspective Thinking – Understanding others view Points, Respecting Others Opinions (iv) Decision Making – Rational, Analytical & Ethical Solutions.						15
4	<b>You CAN DO IT...</b> (i) Managing Stress - Good Stress , Bad Stress, Anxiety (ii) Managing time - Planning, Prioritization, Delegation, Productivity and Positivity (iii) Managing Emotions – Self- Regulation, Self-Motivation, Empathy, Assertiveness, Anger Management (iv) Handling Peer Pressure- Types of Peer Pressure: Spoken Peer Pressure, Unspoken Peer Pressure, Direct Peer Pressure, Indirect Peer Pressure, Positive Peer Pressure, Negative Peer Pressure.						15
<b>Total</b>						<b>60</b>	

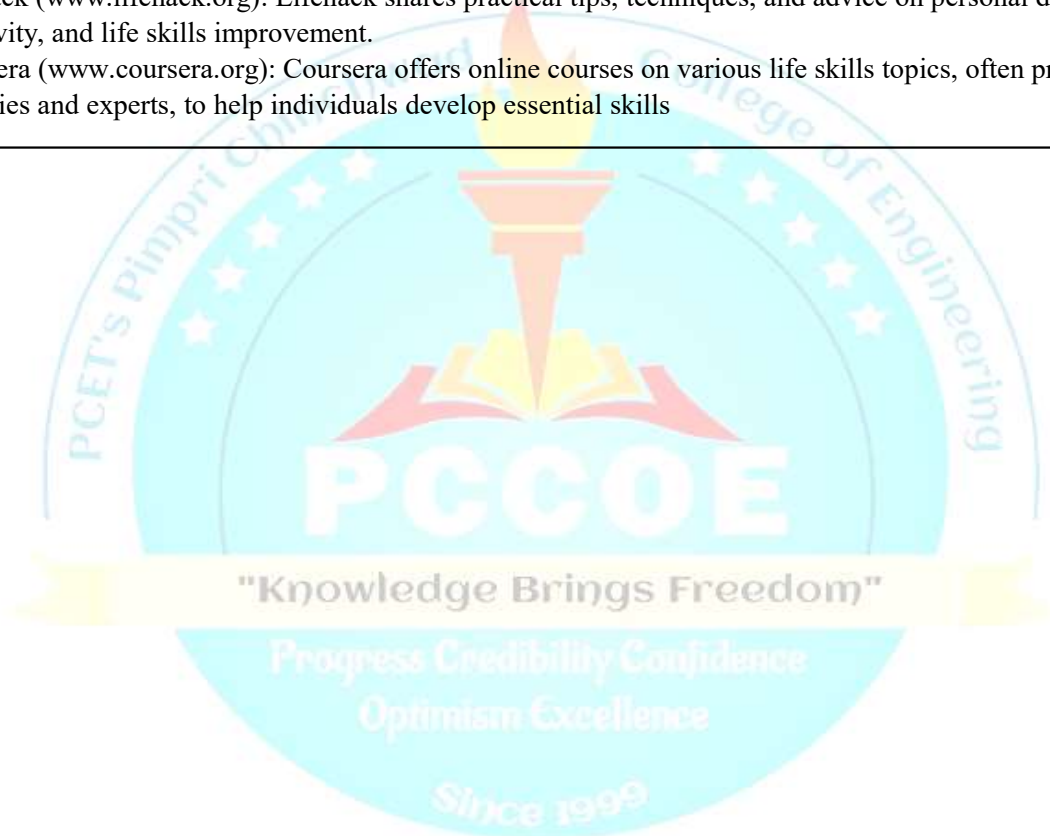


**Reference Books**

1. "The 7 Habits of Highly Effective Teens" by Sean Covey Publisher: Simon & Schuster, 2017
2. "How to Win Friends and Influence People" by Dale Carnegie Publisher: Simon & Schuster, 2020
3. "Emotional Intelligence: Why It Can Matter More Than IQ" by Daniel Goleman Publisher: Bantam Books, 2021
4. "Mindset: The New Psychology of Success" by Carol S. Dweck Publisher: Ballantine Books, 2019
5. "The Power of Habit: Why We Do What We Do in Life and Business" by Charles Duhigg Publisher: Random House, 2016

**Weblinks**

1. Psychology Today ([www.psychologytoday.com](http://www.psychologytoday.com)): Psychology Today publishes articles and insights from psychologists and mental health experts that can be useful for improving life skills and emotional intelligence.
2. Lifehack ([www.lifehack.org](http://www.lifehack.org)): Lifehack shares practical tips, techniques, and advice on personal development, productivity, and life skills improvement.
3. Coursera ([www.coursera.org](http://www.coursera.org)): Coursera offers online courses on various life skills topics, often provided by universities and experts, to help individuals develop essential skills



# Curriculum Structure

**First Year B.Tech**

**Information Technology**

**Semester II**

"Knowledge Brings Freedom"

Progress Credibility Confidence  
Optimism Excellence

Since 1999

Program: B. Tech. (Information Technology)				Semester: II			
Course: Multivariate Calculus				Code: BSH22A06			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial*	Credit	IE	MTE	ETE	Total
2	-	1	2	20	30	50	100
<b>Prior Knowledge:</b>							
1) Elementary Mathematics.							
2) Elementary Calculus							
<b>Course Objectives:</b> This course aims at enabling students,							
1) To strengthen the concepts of multivariable calculus and its application in maxima & minima, error & approximation area, volume							
2) To make students acquainted with advanced techniques to evaluate integrals.							
<b>Course Outcomes:</b> After learning the course, the students will be able to:							
1) Evaluate Partial Differentiation and apply the concept of partial differentiation to find Maxima & Minima and Error & Approximation.							
2) Solve for First order and first degree partial differential equations.							
3) Understand definite improper integrals like Gamma, Beta function, DUIS.							
4) Apply multiple integration techniques to analyze Area, Volume.							
Unit	Description						Duration (Hrs.)
1	<b>Partial Differentiation:</b> Partial derivatives, Composite function, Chain Rule, variable to be treated as constant, total derivatives. Euler's theorem for homogeneous functions. Application of Partial derivatives: Jacobian for explicit function, Errors and Approximations, Maxima and Minima of two variable functions.						8
2	<b>Partial Differential Equation(PDE):</b> Definition of PDE, order and degree of PDE, Formation of PDE, Classification of PDE, Initial and Boundary value problems, Solution of First order Partial differential equations.						7
3	<b>Integral Calculus:</b> Beta and Gamma functions, differentiation under integral sign (DUIS).						7
4	<b>Multiple Integral:</b> Double integration, conversion into polar form, application of double integration to the area, Triple integration, Dirichlet's theorem, application of triple integration to Volume.						8
<b>Total</b>						<b>30</b>	
<b>* Tutorial will be conducted in batches as 1Hr/week/batch</b>							
Sr. No.	List of Tutorials						
1	Partial derivatives basic rules, Mixed partial derivatives & properties ;						
2	Euler's theorem on Homogeneous Functions and deductions;						
3	Examples on variables to be treated as constant, Composite functions;						
4	Definition of Jacobian, Jacobian of explicit functions;						
5	Errors & Approximations, problem solving;						
6	Maxima and minima of functions of two variables;						
7	Partial differential equation formation, classification,						
8	Solution of first order first degree						
9	Beta, Gamma Function & its properties;						
10	Differentiation under integral sign & Problems;						
11	Concept of Double Integration and problem Solving;						
12	Application of double integration to find Area;						
13	Concept of Triple integration and problem Solving;						
14	Dirichelet's theorem and Problems;						
15	Application of triple integration to find Volume;						

**Text Books:**

- 1) Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill).
- 2) Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.)

**Reference Books:**

- 1) Higher Engineering Mathematics, 22e, by H. K. Das (S. Chand Publication, Delhi).
- 2) Advanced Engineering Mathematics, 4e, by S.R.K. Iyengar, Rajendra K. Jain (Alpha Science International, Ltd).
- 3) Advanced Engineering Mathematics, 7e, by Peter V. O'Neil (Thomson Learning).
- 4) Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education).
- 5) Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi).



Program: B. Tech. (Information Technology)				Semester: II			
Course: Engineering Physics				Code: BSH22A02			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
3	-	-	3	20	30	50	100
<b>Prior Knowledge:</b> 1) Wave theory of light 2) Elasticity 3) Atom, molecule & nuclei 4) Current, electricity & magnetism 5) Electromagnetic Induction							
<b>Course Objectives:</b> This course aims at enabling students, 1) To build strong conceptual understanding of Optics, Semiconductor Physics & Quantum Physics 2) To explore advances in Physics with introduction of Lasers, Nanotechnology & Superconductivity 3) To provide consciousness about the importance of Physics principles in various engineering applications							
<b>Course Outcomes:</b> After learning the course, the students will be able to: 1) Interpret intensity variation due to optical phenomena like interference and relate these concepts to various engineering applications 2) Apply basics of semiconductor physics to explain the behavior of charge carriers inside a semiconductor 3) Illustrate the working principle of laser and their prominent applications 4) To distinguish wave behavior of a matter particle for the manipulation of the processes at quantum scale. 5) Interpret properties of superconductors & their applications in advanced technologies 6) Summarize properties, preparation methods of nanomaterials & explore their applications in various engineering fields							
Unit	Description						Duration (Hrs.)
1	<b>Wave Optics</b> Interference: Interference, phase difference & path difference between waves, constructive & destructive interference, phase difference due to reflection at boundaries of optical interfaces, thin film, interference due to thin film of uniform thickness, conditions of maxima and minima, anti-reflection coating as an application of interference  <b>Diffraction:</b> Diffraction, Fraunhofer diffraction at a single slit (Qualitative)-condition of maxima and minima, resultant intensity distribution pattern, diffraction grating (Qualitative), introduction to X-Ray diffraction						7
2	<b>Semiconductor Physics</b> Band Theory of solids, Electrical conductivity of conductors & semiconductors, Hall effect (with derivation), Fermi Dirac probability distribution function, Fermi energy, position of Fermi level in intrinsic semiconductors (Qualitative) & in extrinsic semiconductors, dependence of Fermi level on temperature & doping concentration, energy band diagram of P-N Junction diode, solar cell I-V characteristics.						6
3	<b>Laser &amp; Fiber Optics</b> Laser: Introduction, interaction of light with matter- absorption, spontaneous emission, stimulated emission, population inversion, metastable state, active system, resonant cavity, characteristics of laser, semiconductor hetero-junction laser, carbon dioxide laser, applications of laser-industrial, defense & medical; introduction to holography <b>Fiber Optics:</b> Propagation of light in optical fibers, acceptance angle, numerical aperture, modes of propagation, types of fibers- step index, graded index, single mode & multi-mode; Losses -attenuation, dispersion						8

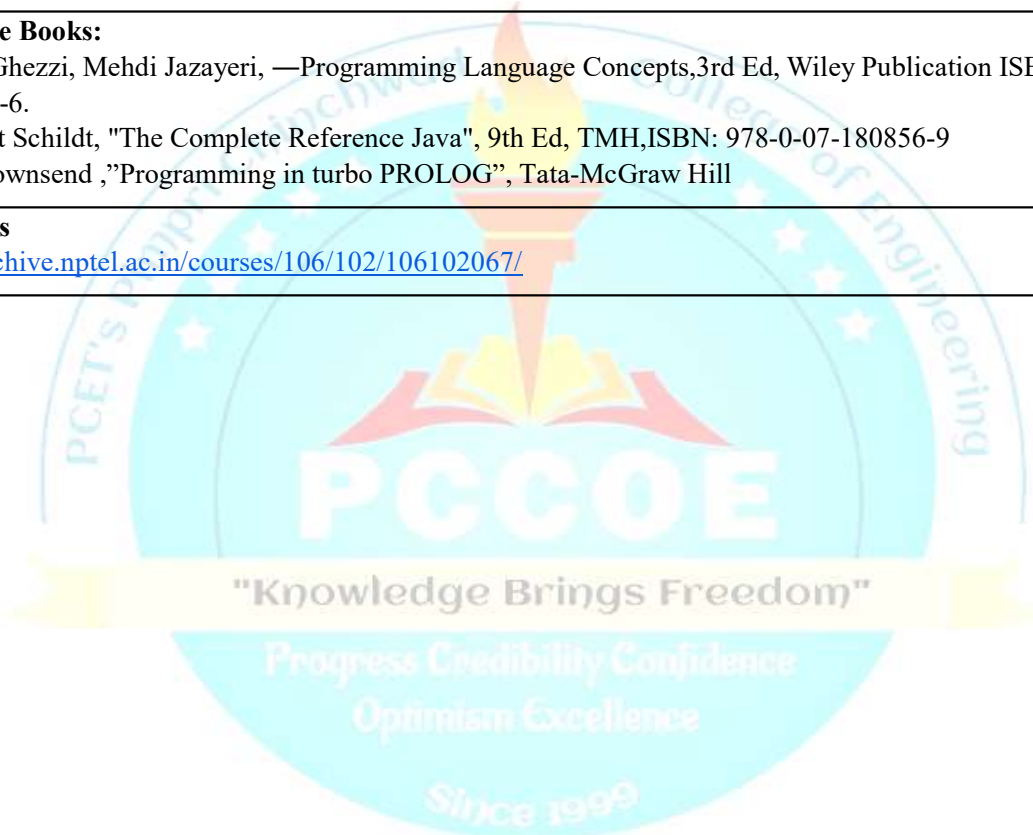


4	<p><b>Quantum Mechanics</b>  Limitations of classical physics, need of quantum mechanics, wave particle duality of radiation &amp; matter, De Broglie hypothesis, De Broglie wavelength in terms of kinetic &amp; potential energy, concept of wave packet, phase and group velocity, properties of matter waves, Heisenberg's uncertainty principle, wave function &amp; probability interpretation, well behaved wave function, Schrodinger's time independent wave equation, applications of independent wave equation to the problem of (i) particle in rigid box, (ii) particle in a non-rigid box(qualitative), Tunneling effect, examples of tunneling effect, tunnel diode &amp; scanning tunneling microscope (STM)</p>	8
5	<p><b>Magnetism and Superconductivity</b>  Magnetism: Classification of magnetic materials, temperature dependent magnetic transitions (Curie and Neel temperature), magnetic hysteresis loop, magneto-resistance, giant magneto-resistance (GMR), application of magnetic materials in magneto caloric effect, adiabatic demagnetization.  Superconductivity: Introduction, critical temperature, properties of superconductors-zero electrical resistance, persistent current, Meissner effect, critical magnetic field, BCS theory, type I and II superconductors, low T<sub>c</sub> and high T<sub>c</sub> superconductors, Josephson effect, DC-SQUID-construction, working and applications, applications - superconducting magnets, maglev trains</p>	8
6	<p><b>Introduction to Nanoscience</b>  Introduction, surface to volume ratio, quantum confinement, properties of nanomaterials-optical, electrical, mechanical, magnetic; methods of preparation of nanomaterials- bottom-up and top-down approaches, physical methods- high energy ball milling, physical vapor deposition; chemical method - colloidal route for synthesis of gold nanoparticle , aerogels-properties and applications, applications of nanomaterials in medical, energy, automobile, space, defense; introduction to quantum computing.</p>	8
<b>Total</b>		<b>45</b>
<p><b>Text Books:</b>  1) A textbook of Engineering Physics-Dr. M.N. Avadhanulu, Dr. P.G. Kshirsagar- Revised edition 2015, S. Chand &amp; Company Pvt. Ltd.  2) Engineering Physics-R.K. Gaur, S. L Gupta, -Eighth revised edition 2012, Dhanpatrai Publications (P) Ltd.  3) Nanotechnology -Principles &amp; Practices - Sulabha K. Kulkarni -Third edition -Capital Publishing Company.</p> <p><b>Reference Books:</b>  1) Lasers &amp; nonlinear Optics-B. B. Laud-Third edition, New Age International (P)Ltd. Publishers.  2) Fundamentals of Optics- Francis A. Jenkins, Harvey E. White, Fourth edition, McGraw Hill Education (India) Pvt. Ltd.  3) Fundamentals of Physics- Resnick &amp; Halliday (John Wiley &amp; sons)  4) An introduction to Laser's theory and applications – Dr. M. N. Avdhanulu, Dr. P.S. Hemne– Revised edition 2017-S. Chand &amp; Company Pvt. Ltd.  5) Introduction to Quantum Mechanics. - David J. Griffiths, Darrell F. Schroeter, Third edition, Cambridge University Press.  6) Introduction to solid states Physics - Charles Kittel, Eighth Edition, Wiley India Pvt Ltd.  7) Nano: The Essentials -T. Pradeen. First edition 2007. McGraw Hill Education</p>		

<b>Program: B. Tech. (Information Technology)</b>				<b>Semester: II</b>			
<b>Course: Engineering Physics Laboratory</b>				<b>Code: BSH22A03</b>			
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>TW</b>	<b>Oral</b>	<b>Practical</b>	<b>Total</b>
-	2	-	1	50	-	-	50
<b>Prior Knowledge:</b>							
1) Wave theory of light 2) Elasticity 3) Atom, molecule & nuclei 4) Current, electricity & magnetism 5) Electromagnetic Induction							
<b>Course Objectives:</b> This course aims at enabling students,							
1) To provide better understanding of concepts, principles of Physics by giving hands on experience 2) To develop an insight in scientific experimental methodologies							
<b>Course Outcomes:</b> After learning the course, the students will be able to:							
1) Develop an ability to handle measuring instruments and understand uncertainty and errors involved in various measurements 2) Apply the knowledge of Physics to learn various experimental methodologies - by performing experiments related to optics, sound, semiconductors, magnetism & Laser							
<b>Unit</b>	<b>Description (Any 10 experiments from following list)</b>						
1	To determine the radius of curvature of Plano-convex lens using Newton's rings.						
2	To determine unknown wavelength by using plane diffraction grating.						
3	To verify Malus Law of polarization of light.						
4	To determine refractive indices and identification of types of crystal using double refraction.						
5	To determine the number of lines on grating surface using Laser.						
6	To study IV characteristics of solar cell and determine fill factor.						
7	To determine band gap of given semiconductor.						
8	To determine Hall coefficient and charge carrier density.						
9	To determine Magnetic susceptibility of given material by Quinke's Tube Experiment.						
10	To determine compressibility of given liquid using Ultrasonic Interferometer.						
11	To Determine specific rotation of a solution with Laurent's Half Shade Polari meter						
12	To Determine electrical resistivity of given semiconductor using four probe method						
<b>Text Books:</b>							
1) A textbook of Engineering Physics-Dr. M.N. Avadhanulu, Dr. P.G. Kshirsagar- Revised edition 2015, S. Chand & Company Pvt. Ltd. 2) Engineering Physics-R.K. Gaur, S. L Gupta, -Eighth revised edition 2012, Dhanpatrai Publications (P) Ltd.							
<b>Reference Books:</b>							
1) Lasers & nonlinear Optics-B. B. Laud-Third edition, New Age International (P) Ltd. Publishers. 2) Fundamentals of Optics- Francis A. Jenkins, Harvey E. White, Fourth edition, McGraw Hill Education (India) Pvt. Ltd. 3) Fundamentals of Physics- Resnick & Halliday (John Wiley & sons) 4) An introduction to Laser's theory and applications – Dr. M. N. Avadhanulu, Dr. P.S. Hemne– Revised edition 2017-S. Chand & Company Pvt. Ltd. 5) Introduction to solid states Physics - Charles Kittel, Eighth Edition, Wiley India Pvt Ltd.							

<b>Program: B. Tech. (Information Technology)</b>						<b>Semester: II</b>	
<b>Course: Principles of Programming Languages</b>						<b>Code: BIT22B01</b>	
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>IE</b>	<b>MTE</b>	<b>ETE</b>	<b>Total</b>
<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>20</b>	<b>30</b>	<b>50</b>	<b>100</b>
<b>Prior Knowledge:</b> Fundamentals of programming language is essential							
<b>Course Objectives:</b> This course aims at enabling students, 1. To learn basic principles of programming languages and programming paradigms 2. To learn structuring the data and manipulation of data, computation and program structure 3. To learn basic concepts of logical and functional programming language							
<b>Course Outcomes:</b> After learning the course, the students will be able to: 1. Make use of basic principles of programming languages 2. Able to understand Data representation and Computations 3. Able to structure and compute data using control structures 4. Able to develop a simple program using basic concepts of Functional and Logical programming paradigm 5. Able to implement Functions for developing programs 6. Able to develop programs using Object Oriented Programming language							
<b>Unit</b>	<b>Description</b>						<b>Duration (Hrs.)</b>
1	<b>FUNDAMENTALS OF PROGRAMMING</b> Importance of Studying Programming Languages, History of Programming Languages, Impact of Programming Paradigms, Role of Programming Languages, Programming Environments. Programming paradigms- Introduction to programming paradigms, Introduction to four main Programming paradigms- procedural, object oriented, functional, and logic & rule based.						8
2	<b>DATA, DATA TYPES, AND BASIC STATEMENTS</b> Names ,Variables Binding, Type Checking, Scope, Scope Rules, Lifetime And Garbage Collection, Primitive Data Types, Strings, Array Types, Structure And Union Types, Pointers And References , Arithmetic Expressions, Type Conversions, Assignment Statements						8
3	<b>STRUCTURING THE DATA, COMPUTATIONS AND PROGRAM</b> Selection Statements, Iterative Statements, Unconditional Branching. Subprograms: Fundamentals of Sub Programs, Design Issues for Subprograms, Local referencing Environments						6
4	<b>FUNCTIONS AND IMPLEMENTATIONS</b> Local Referencing, Parameter Passing, Overloaded Methods, Semantics Of Call And Return –Implementing, Stack And Dynamic Local Variables, Nested Functions, Blocks, Dynamic Scoping						8
5	<b>LOGICAL AND FUNCTIONAL PROGRAMMING</b> Functional Programming Paradigm:, Basic LISP definitions, predicates, conditionals and scoping, Recursion and iteration, Properties List array and access functions, Logic Programming Paradigm: An Overview of Prolog, Syntax and Meaning of Prolog Programs, Lists, Operators, Arithmetic, Using Structures: Example Programs						7

6	<b>OBJECT ORIENTED PROGRAMMING LANGUAGE OVERVIEW</b> Fundamentals of java, declaration statements , classes and methods: class fundamentals, declaring objects, assigning object reference variables, adding methods to a class, returning a value, constructors, this keyword, garbage collection, finalize() method, overloading Methods, argument passing	8
<b>Total</b>		<b>45</b>
<b>Text Books:</b>		
1. T. W. Pratt, M. V. Zelkowitz, "Programming Languages Design and Implementation", 4th Ed, PHI, ISBN 81-203-2035-2.		
2. 2. Sebesta R., "Concepts of Programming Languages", 4th Edition, Pearson Education, ISBN81-7808-161-X		
<b>Reference Books:</b>		
1. Carlo Ghezzi, Mehdi Jazayeri, —Programming Language Concepts,3rd Ed, Wiley Publication ISBN : 978-81-265-1861-6.		
2. Herbert Schildt, "The Complete Reference Java", 9th Ed, TMH,ISBN: 978-0-07-180856-9		
3. Carl Townsend ,”Programming in turbo PROLOG”, Tata-McGraw Hill		
<b>E Sources</b>		
<a href="https://archive.nptel.ac.in/courses/106/102/106102067/">https://archive.nptel.ac.in/courses/106/102/106102067/</a>		





<b>Program: B. Tech. (Information Technology)</b>						<b>Semester: II</b>	
<b>Course: Programming Laboratory</b>						<b>Code: BIT22B02</b>	
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>TW</b>	<b>Practical</b>	<b>Oral</b>	<b>Total</b>
-	4	-	2	50	50	-	100
<b>Prior Knowledge:</b> Computer fundamentals and Problem Solving skills is essential							
<b>Course Objectives:</b> This course aims at enabling students, 1. To write a neat code by selecting appropriate programming constructs. 2. To impart the concepts like functions, pointers, user defined data types, class and object.							
<b>Course Outcomes:</b> After learning the course, the students will be able to: 1. Implement conditional statements, loop, Array and pointer to solve various problem statements. 2. Build a modularized program using functions. 3. Demonstrate the user defined data type structures and unions. 4. Make use of OOPS concepts to write a simple program.							
<b>Sr. No.</b>	<b>Suggested List of assignments</b>						
1	Write a program to calculate the salary of an employee given his basic pay (take input from user). Calculate gross salary of employee. Let HRA be 10% of basic pay and TA be 5% of basic pay. Let an employee pay professional tax as 2% of total salary. Calculate net salary payable after deduction						
2	Write a program to accept marks of five courses and if student is pass then find the grade obtained by student. If student scores aggregate greater than 75%, then the grade is distinction. If aggregate is 60>and <75 then the grade is first division. If aggregate is >=50 and <60 then the grade is second division. If aggregate is >=40 and <50 then the grade is third division.						
3	Write a program to check whether given number is Prime or not. Take a number as input from user.						
4	Write a program to accept n number of element from user (where, n is specified by user) and stores data in an array and display the largest element of that array using loops.						
5	Write a C program to store N numbers in an array and compute the sum of all even and odd numbers in an array.						
6	Write a program generate Fibonacci series with and without using recursive function.						
7	Write a program to swap values of two elements. Use function and pass argument using call by Value and call by reference.						
8	Write a program that uses functions to perform the following operations: a) Reading a complex Number b) Writing a complex number c) Addition of two complex numbers d) Multiplication of two complex numbers.						
9	A class teacher wants to keep record of 10 students in the class along with the names and marks obtained in 5 subjects. Write a C program with structure that displays : a) Overall percentage result of the class b) Total number of passing students in the class, c) Total number of students failing in one subject d) Total number of distinctions in the class.						

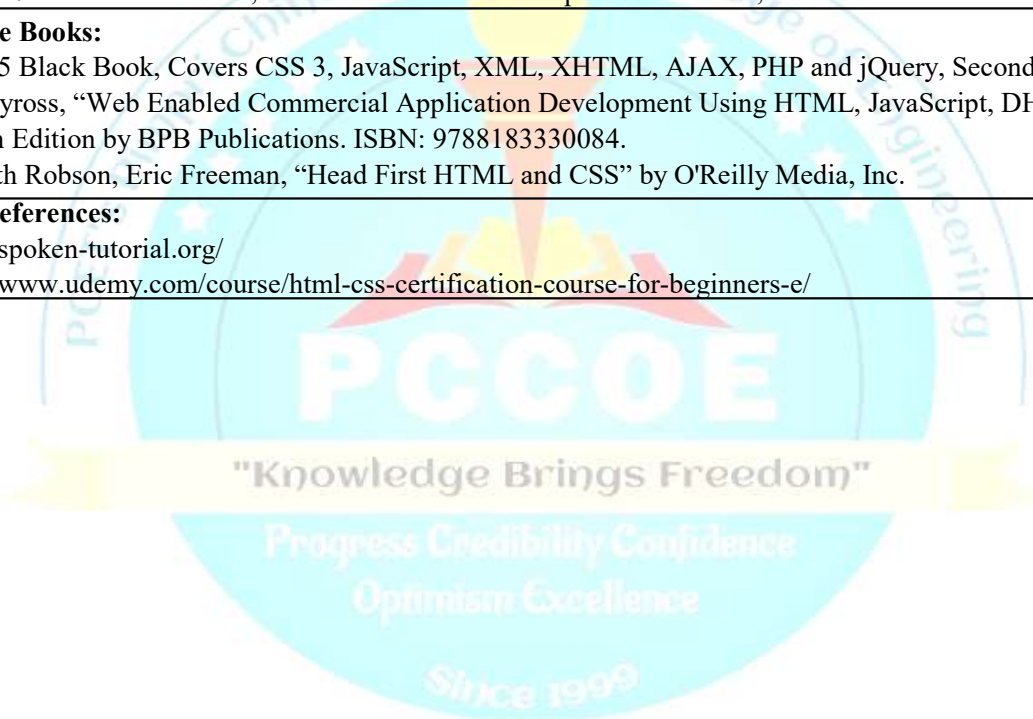


10	<p>Write a program to define a structure for customer bank account that holds information like account number, name of account holder, balance, internet banking facility availed (Yes or No), pin code (422001 to 422013), account type (saving, recurring, deposit):</p> <p>a) Read account details for N customers.</p> <p>b) Identify the golden, silver and general customers.</p> <p>c) Golden customers: Balance &gt; 10, 00,000. Silver Customers: Balance &gt; 5, 00, 000 and &lt; 10, 00, 000. General customers: Balance &lt;5, 00, 000.</p> <p>d) Display the list of customers availing the internet banking facility.</p> <p>e) Display the customers belonging to a particular geographical location depending on postal code.</p>
11	Write a program to represent sets using pointers to one dimensional arrays and implement functions to perform i) Union ii) Intersection
12	Write a program in C to Create a File, Read from it, And Close the File.(Using sequential file handling Concepts).
13	<p>Write a Java program using a class and write constructor to initialize two numbers. Include member functions to perform the following tasks:</p> <ol style="list-style-type: none"> <li>1. To display two numbers.</li> <li>2. To add two numbers.</li> <li>3. Subtract one number from other.</li> </ol>
14	Write a program in C to implement type/copy command using command line arguments.
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. E.Balagurusamy, “Programming in ANSIC”, 8th Edition, McGrawHill, 2019.</li> <li>2. Yashavant Kanetkar, “Let Us C”, 16th edition, BPB publications, 2018</li> <li>3. Herbert Schildt, “C: The Complete Reference”, 4th Edition, McGrawHill, 2000</li> </ol>	
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Maureen Sprankle, “Problem Solving and Programming Concepts”, 7th Edition, Prentice Hall, 1989.</li> <li>2. R.G.Dromey, “How to Solve it by Computer”, 1st Edition, Prentice-Hall International, 1982.</li> <li>3. Brian W Kernighan, Dennis M Ritchie, “C Pro</li> </ol>	

<b>Program: B. Tech. (Information Technology)</b>						<b>Semester: II</b>	
<b>Course: Data Communication</b>						<b>Code: BIT22C01</b>	
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>IE</b>	<b>MTE</b>	<b>ETE</b>	<b>Total</b>
2	-	-	1	20	-	30	50
<b>Prior Knowledge:</b> -Computer Fundamentals is essential.							
<b>Course Objectives:</b> This course aims at enabling students, 1.To understand the data communication and telecommunications. 2. To learn fundamentals of communication media. 3. To understand data transmission modes.							
<b>Course Outcomes:</b> After learning the course, the students will be able to: 1. Interpret the basics of data communication. 2. Discuss analog and digital signals. 3. Illustrate the data transmission modes. 4. Explain transmission media.							
<b>Unit</b>	<b>Description</b>						<b>Duration (Hrs.)</b>
1	<b>Fundamentals of Data communication</b> Definition, components in data communication- message, sender, receiver, communication channels, set of rules (protocol), data representation, data flow.						8
2	<b>Data and Signals</b> Analog and digital data, analog and digital signals, periodic signals, non-periodic signals, bandwidth of a signal, amplitude, period, frequency and phase, digital signals- bit rate, bit length						8
3	<b>Data Transmission</b> Modulation techniques- digital to digital conversion, analog to digital conversion, modes of data transmission- parallel and serial communication; synchronous communication, asynchronous communication, simplex, half duplex and full duplex communication, multiplexing and demultiplexing.						7
4	<b>Transmission Media</b> Guided Media - twisted pair cable, coaxial cable, fiber optic cable; unguided media- wireless, switching - circuit-switched networks, packet switching, structure of a switch.						7
						<b>Total</b>	<b>30</b>
<b>Text Books:</b> 1. Atul Kahate, Achyut Godbole, "Data Communications and Networks", Tata McGraw Hill Education Pvt. Ltd. 2. Behrouz A Forouzan , "Data Communications and Networking", 5th Ed, McGraw – Hill Education India Edition 2013, ISBN-13: 9781259064753.							
<b>Reference Books:</b> 1. S. Tanenbaum , "Computer, Networks", PHI Publication, 4th edition, ISBN: 8178087855.							
<b>Online References:</b> 1. <a href="https://nptel.ac.in/courses/1061050">https://nptel.ac.in/courses/1061050</a> 2. <a href="https://www.udemy.com/course/learning-computer-communication-and-networking-fundamentals/">https://www.udemy.com/course/learning-computer-communication-and-networking-fundamentals/</a>							

<b>Program: B. Tech. (Information Technology)</b>				<b>Semester: II</b>			
<b>Course: Web Development Laboratory</b>				<b>Code: BIT22G01</b>			
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>TW</b>	<b>Practical</b>	<b>Oral</b>	<b>Total</b>
-	4	-	2	100	-	-	100
<b>Prior Knowledge:</b> Computer Fundamentals, Internet Fundamentals.							
<b>Course Objectives:</b> This course aims at enabling students, 1. To design effective user interfaces. 2. To create interactive websites.							
<b>Course Outcomes:</b> After learning the course, the students will be able to: 1. Explore web programming using HTML, CSS and JavaScript. 2. Build effective User Interface 3. Design Web site using HTML, CSS and JavaScript.							
<b>Sr. No.</b>	<b>List of Experiments</b>						
<b>Group A</b>							
1	Create a simple webpage using HTML5 Semantic and Structural Elements.						
2	Create a webpage using HTML5 Media Elements. (minimum five elements)						
3	Design a webpage for implementing – a. Ordered list within unordered list. b. Unordered list within ordered list. c. Ordered list within ordered list (implement different list numbering style). d. Unordered list within unordered list (Implement different bullet styles). Write an HTML script that displays definitions of minimum 10 terms related to a context. Use definition lists for the same.						
4	Adding Hyperlinks and Images: a. Create a webpage containing two images and add a hyperlink to another webpage. 1. Apply width and height property to one image. 2. Align one image to center and the other one to left. 3. Assign the second image as hyperlink to another webpage. b. Create a webpage containing an image and short paragraph. Apply following- 1. Create the map of image with sections of image linking to different webpage's in the same HTML where it is to be applied. 2. Apply this map on the image.						
5	Write an HTML page that contains a selection box with a list of 5 Companies, when the user selects a Company, its capital should be printed next to the list; Add CSS to customize the properties of the font of the capital (color, bold and font size).						
6	Create IT Department ITSA Registration Form in HTML using textbox, text area, radio button and drop down menu, check box, submit, file and reset button etc. Field should contain name, address, birth- date, qualification, email, phone number, gender, comments, attach photo etc. Use HTML Form elements wherever required. Align all elements using table.						

7	<p>Design the following static web pages required for an online book store web site.</p> <p>1) HOME PAGE: The static home page must contain three frames.</p> <p>2) LOGIN PAGE</p> <p>3) CATALOGUE PAGE: The catalogue page should contain the details of all the books available in the web site in a table.</p> <p>4) REGISTRATION PAGE</p>
8	<p>Write a java script program to test the first character of a string is uppercase or not.</p> <p>Write a java script for loop that will iterate from 0 to 15 for each iteration, it will check if the current number is odd or even, and display a message to the screen.</p> <p>To design the scientific calculator and make event for each button using java script.</p>
<b>Group B (Mini Project)</b>	
9	Create a website using knowledge of HTML, CSS and validate using JavaScript.
<b>Text Book:</b> Thomas A. Powell , “HTML & CSS: The Complete Reference”, Fifth Edition.	
<b>Reference Books:</b>	
1.HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, Second Edition.	
2.Ivan Bayross, “Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP”, 4th Edition by BPB Publications. ISBN: 9788183330084.	
3.Elisabeth Robson, Eric Freeman, “Head First HTML and CSS” by O'Reilly Media, Inc.	
<b>Online References:</b>	
1. <a href="https://spoken-tutorial.org/">https://spoken-tutorial.org/</a>	
2. <a href="https://www.udemy.com/course/html-css-certification-course-for-beginners-e/">https://www.udemy.com/course/html-css-certification-course-for-beginners-e/</a>	



<b>Program: B. Tech. (Information Technology)</b>				<b>Semester: II</b>			
<b>Course: Life Skills 2</b>				<b>Code: BSH22K01</b>			
<b>Teaching Scheme</b>				<b>Evaluation Scheme</b>			
<b>Lecture</b>	<b>Practical</b>	<b>Tutorial</b>	<b>Credit</b>	<b>TW</b>	<b>Practical</b>	<b>Oral</b>	<b>Total</b>
-	4	-	2	100	-	-	100
<b>Prior Knowledge: -Nil</b>							
<p><b>Course Objectives:</b> This course aims at enabling students,</p> <ol style="list-style-type: none"> <li>1) To equip them with essential skills and knowledge that complement their academic education, preparing them to excel not only as engineers but also as well-balanced individuals</li> <li>2) To develop students' vital life skills that promotes personal growth, resilience, and success in their academic journey and beyond</li> </ol>							
<p><b>Course Outcomes:</b> After learning the course, the students will be able to:</p> <ol style="list-style-type: none"> <li>1) Understand the ways to nurture their passion.</li> <li>2) Develop skills growth mindset to be successful in personal and professional life.</li> <li>3) Demonstrate adaptability and flexibility for any environment.</li> <li>4) Apply essential skills for successful and happy life management.</li> </ol>							
<b>Unit</b>	<b>Description</b>						<b>Duration (Hrs.)</b>
1	<p><b>Nurture Your Passion</b></p> <ul style="list-style-type: none"> <li>(i) Developing Hobbies- Importance, Ways and Benefits</li> <li>(ii) Exploring Skills - Singing/Painting/Dancing etc</li> <li>(iii) Sports: Basketball, Table tennis, Football and Volleyball</li> <li>(iv) Performing Arts: Painting/ Sketching/ Drawing</li> <li>(v) Stage performance</li> <li>(vi) Let's Play to Learn - games and play forms possible, like, Puzzles &amp; Brainteasers, quiz.</li> </ul>						15
2	<p><b>Lead Yourself - Growth Mindset</b></p> <ul style="list-style-type: none"> <li>(i) Understanding the concept for personal development.</li> <li>(ii) Embracing change: Coping with the dynamic nature of life</li> <li>(iii) Resilience and perseverance: Overcoming obstacles and setbacks</li> <li>(iv) Developing self-leadership skills and taking initiative/ responsibilities.</li> </ul>						15
3	<p><b>Adaptability and Flexibility</b></p> <ul style="list-style-type: none"> <li>(i) Adaptability in a rapidly changing world</li> <li>(ii) Problem-solving and decision-making in dynamic situations. Approaching Problem Differently</li> <li>(iii) Embracing uncertainty: Coping with ambiguity and making the most of new opportunities</li> <li>(iv) Flexibility in teamwork: Navigating diverse team dynamics effectively.</li> </ul>						15
4	<p><b>Life Management</b></p> <ul style="list-style-type: none"> <li>(i) Financial Literacy-Saving is earning, Value of money</li> <li>(ii) Coping up with Virtual Life and Reality</li> <li>(iii) Understanding the responsibilities and impact of Global Citizenship</li> <li>(iv) Environmental awareness and sustainable practices</li> <li>(v) Social responsibility: Contributing positively to the community.</li> </ul>						15
<b>Total</b>							<b>60</b>



**Reference Books**

- 1) "Mindset: The New Psychology of Success" by Carol S. Dweck Publisher: Ballantine Books
- 2) "The Financial Diet: A Total Beginner's Guide to Getting Good with Money" by Chelsea Fagan and Lauren VerHage
- 3) "Grit: The Power of Passion and Perseverance" by Angela Duckworth Publisher: Scribner, 2018

**Weblinks**

- 1) SkillsYouNeed ([www.skillsyouneed.com](http://www.skillsyouneed.com)): This website offers comprehensive information and practical guidance on a wide range of life skills, including communication, time management, problem-solving, and more
- 2) MindTools ([www.mindtools.com](http://www.mindtools.com)): MindTools provides resources on personal effectiveness, leadership, communication skills, and other essential life skills to enhance professional and personal development
- 3) TED Talks ([www.ted.com](http://www.ted.com)): TED Talks offer inspiring and informative speeches by experts and thought leaders covering various life skills topics, including resilience, emotional intelligence, and personal growth
- 4) Verywell Mind ([www.verywellmind.com](http://www.verywellmind.com)): This website covers mental health, emotional well-being, and self-improvement topics that contribute to overall life skills development

