Bharati Vidyapeeth

(Deemed to be University)

Pune, India

College of Engineering, Pune

B. Tech (Information Technology)

(2023 CBCS COURSE)

Program Curriculum

As Per NEP Guidelines

VISION OF THE UNIVERSITY

Social Transformation through Dynamic Education

MISSION OF THE UNIVERSITY

- To make available quality education in different areas of knowledge to the students as per their choice and inclination
- To offer education to the students in a conducive ambience created by enriched infrastructure! and academic facilities in its campuses.
- To bring education within the reach of rural, tribal and girl students by providing them substantive fee concessions and subsidized hostel and mess facilities
- To make available quality education to the students of rural, tribal and other deprived sections of the population

VISION OF THE INSTITUTE

To be World Class Institute for Social Transformation Through Dynamic Education.

MISSION OF THE INSTITUTE

- To provide quality technical education with advanced equipment, qualified faculty members, infrastructure to meet needs of profession and society.
- To provide an environment conducive to innovation, creativity, research and entrepreneurial leadership.
- To practice and promote professional ethics, transparency and accountability for social community, economic and environmental conditions.

VISION OF THE DEPARTMENT

To be a leading Programme, transforming students into skilled IT professionals.

MISSION OF THE DEPARTMENT

• Amplify the student's technical skills by conducting continuing education programs, organizing and participating in various technical events.

• Provide comprehensive support in synchronization with industry to achieve professional and technological excellence.

• Provide an environment for effective social and ethical skills.

PROGRAM EDUCATIONAL OBJECTIVES

PEO1: Cultivate IT graduates for industry, pertaining to Information Technology solutions.

PEO2: Practice technical competency and teamwork abilities.

PEO3: Exhibit social responsibilities by following ethical practices in graduate's professional pursuits.

PROGRAM OUTCOMES

1. Apply knowledge of Mathematics and Computer Science to analyse computer-based information systems.

2. Apply logical and programming skills to identify, formulate and analyse for solving computational problems.

3. Examine complex problems by a diagnosis of available information to provide an appropriate conclusion.

4. Design applications with suitable consideration of societal needs.

5. Use functional skills of modern IT tools and techniques for modelling and implementation.

6. Play the role of a team player to accomplish a common goal.

7. Convey technological concepts through significant documentation and presentation skills.

8. Demonstrate professional conduct by following norms of the Engineering practice.

9. Apply Software Engineering methodologies for sustainable development.

10. Follow ethical and legal practices related to the functioning of the IT industry.

11. Apply management skills and techniques for creating time-bound and cost-effective projects.

12. Exhibit lifelong learning by upgrading to state-of-the-art IT practices and technology.

PROGRAM SPECIFIC OUTCOMES

At the end of the program, Graduates will be able to

PSO 1: Use knowledge of core and allied courses for developing a computer-based system to deliver a quality product for real-world problems of society.

PSO 2: Apply modern IT tools and techniques for perusing student's professional career by practicing effective communication with team members.

PSO 3: Develop time-bound, cost-effective, and sustainable solutions by following professional ethics.

CORELATION BETWEEN GRADUATE ATTRIBUTES AND PROGRAMME OUTCOMES

Graduate Attributes/ Programme Outcomes	a	b	c	d	e	f	g	h	i	j	k	l
Engineering Knowledge	✓											
Problem Analysis		✓										
Design/Development of Solutions			✓									
Conduct Investigations of Complex Problems				✓								
Modern Tool Usage					✓							
The Engineer and Society						✓						
Environment and Sustainability							✓					
Ethics								✓				
Individual and Teamwork									✓			
Communication										✓		
Project Management and Finance											✓	
Life-Long Learning												✓

A. DEFINITION OF CREDITS:

1 Hour Lecture (L) per week	1 credit
1 Hour Tutorial (T) per week	1 credit
1 Hour Practical (P) per week	0.5 credits
2 Hours Practical (Lab) per week	1 credit

B. Overall Structure of Undergraduate Engineering Programme

Sr. No.	Category	Breakup of Credits
1	Basic Science Courses	16
2	Engineering Science Course	21
2	Program Core Courses and Lab	105
4	Professional Elective Courses	12
5	Project	12
6	Internship	04
7	Skill based Courses	12
**8	Value based Courses	02 (Optional Credit)
9	Humanity/Social	03
10	Massive Open Online Courses (MOOC)	04 (Add on)
TOTAL		185

**** Indicates optional credits**

C. Course Code and Definition

Course Code	Definitions
L	Lecture
T	Tutorial
P	Practical
TW	Term Work
O	Oral
SEE	Semester End Examination
ESC	Engineering Science Courses
BSC	Basic Science Courses
PCC	Program Core Courses
PEC	Professional Elective courses
VAC	Value added Courses
SBC	Skill Based Courses
HSMC	Humanities/Social and management Courses
PROJ	Project
MAC	Mandatory Credit Course
INTERNSHIP	Internship

D. Semester wise Credits

Sr. No.	Semester	Credits
1	I	25
2	II	25
3	III	23
4	IV	22
5	V	23
6	VI	22
7	VII	23
8	VIII	22

E. Minor Degree: Total Credit: 20

Sr. No.	Semester	Minor-1 (Business Analytics)	Minor-2 (Software Engineering and Testing)	Minor-3 (Cyber Forensics)	Minor-4 (Cloud Computing)	Credit
01	**III**	Computational Statistics	Software Project Management	Data Privacy	Distributed Computing	**5**
02	**IV**	Machine Learning	Object Oriented Modelling and Design	Web Security	Cloud Systems and Infrastructure	**5**
03	**V**	Deep Learning	Software Testing and Quality Assurance	Ethical Hacking	Cloud Services	**5**
04	**VI**	Business Intelligence	Software Testing Practices	Cyber Defense	Development and Operations	**5**

BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY)
COLLEGE OF ENGINEERING, PUNE
B. Tech. (Information Technology): Semester –I (2023 CBCS COURSE)

Sr. No	Category	Subject Code	Subject	Teaching Scheme			Examination Scheme-Marks						Credits			
				L	P	T	ESE	Internal Assessment	TW	PR	OR	Total	Th	Pr/Or	Tut	Total
1.	BSC		Engineering Mathematics- I	3	-	1	60	40	-	-	-	100	3	-	1	4
2.	BSC		Engineering Chemistry	3	2	-	60	40	50	-	-	150	3	1	-	4
3.	ESC		Digital Electronics	4	2	-	60	40	50	-	-	150	4	1	-	5
4.	ESC		Structured Programming	4	-	-	60	40	-	-	-	100	4	-	-	4
5.	PCC		Web Technologies	4	2	-	60	40	25	-		125	4	1	-	5
6.	HSMC		Communication Skills	-	2	-	-	-	50	-	-	50	-	1	-	1
7.	SBC		Information Technology Laboratory-I	-	2	-	-	-	25	-	25	50	-	1	-	1
8.	ESC		Computer Workshop Technology	-	2	-	-	-	25	-	-	25	-	1	-	1
			Total	**18**	**12**	**1**	**300**	**200**	**225**	**0**	**25**	**750**	**18**	**6**	**1**	**25**

BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY)
COLLEGE OF ENGINEERING, PUNE
B. Tech. (Information Technology): Semester –II (2023 CBCS COURSE)

Sr. No	Category	Subject Code	Subject	Teaching Scheme			Examination Scheme-Marks						Credits			
				L	P	T	ESE	Internal Assessment	TW	PR	OR	Total	Th	Pr/Or	Tut	Total
1.	BSC		Engineering Mathematics- II	3	-	1	60	40	-	-	-	100	3	-	1	4
2.	BSC		Engineering Physics	3	2	-	60	40	50	-	-	150	3	1	-	4
3.	ESC		Content Management System	4	2	-	60	40	50	-	-	150	4	1	-	5
4.	ESC		Computer Communication and Networks	4	2	-	60	40	25	-	-	125	4	1	-	5
5.	PCC		Object Oriented Programming	4	-	-	60	40	-	-	-	100	4	-	-	4
6.	HSMC		Universal Human Values	-	2	-	-	-	50	-	-	50	-	1	-	1
7.	SBC		Information Technology Laboratory-II	-	2	-	-	-	25	-	25	50	-	1	-	1
8.	ESC		Computer Aided Drawing & Design	-	2	-	-	-	25	-	-	25	-	1	-	1
			Total	**18**	**12**	1	**300**	**200**	**225**	**0**	**25**	**750**	**18**	**6**	**1**	**25**

BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY)
COLLEGE OF ENGINEERING, PUNE
B. Tech. (Information Technology): Semester –III (2023 CBCS COURSE)

Sr. No	Category	Subject Code	Subject	Teaching Scheme			Examination Scheme-Marks						Credits			
				L	P	T	ESE	Internal Assessment	TW	PR	OR	Total	Th	Pr/ Or	Tut	Total
1.	PCC		Discrete Structure and Graph Theory	4		-	60	40	-	-	-	100	4	-	-	4
2.	PCC		Database Management Systems	3	2	-	60	40	25	25	-	150	3	1	-	4
3.	PCC		Operating System	3	2	-	60	40	25	-	25	150	3	1	-	4
4.	PCC		Microprocessors and Microcontrollers	3	2	-	60	40	25	-	25	150	3	1	-	4
5.	PCC		Data Structures	4	2	-	60	40	25	25	-	150	4	1	-	5
6.	SBC		Information Technology Laboratory-III	-	2	1	-	-	25	25	-	50	-	1	1	2
			Total	**17**	**10**	**1**	**300**	**200**	**125**	**75**	**50**	**750**	**17**	**5**	**1**	**23**
7.	*MOOC/ Swayam NPTEL		MOOC-I	-	-	-	-	-	-	-	-	-	-	-	-	2
8.	**VAC		VAC- I	-	**2**	-	-	-	-	-	-	-	-	1	-	1

*** Indicate this is mandatory but the credits will not be considered in SGPA/CGPA. (As and when the students complete the course and submit the certificate, it should be reflected in the marksheet. The student should clear the subject up to 7th Sem of his/her coursework.)**

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BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY)
COLLEGE OF ENGINEERING, PUNE
B. Tech. (Information Technology): Semester –IV (2023 CBCS COURSE)

Sr. No	Category	Subject Code	Subject	Teaching Scheme			Examination Scheme-Marks						Credits			
				L	P	T	ESE	Internal Assessment	TW	PR	OR	Total	Th	Pr/Or	Tut	Total
1.	PCC		Formal Languages and Automata Theory	3	-	-	60	40	-	-	-	100	3	-	-	3
2.	PCC		Software Engineering	3	2	-	60	40	25	-	25	150	3	1	-	4
3.	PCC		Advanced Database Management Systems	4	2	-	60	40	25	-	25	150	4	1	-	5
4.	PCC		Computer Organization and Architecture	3	2	-	60	40	25	-	25	150	3	1	-	4
5.	PCC		Applied Algorithm	3	2	-	60	40	25	25	-	150	3	1	-	4
6.	SBC		Information Technology Laboratory-IV	-	2	1	-	-	25	25	-	50	-	1	1	2
			Total	**16**	**10**	**1**	**300**	**200**	**125**	**50**	**75**	**750**	**16**	**5**	**1**	**22**
7.	*MOOC/Swayam NPTEL		MOOC-II	-	-	-	-	-	-	-	-	-	-	-	-	**2**

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**** Indicate this is mandatory but the credits will not be considered in SGPA/CGPA**

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COLLEGE OF ENGINEERING, PUNE
B. Tech. (Information Technology): Semester –V (2023 CBCS COURSE)

Sr. No.	Category	Subject Code	Subject	Teaching Scheme			Examination Scheme-Marks						Credits			
				L	P	T	ESE	Internal Assessment	TW	PR	OR	Total	Th	Pr/Or	Tut	Total
1.	PCC		Mobile Application Development	3	2	-	60	40	25	25	-	150	3	1	-	4
2.	PCC		Artificial Intelligence and Machine Learning	4	2	-	60	40	25	25	-	150	4	1	-	5
3.	PCC		Data Ware Housing and Data Mining	4	2	-	60	40	25	-	25	150	4	1	-	5
4.	PCC		Distributed Systems	3	2	-	60	40	25	-	25	150	3	1	-	4
5.	PCC		Agile Methodology	3	-	-	60	40	-	-	-	100	3	-	-	3
6.	SBC		Information Technology Laboratory-V	-	2	1	-	-	25	25	-	50	-	1	1	2
			Total	**17**	**10**	**1**	**300**	**200**	**125**	**75**	**50**	**750**	**17**	**5**	**1**	**23**
7.	** MAC		Environmental Studies	-	-	-	-	-	-	-	-	-	-	-	-	-

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BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY)
COLLEGE OF ENGINEERING, PUNE
B. Tech. (Information Technology): Semester –VI (2023 CBCS COURSE)

Sr. No	Category	Subject Code	Subject	Teaching Scheme			Examination Scheme-Marks						Credits			
				L	P	T	ESE	Internal Assessment	TW	PR	OR	Total	Th	Pr/ Or	Tut	Total
1.	PCC		Cloud Computing	3	-	-	60	40	-	-	-	100	3	-	-	3
2.	PCC		Deep Learning	3	2	-	60	40	25	-	25	150	3	1	-	4
3.	PCC		Software Testing	3	2	-	60	40	25	-	25	150	3	1	-	4
4.	PCC		Full Stack Web Development	3	2	-	60	40	25	25	-	150	3	1	-	4
5.	PEC		Professional Elective-I	3	2	-	60	40	25	-	-	125	3	1	-	4
6.	SBC		Information Technology Laboratory-VI	-	2	1	-	-	25	25	-	50	-	1	1	2
7.	HSMC		Professional Skills	-	2	-	-	-	25	-	-	25	-	1	-	1
			Total	**15**	**12**	**1**	**300**	**200**	**150**	**50**	**50**	**750**	**15**	**6**	**1**	**22**
8	**VAC		VAC- II	-	2	-	-	-	-	-	-	-	-	1	-	1

**** Indicate this is mandatory but the credits will not be considered in SGPA/CGPA**

Professional Elective-I

1	Network Security and Cryptography
2	Information Retrieval
3	Software Architecture

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COLLEGE OF ENGINEERING, PUNE
B. Tech. (Information Technology): Semester –VII (2023 CBCS COURSE)

Sr. No	Category	Subject Code	Subject	Teaching Scheme			Examination Scheme-Marks						Credits			
				L	P	T	ESE	Internal Assessment	TW	P R	OR	Total	Th	Pr/ Or	Tut	Total
1.	PCC		Project Planning and Management	3	2	-	60	40	25	-	25	150	3	1	-	4
2.	PCC		Data Analytics and Visualization	3	2	-	60	40	25	25	-	150	3	1	-	4
3.	PCC		Wireless and Mobile Communication	3	-	-	60	40	-	-	-	100	3	-	-	3
4.	PEC		Professional Elective-II	3	2	-	60	40	25	-	25	150	3	1	-	4
5.	PROJ		Project Stage –I	-	2	-	-	-	100	-	50	150	-	4	-	4
6.	*Internship		Internship	-	2	-	-	-	25	-	25	50	-	4	-	4
			Total	**12**	**10**	**-**	**240**	**160**	**200**	**25**	**125**	**750**	**12**	**11**	**-**	**23**

***Internship will be of 60 days. It should be done after VIth Semester Examination is over.**

Professional Elective-II

1	Natural Language Processing
2	Soft Computing
3	Web Application Security

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B. Tech. (Information Technology): Semester –VIII (2023 CBCS COURSE)

Sr. No	Category	Subject Code	Subject	Teaching Scheme			Examination Scheme-Marks						Credits			
				L	P	T	ESE	Internal Assessment	TW	PR	OR	Total	Th	Pr/Or	Tut	Total
1.	PCC		Big Data Analytics	3	2	-	60	40	25	-	25	150	3	1	-	4
2	PCC		Blockchain Technologies	3	2	-	60	40	25	-	25	150	3	1	-	4
3.	PEC		Professional Elective -III	3	2	-	60	40	25	-	25	150	3	1	-	4
4.	Project		Project Stage-II	-	4	-	-	-	150	-	100	250	-	8	-	8
5.	SBC		Information Technology Laboratory-VII	-	2	1	-	-	25	25	-	50	-	1	1	2
			Total	**9**	**12**	**1**	**180**	**120**	**250**	**25**	**175**	**750**	**9**	**12**	**1**	**22**

Professional Elective-III

1	Storage Area Network
2	Internet of Things
3	Web Services

B. Tech Information Technology
Semester I

Engineering Mathematics-I (Common for all Branches)

Teaching Scheme:	**Examination Scheme:**		**Credits Allotted**
Theory:- 03 Hours/ Week	End Semester Examination	60 Marks	Theory: 03
Tutorial :- 01 Hours/ Week	Internal Assessment	40 Marks	Tutorial: 01
	Total	100 Marks	Total 04

Course Prerequisites:- The students should have knowledge of
Algebra of matrices and its Determinants, Maxima and Minima of single variable functions.

Course Objective

On completion of the course –

1. Fundamental theorems, concepts in Matrices, Demoivr's theorem and its applications in engineering.
2. Various techniques in Calculus, Explanation of functions and Infinite series.
3. Partial differentiation, maxima, minima and its applications in engineering.

Course Outcomes:- After completion of the course students will be able to

1. Understand rank of matrix and apply it to solve system of linear equations
2. Understand the DeMoiver's theorem, hyperbolic functions and apply it in engineering problems.
3. Understand the Leibnitz's rule and apply it to find nth derivative of a function.
4. Understand fundamental concepts of convergence, divergence of infinite series and its tests.
5. Understand the concept of partial differentiation and apply it to find total derivative.
6. Evaluate the maxima and minima of any two variables functions..

Unit I: Matrices (06 Hrs)

Rank, Normal form, System of Linear Equations, Linear Dependence and Independence, Linear and Orthogonal Transformations, Eigen values, Eigen Vectors, Cayley – Hamilton Theorem.

Unit II: Complex Numbers and Applications: (06 Hrs)

Definition, Cartesian, Polar and Exponential Forms, Argand's Diagram, De'Moivre's theorem and its application to find roots of algebraic equations., Hyperbolic Functions, Logarithm of Complex Numbers, Separation into Real and Imaginary parts, Application to problems in Engineering.

Unit III: Differential Calculus: (06 Hrs)

Successive Differentiation, nth Derivatives of Standard Functions, Leibnitz's Theorem,

Expansion of Functions: Taylor's Series and Maclaurin's Series

Unit IV: Differential Calculus: **(06 Hrs)**

Indeterminate Forms, L' Hospital's Rule, Evaluation of Limits.

Infinite Series: Infinite Sequences, Infinite Series, Alternating Series, Tests for Convergence, Absolute and Conditional Convergence, Power series, Range of Convergence

Unit V: Partial Differentiation and Applications: **(06 Hrs)**

Partial Derivatives, Euler's Theorem on Homogeneous Functions, Implicit functions, Total Derivatives, Change of Independent Variables, Errors and Approximations.

Unit VI: Jacobian: **(06 Hrs)**

Jacobians and their applications, Chain Rule, Functional Dependence.

Maxima and Minima: Maxima and Minima of Functions of two variables, Lagrange's method of undetermined multipliers.

PBL: Project Base Learning (Topics)

1	Echelon form
2	Normal form
3	Linear and orthogonal transformation
4	Eigen values and eigen vectors
5	Argand diagram
6	De Movre's theorem
7	Hyperbolic and logarithmic functions
8	Leibnitz theorem
9	Taylor's theorem
10	L'Hospital rule
11	Tests for convergence
12	Euler theorem for homogeneous functions
13	Total derivative
14	Maxima and minima for two variable function
15	Langrage undetermined multipliers

Textbooks

1. Applied Mathematics (Volumes I and II) by P. N. Wartikar & J. N. Wartikar (Pune Vidyarthi Griha Prakashan, Pune),7th Edition, 1988, Reprint 2010.

Reference Books

1. Higher Engineering Mathematics by B.S. Grewal (Khanna Publication, Delhi), 42th Edition, 2012.
2. Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill), Edition, 2008
3. Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.), 8th Edition, 1999, Reprint 2010
4. Advanced Engineering Mathematics, 7e, by Peter V.O'Neil (Thomson Learning), Edition 2007

5. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education), 2nd, Edition, 2002

Unit Test –

Unit Test - I	**Unit I, II, III**
Unit Test - II	**Unit IV, V, VI**

Engineering Chemistry (Common for all Branches)

Teaching Scheme:	Examination Scheme:		Credits Allotted
Theory:-03 Hours/ Week	End Semester Examination	60 Marks	Theory: 03
Practical:-02Hours/week	Internal Assessment	40 Marks	Practical: 01
	Term Work	50 Marks	
	Total	150 Marks	Total 04

Course Prerequisites:- The student should have
Basic knowledge of chemistry.
Basic knowledge of electrochemistry and chemistry of materials
Introductory knowledge of polymers.

Course Objective The student should acquire the knowledge of

1. To develop the interest among the students regarding chemistry and their applications in engineering.
2. To develop confidence among students about chemistry, how the knowledge of chemistry is applied in technological field.
3. The student should understand the concepts of chemistry to lay the groundwork for subsequent studies in the Engineering field

Course Outcomes:- After completion of the course students will be able to

1. Understand the different methods of analysis of water,different environmental pollutants and importance of green chemistry
2. Understand the importance of fuels and apply it for various engineering applications.
3. Explain the drawbacks of corrosion and different methods of elimination of corrosion
4. Apply the concept of polymer to study advanced materials.
5. Apply the basic concept of chemistry to explain the chemical properties and processes of materials of nanoscale
6. Understand the instrumental analysis helpful for various engineering applications

Unit I: Water Technology & Green Chemistry (6Hrs)

Introduction, sources and impurities in water, Hardness of water, types, and determination of hardness using EDTA titration, softening of hard water by ion- exchange process. Numerical problems on hardness of water. Major environmental pollutants, Basic principles of green chemistry. Atom economy, Synthesis of adipic acid, Industrial applications of green chemistry, Numerical problems on Atom economy.

Unit II: Electrochemical energy and solar energy (6Hrs)

Fuels: Introduction, Definition, importance of fuels, calorific value, types, fluidized bed catalytic cracking, knocking (Petrol engine), mechanism and its ill effects, biodiesel, power alcohol, octane and cetane number. Solar Energy: Introduction, construction, working and applications of photovoltaic cell.

Unit III: Corrosion technology and it's control (6hrs)

Introduction, Electrochemical theory of corrosion, Types of corrosion, Differential metal and differential aeration (pitting and water line) caustic embrittlement. Factors affecting the rate of corrosion, Corrosion control: Cathodic protection, sacrificial anode and impressed current methods, Metal coatings, Galvanization and tinning, Anodizing, Anodizingof aluminium, Organic coatings: Paint and varnishes.

Metal finishing: Introduction, Technological importance. Principles of electroplating. Electroplating of chromium. Electro less plating: Introduction, electro less plating of nickel & copper on PCB with applications

Unit IV: Engineering Materials and Technology (6 Hrs)

Polymers: Introduction, classification, Synthesis and applications of Polyurethane, polycarbonates, Conducting Polymers: Synthesis & Mechanism of conduction in poly aniline.

Composites: Introduction, constitution, classification. Types: fiber glass, hybrid and reinforced Composites with applications.

Unit V: Nano materials (6Hrs)

Introduction, size dependent properties (Surface area, Electrical, Optical, Catalytic and Thermal properties). Synthesis of nano materials: Top down and bottom up approaches, Synthesis by Sol-gel, precipitation and chemical vapour deposition, Nano scale materials: Fullerenes, Carbon nano tubes and graphenes – properties and applications.

Unit VI: Instrumental methods of analysis (6Hrs)

Introduction, Theory, Instrumentation and applications of colorimetry, pHmetry, conductometry Introduction to spectroscopy, principles and applications of UV/Vis. Spectroscopy

PBL: Project Base Learning (Topics)

Sr. No	Topics
1	Comparison of Hardness, Alkalinity, Dissolved oxygen, Chlorides and COD of water from two different sources
2	Removal of industrial pollutants from wastewater by adsorption on activated charcoal
3	Preparation of biofuels from two natural sources
4	Two synthetic approaches for the production of H_2 as a clean fuel

5	Prevention of corrosion by metal coupling
6	Construction of bio sensor in engineering applications
7	Design and simulation of automatic solar - photo voltaic panels as renewable energy source.
8	Synthesis of Conjugated Polymers and Molecules Using Sugar Reagents and Solventless Reactions. OR Composite materials and it properties, applications and types
9	To study mechanism of lubrication
10	Electroplating- study on how different metals can be used and the practical applications
11	Prepare Ag- nanoparticles by using sol-gel method
12	Preparation of Ag nanoparticle from two natural sources
13	With the help of green chemistry principles, prepare any organic dye by using Traditional and Green pathway.
14	Prepare epoxy resins by using suitable metho
15	Measurement and effect of waste disposal from laboratories in the college

Practical (Any Eight of the Following)

1. Determination of Hardness of water sample by EDTA method
2. To determine strength of acid by pH – metric Titration
3. To measure the strength of acid by conductometric titration
4. Measurement of Surface tension of a given liquid by Stalgmometer.
5. To determine alkalinity water sample.
6. Estimation of the given amount of copper in the given solution by colorimetry
7. Synthesis of conducting polyaniline from aniline by oxidative polymerization
8. Determination of iron content in the given solution by Mohr's method
9. To determine the strength of given acid solution by titrating it against base solution using indicator
10. Determination of reaction rate, order and molecularity of hydrolysis of ethyl acetate
11. Verification of Beer-Lambert's Law.
12. Determination of Viscosity of Liquids by Ostwald's Viscometer
13. Determination Of Chloride Content Of Water By Argentometry
14. Estimation of copper from brass by iodometry
15. To study set up of Daniel cell.

Text Books

1. Engineering Chemistry, Jain P.C & Jain Monica,Dhanpat Rai & Sons, Delhi (1992)
2. Engineering Chemistry, O. G. Palanna, Tata McGraw-Hill Publication, New Delhi
3. A textbook of Engineering Chemistry, S. S. Dara, McGraw-Hill Publication, New Delhi

Reference Books

1. Engineering Chemistry- Fundamentals and applications, Shikha Agarwal,Cambridge Publishers (2015)
2. Polymer Science and technology (2nd Edition), P. Ghosh, Tata McGRAW Hill, (2008)
3. Principles of Instrumental Analysis, Douglas A. Skoog, F. James Holler,Stanley R. Crouch,Cengage learning (2017)
4. Polymers: Chemistry & Physics of Modern Materials (2nd edition) J.M.G.Cowie, Blackie, Academic & Professional (1994)
5. Integrated design and operation of water treatment facilities, Kawamura, Susumu. John Wiley & Sons (2000)

Unit Test –

Unit Test - I	**Unit I, II, III**
Unit Test - II	**Unit IV, V, VI**

Digital Electronics

TEACHING SCHEME		EXAMINATION SCHEME		CREDIT CHEME	
Lecture:	**4 Hours/Week**	**End Semester Examination:**	**60 Marks**	**Theory**	**4**
Practical:	**2 Hours/Week**	**Internal Assessment:**	**40 Marks**	**Practical**	**1**
		Term work:	**50 Marks**		
Total	**6 Hours**	**Total Marks:**	**150 Marks**	**Total**	**5**

Course Objective:

1. To present the Digital fundamentals, Boolean algebra and its applications in digital systems.
2. To familiarize with the design of various combinational digital circuits using logic gates
3. To introduce the analysis and design procedures for synchronous and asynchronous sequential circuits.
4. To understand the various semiconductor memories and related technology.

Prerequisite:

Basics of Physics, Mathematics, Basics of computer fundamentals

Course Outcomes: On completion of the course, students will have the ability to:

1. Comprehend different number systems and Boolean algebraic principles.
2. Apply logic design minimization techniques to simplify Boolean expressions
3. Analyze and design combinational logic circuits.
4. Demonstrate the operations of systems with sequential circuit elements.
5. Comprehend characteristics and structure of Programmable Logic Devices and Memory.
6. Draw ASM charts for sequential circuit design.

Unit 1 : Number system and Codes **08 Hours**

Introduction to Number Systems: Decimal, Binary, Octal, Hexadecimal and interconversion of number system, Representation of Negative Numbers, 1's complement and 2's complement.

Digital Codes : BCD codes(8421-2421), gray code, excess–3 code, cyclic code, code conversion, ASCII, EBCDIC codes.
Binary Arithmetic: Binary addition, Binary subtraction, Subtraction using 1's complement and 2's complement, Binary multiplication, and division.

Unit II : Boolean Algebra

Logic Gates: Logic Gates-Basic Gates, (AND, OR, NOT, NAND, NOR, Ex-OR, ExNOR and their truth tables,), Logical Operators, Universal Gates, realization of other gates using universal gates. **08 Hours**

Logic Design Minimization: Boolean algebra, De Morgan's Theorems, Standard representation of logic functions, Sum of Product (SOP) form, Product of Sum (POS) form, Simplification of logical functions, Minimization of SOP and POS forms using Karnaugh-Maps up to 4 variables Don't care condition

Unit III : Combinational Circuits **08 Hours**

Binary and BCD arithmetic, Half Adder, Full Adder, Half Subtractor, Full Subtractor, Binary Adder (IC 7483), BCD adder, Code converters, Multiplexers, De multiplexer, Decoder (IC 74138) and their use in combinational logic design, Priority Encoder, Digital Comparators, Parity generators and Checker (IC 74180)

Unit IV: Sequential Circuits **08 Hours**

Flip- flop: SR, JK, D, T flip flops, Truth Tables and Excitation tables, Conversion from one type to another type of Flip Flop.
Registers: Buffer register, Shift register.
Counters: Asynchronous counters, Synchronous counters, Modulus counters

Unit V : FSM and ASM chart **08 Hours**

Introduction to FSM, Moore and Mealy State machine, state machine as a sequential controller. Design of state machines: state table, state assignment, transition/excitation table, excitation maps and equations, logic realization, ASM chart notations, ASM block, State diagram, ASM chart for sequential circuits, Multiplexer Controller.

Unit VI : Memory and PLD **08 Hours**

Semiconductor memories: memory organization, memory expansion, Classification and characteristics of memories, RAM, ROM, EPROM, EEPROM, NVRAM, SRAM, DRAM. Programmable logic devices: Study of PROM, PAL, PLAs. Architecture of PLA, designing combinational circuits using PLDs.

Textbooks:

1. M. Morris Mano and M. D. Ciletti, Digital Design, Pearson Education.
2. R. P. Jain, Modern Digital Electronics, Tata McGraw Hill Publication.
3. F.J. Hill and G.L. Peterson, Switching Theory and Logic Design, John Wiley
4. J.F. Wakerly "Digital Design: Principles and Practices", 3rd edition, 4th reprint, Pearson Education, 2

Reference Books:

1. David J. Comer, Digital Logic & State Machine Design, Oxford University Press.
2. Digital Integrated Electronics- H.Taub & D.Shilling, Mc Graw Hill.

List of Laboratory Exercises:

1. Verify truth tables of logic gates. (AND, OR, XOR, NOT, NAND, NOR). Simplify the given Boolean expression using K-map and implement using gates
2. State De-Morgan's theorem and write Boolean laws. Implement NAND and NOR as Universal gates.
3. Design (truth table, K-map) and implement half and full adder/subtractor.
4. Design (truth table, K-map) and implement 4-bit BCD to Excess-3 Code converters.
5. Study of magnitude Comparator using IC 7485.

6. Implement of logic functions using multiplexer IC 74151 (Verification, cascading & logic function implementation).
7. Implement logic functions using 3:8 decoder IC 74138.
8. Verify truth tables of different types of flip flops.
9. Design (State diagram, state table & K map) and implement 3 bits Up and Down Asynchronous and Synchronous Counter using JK flip-flop.
10. Design and implement modulo 'n' counter with IC 7490.

Project Based Learning Assignments

Note:- *Students in a group of 3 to 4 shall complete any one project from the following list

1. Survey report of basic gates ICs 7432, 4011, 4050, 4070,4071,40106
2. Implement combinational logic Circuit of given Boolean Equation.
3. Implement Half Adder and Half Subtractor.
4. Implement Full Adder using two Half Adders
5. Build 4-bit parallel Adder / Subtractor using IC.
6. Build Code Converters: Binary to Gray
7. Build Code Converters: Excess 3 to Binary)
8. Implement Two Bit Magnitude Comparator using IC 7485
9. Implement given combinational logic using MUX
10. Implement 7 segment decoder driver using IC 7447.
11. Build a Decade counter and Up-Down Counter.
12. Build a Shift Registers: SISO and SIPO
13. Implement the Johnson Counter and Ring Counter.
14. Survey Report on Static I/O and transfer Characteristic of TTL and CMOS

Syllabus for Unit Tests:

Unit Test -1	Unit – I, Unit – II, Unit - III
Unit Test -2	Unit – IV, Unit – V, Unit - VI

Structured Programming

TEACHING SCHEME		EXAMINATION SCHEME		CREDIT SCHEME	
Lecture:	**4 Hours/Week**	**End Semester Examination:**	**60 Marks**	**Theory**	**4**
		Internal Assessment:	**40 Marks**		
Total	**4 Hours/Week**		**100 Marks**		**4**

Course Objective:
To provide an overview of fundamental principles, concepts, and constructs of computer programming.

Prerequisite:
Basic knowledge of Computer Handling.

Course Outcomes: On completion of the course, students will have the ability to:
1. Study steps towards problem solving.
2. Understand fundamental concepts of programming language.
3. Illustrate conditional, branching and iteration
4. Decompose a problem into functions.
5. Explore array and structures to solve simple numerical method problems.
6. Exercise file handling concepts.

Unit I **08 Hours**

Introduction to Computing: Introduction to problem solving using computers, Problem solving steps, Algorithms-definition, characteristics, examples ,advantages and limitations, Flowcharts Comparison with algorithms, Pseudo codes, Programming Languages as tools, types of programming paradigms, Compilation process, linking and loading, syntax and semantic errors, testing a program, Good Programming Practices

Unit II **08 Hours**

'C' Fundamentals: Features of C, header files, pre-processor directives, compiling and executing a C program, syntax and semantic errors, libraries, structure of a C program, declarations, constants, variables, data types, operators and expressions, precedence and associativity of operators, type conversions, input and output functions- printf and scanf.

Unit III **08 Hours**

Control Structures: Decision making structures: if-else statement, nested if-else, use of logical operators, Loop control structure: for, while, do-while loops, use of break and continue, Nested structures, Case control structure: switch case
Pointers: Concept, pointer declaration, assignment, initialization, and access.

Unit IV

08 Hours

Function: Types of functions, function definition and declaration, function prototype, calling and returning function, passing values between functions,

standard library functions and user defined functions, passing array as function parameter, call-by-value, call-by-reference, recursive function.

Unit V **08 Hours**

Arrays: Concept, declaration, initialization, processing with array, one, two and multidimensional array, pointer to an array, Passing arrays to function.
Strings: concept, declaration, initialization, and standard string library functions.
Structures: Concept, declaration, accessing structure elements, array of structures, pointer to structures, self-referential structures, use of structures, union.

Unit VI **08 Hours**

File handling: File Handling in C, Types of files, Functions for file handling, Defining and opening a file, closing a file, Input/output and Error Handling on Files.

Textbooks

1. Brian W. Kernighan, Dennis M. Ritchie, "The C Programming Language", Prentice Hall, ISBN 0131103628.
2. Donald E. Knuth, "The Art of Computer Programming", Addison-Wesley, ISBN-10: 0201485419, ISBN13: 978-0201485417.
3. T. E. Bailey, "Program design with pseudo code", Brooks/Cole Publisher, ISBN-10 : 0534055745, ISBN-13: 978-0534055745.
4. Kanetkar Yashavant P, "Let us C", BPB publications.
5. Subrata Saha and Subhodip M., "Basic Computation and Programming with C", Cambridge University of Press, India, ISBN:9781316601853.

Reference Books

1 Lamey Robert, "Logical problem solving", Prentice Hall, ISBN: 9780130618825.
2 Henry Mullish, Herbert L. Cooper, "The Spirit of C", Thomson Learning, ISBN 0314285008.

Project Based Learning Assignments*

Note:- *Students in a group of 3 to 4 shall complete any one project from the following list)

1. Design and develop a project for Diary management System
2. Design and develop a project for Calendar using C
3. Design and develop a project for Contact Management System
4. Design and develop a project for Library Management System
5. Design and develop a project for Snake Game
6. Design and develop a project for Bus Reservation system
7. Design and develop a project for Hospital Management system
8. Design and develop a project for Employee management system
9. Design and develop a project for Diary management System
10. Design and develop a project for Calendar using C
11. Design and develop a project for Contact Management System
12. Design and develop a project for Library Management System

Syllabus for Unit Tests:

Unit Test -1	Unit – I, Unit – II, Unit – III
Unit Test -2	Unit – IV, Unit –V, Unit - VI

Web Technologies

TEACHING SCHEME		EXAMINATION SCHEME		CREDIT SCHEME	
Lecture:	**4 Hours/Week**	**End Semester Examination:**	**60 Marks**	**Theory**	**4**
Practical:	**2 Hours/Week**	**Internal Assessment:**	**40 Marks**	**Practical**	**1**
		Term Work:	**25 Marks**		
Total	**6 Hours/Week**		**125 Marks**		**5**

Course Objective:
To develop the skill & knowledge of Web page design.

Prerequisite:
Basic knowledge of HTML tags.

Course Outcomes: On completion of the course, students will have the ability to:

1. To learn Internet protocols.
2. To design web pages using html and CSS
3. To design websites using JavaScript and to design responsive web pages
4. To learn eXtensible Markup Language.
5. To learn foundations of Human Computer Interaction.
6. To learn screen designing and web interface designing.

Unit I **08 Hours**

Fundamentals: Introduction to the Internet, World Wide Web, Web Browsers, Web Servers, URL, Overview of different protocols: HTTP, POP, SMTP, FTP, HTTP Request message, HTTP Response Message, HTTP Client Server Architecture, IPv4, IPv6.

Unit II **08 Hours**

HTML: Introduction, history, versions. HTML elements: headings, paragraphs, line break, colors and fonts, links, frames, lists, tables, images and forms, Difference between HTML and HTML5.

CSS: Introduction to Style Sheet, CSS features, CSS core syntax, Style sheets and HTML, Internal Stylesheets, External stylesheets, Inline Stylesheets, Style rule cascading and inheritance, text properties. Bootstrap.

Unit III **08 Hours**

JavaScript: Introduction to JavaScript, JavaScript in perspective, basic syntax, variables and data types, statements, operators, literals, functions, objects, arrays, built in objects, JavaScript debuggers, jQuery.

Front End Frameworks: Explore Bootstrap Elements, Downloading Bootstrap, downloading a Bootstrap Example

Unit IV **08 Hours**

XML: Introduction to XML, Uses of XML, XML Key Components, Comparing XML with HTML, Describing the Structure of XML - Declaration, Elements, Attributes, Comments, CDATA, XML Entity References, Parsers, Document Type Definitions, XSL.

Unit V **08 Hours**

Introduction to HCI: What is HCI, History, Computer devices, User Interface, Benefits, Principles of User Interface, Good Design, Benefits, Graphical user interface, Direct Manipulation, Design Thinking, Stages of Design Thinking

Unit VI **08 Hours**

Screen Designing: Design goals, Screen planning, organizing screen elements, ordering of screen data and content, Screen navigation and flow, Design rules: Principles, standards, guidelines, Golden rules of HCI.

Web Interface Design: Designing Web Interfaces, Application Designing, game Designing.

Textbooks

1.Getting Started with Web Components: Build modular and reusable components using HTML, CSS and JavaScript by Prateek Jadhwani.
2. Jump Start Bootstrap: Get Up to Speed With Bootstrap in a Weekend By Syed Fazle Rahman.
3. Fronted Web Development/Web Designing, HTML, CSS & JavaScript Basic Tutorial by Sachin Srivastav
4. Web Design and Development: Website Technologies Fundamentals By Steven Bright.
5. Web Technologies, Black Book, Dreamtech Press.
6.Ben Shneidermann, “Designing the user interface”, Third edition, Pearson education, Asia

Reference Books

1. HTML and C Learn HTML, CSS, and JavaScript and Build a Website, App, and Game by Young Rewired State and Duncan Beedie.
2.Mastering HTML, CSS & Javascript Web Publishing by Laura Lemay, Rafe Colburn HTML & CSS, and JavaScript & JQuery (2 book set) by Jon Duckett.
3. Wilbert O Galitz, “The essential guide for user interface design”, Wiley Dream Tech.
4. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel Pearson.

List of Laboratory Exercise:

1) Design home page for any website according to domain.
2) Implement various functionality using different tags of HTML while designing web pages.
3) Implement web pages formatting and content formatting using CSS.
4) Implement responsive approach in website designing.
5) Explorer front end framework using Bootstrap Elements.
6) Describe user interface with its benefits.
7) How to design a screen with proper planning?

8) Write a case study on application designing.

Project Based Learning Assignments*

Note:- *Students in a group of 3 to 4 shall complete any one project from the following list)

1. Design website for department and college
2. Design website for e-commerce platform.
3. Design website for reservation system (e.g. bus, train, air)
4. Design website for online food delivery system.
5. Design website for CRM (database management).
6. Design website for hospital management system.
7. Design website for advertisement of products.
8. Design website for customer support system.
9. Design website for Business Portfolio.
10. Design website for Quiz Game.
11. Design website for E-library system.
12. Design website for survey system.
13. Design website for Banking system.
14. Design website for social media.
15. Design matrimonial website.

Syllabus for Unit Tests:

Unit Test -1	Unit – I, Unit – II, Unit – III
Unit Test -2	Unit – IV, Unit –V, Unit - VI

Communication Skills (Common for all Branches)

Teaching Scheme:	**Examination Scheme:**		**Credits Allotted**
Practical :- 02 Hours/ Week	Term Work	50 Marks	Practical: 01
	Total	50 Marks	Total 01

Course Prerequisites:- Students should have knowledge of Basic English grammar
Students should have basic information of sound system of English language.

Course Objective The course objective of Communication Skills puts the following class teaching objectives, considering English Language skills as a wheel rolling aspects in today's world, the focus is on honing the skills such as LSRW and presentation skills. It also puts emphasis on technical and professional writing skills. Honing the presentation skills among students through appropriate activities, this will help them in their business ventures.

Course Outcomes:- After completion of the course students will be able to

1. Understand and construct the error free sentences of English language and do implementation of it in the spoken and written business communication
2. Understand and apply the sounds of English language for correct pronunciation
3. Understand and develop the ability to enhance sound vocabulary for effective communication
4. Understand communication process and principles to do applications in business communication
5. Understand the techniques of writing skills and apply them in appropriate context and domain
6. Create effective business presentation and do effective implementation of it through activities

Unit I: English grammar **(4 Hrs)**

Application of Basic Grammar: Articles, Prepositions, Tenses, Subject-verb agreement, Use of phrases & Clauses in sentences, Common errors

Unit II. Phonetics/study of sounds in English **(4 Hrs)**

Introduction to phonetics, study of speech organs, study of phonetic script, transcriptions of words, articulation of different sound in English, reducing MTI, stress and intonation

Unit III: Vocabulary Enrichment **(4 Hrs)**

Ways of word formation, Foreign phrases, One word substitutions, Synonyms & antonyms, Words often confused, Indian English words, Usage of idioms & phrases.GRAS-PT formula

Unit IV: Communication Skills **(4 Hrs)**

Introduction, forms and function of communication process, non-verbal codes in communication, Importance of listening skills, Listening V/s hearing, Types of listening, Barriers to communication and listening, Importance of LSRW skills in communication

Unit V: Technical Writing Skills **(4 Hrs)**

The mechanics and principles of written communication, Technical Communication, Need and Importance, technical report writing;, email writing, , notice, agenda, minutes of meeting writing. Use of technology in technical writing

Unit VI. Presentation skills **(4Hrs)**

Designing effective presentation, understanding theme, developing content and layout of presentation, use of tone and language, technological tools for effective presentation

Reference Books:

1. Business Communication by Meenakshi Raman, Prakash Singh published by Oxford University press, second edition,
2. Spoken English- A manual of Speech and Phonetics by R. K. Bansal, J. B. Harrison published by Orient Blackswan
3. Technical Communication by Meenakshi Raman, Sangeeta Sharma published by Oxford University press
4. Developing Communication Skills by Krishna Mohan, Meera Banerji published by Macmillan India Pvt Ltd

Recommended web-links for enhancing English language and business communication
http://www.bbc.co.uk/worldservice/learningenglish
http://www.englishlearner.com/tests/test.html
http://www.hodu.com/default.html
http://www.communicationskills.co.in/index.html

Information Technology Laboratory – I

TEACHING SCHEME		EXAMINATION SCHEME		CREDIT CHEME	
Practical:	**2 Hours/Week**	**Term Work:**	**25 Marks**	**Practical:**	**1**
		Oral:	**25 Marks**		
Total	**2 Hours/Week**		**50 Marks**	**Total:**	**1**

Course Objective:
To build the programming skills using 'C' programming to solve real world problems

Prerequisite:
Basics of Computer Handling.

Course Outcomes: On completion of the course, students will have the ability to:

1. Study steps towards problem solving.
2. Understand fundamental concepts of programming language.
3. Illustrate conditional, branching and iteration
4. Develop modular program using functions.
5. Explore array and structures to solve simple numerical method problems.
6. Exercise file handling concepts.

Unit I **04 Hours**

Fundamentals of 'C' Programming: Variables and Constants, Keywords, Scope Rules, Internal and External Linkage, Global Variables, Data Types, Typecasting, Input/Output, Operators, Types of operators, Operator Precedence and Associativity, Introduction to C preprocessor #include, #define, Conditional.

Unit II **04 Hours**

Implementing Control Structures: Implementing decision making structures: if-else statement, nested if-else, use of logical operators, Loop control structure: for, while, do-while loops, use of break and continue, Nested structures, Case control structure: switch case

Implementation of Pointers: pointer declaration, assignment, initialization, and access, Null pointer. Dynamic memory allocation functions — malloc, calloc, realloc and free

Unit III **04 Hours**

Implementation of Functions: function definition and declaration, function prototype, calling and returning function, passing values between functions, standard library functions and user defined functions, passing array as function parameter, call-by-value, call-by-reference, recursive function.

Unit IV **04 Hours**

Implementing Arrays: Implementing One-dimensional Arrays, Declaration of One-dimensional Arrays, Initialization of One-dimensional Arrays, Example programs-Bubble sort, Selection sort, insertion sort, Linear search, Binary search, Two-dimensional Arrays, Declaration of Two-dimensional Arrays, Initialization of Two-

dimensional Arrays, Example programs-Matrix Multiplication, Transpose of a matrix, Applications of array

Implementation of Strings: Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, String-handling Functions, Example Programs (with and without using built-in string functions)

Unit V **04 Hours**

Implementing Structures, Union and Enum:

Structure: Basics, declaring structure and structure variable, typedef statement, array of structure, array within structure, Nested structure; passing structure to function, function returning structure.

Union: basics, declaring union and union variable.

Enum: declaring enum and enum variable.

Unit VI **04 Hours**

Implementing File handling: file pointer, File accessing functions: fopen, fclose, fputc, fgetc, fprintf, fscanf, fread, fwrite,beof, fflush, rewind, fseek, ferror. File handling through command line argument.

Textbooks:

1. Programming in ANSI C, E Balagurusamy, Tata McGraw-Hill, Third Edition.
2. Let Us C, YashwantKanetkar, Infinity Science Press, Eighth Edition.

Reference Books:

1.The C Programming Language, Brian W. Kernighan, Dennis M. Ritchie, Prentice Hall, 2″ Edition.

2. How to solve it by Computer, R.G.Dromey, Pearson Education.

List of Laboratory Exercise:

1. Write a program to accept the length of three sides of a triangle and to test and print the type of triangle as equilateral, isosceles or right angled or none.
2. Write a program to check whether input number is prime or not with and without use of recursive function.
3. Write a program to separate digits of input 4-digit integer, separate and display its digits.
4. Write a program to implement Pascal's Triangle and Floyd's Triangle.
5. Write a program to implement linear and binary search techniques.
6. Write a program to implement sorting techniques: Bubble, Selection, and Insertion sorting.
7. Write a program to accept a string and to display the following:
   (a) Total number of characters in the string.
   (b) Total number of vowels in the string.
   (c) Total number of occurrences of character in the string.
   (d) Check whether string is palindrome or not.
8. Write a program with function to swap values of two elements (call by reference).

9. Write a program to carry out following operations on strings using library functions.
   (a) To concatenate a string S2 to string S1.
   (b) To find the length of a given string.
   (c) To compare two strings S1 and S2.
   (d) To copy a string S2 to another string S1.
10. Write C program to compare two files and report mismatches

Computer Workshop Technology

TEACHING SCHEME		EXAMINATION SCHEME		CREDIT SCHEME	
Practical:	**2 Hours/Week**	**Term Work:**	**25 Marks**	**Practical:**	**1**
Total	**2 Hours/Week**		**25 Marks**	**Total:**	**1**

Course Objective:
To acquire the knowledge of basic manufacturing processes used in computer engineering technology

Prerequisite:
Basics of Engineering materials. Basics of computer and laptop.

Course Outcomes: On completion of the course, students will have the ability to:

7. Understand the basics parts used in the computer and laptop.
8. Understand fundamental concepts of assembly of electronics components (PCB).
9. Understand the various joining processes
10. Develop plastic moulding component used in computer engineering.
11. Developing the component used in computer engineering by use of 3D printing technology.
12. Understand the knowledge of making fasteners used for computer and laptop.

Unit I **04 Hours**

Assembly of Computer: Introduction to hardware peripherals like RAM, ROM, keyboard, Mouse, processors, etc. Generation of processors. Working of SMPS. Study of various ports. Steps and precautions to assemble computer, Tools used in computer hardware

Unit II **06 Hours**

Printed Circuit Boards Assembly (PCB): Study of joining processes, Resistance welding and Soldering processes, why and how flux, tip tinner, solder wick, and post-soldering cleaners are used in the hand soldering process. Laser welding, orbital welding. Advantages and disadvantages of welding processes.

Unit III **06 Hours**

CPU Cabinet Manufacturing Process: Introduction to machines in sheet metal Industry: shearing machine, bending machine, circular profile cutting machines. Different types of sheet metal folds. Rivets and its different parts, selection of rivet heads, types of rivets and its uses. Punching, blanking, shearing, bending, and piercing.

Unit IV **02 Hours**

Plastic Molding Process: Introduction to plastic molding. Types of plastics. Types of plastic molding. Exercise on plastic molding machine ,manufacturing of plastic moulded job.

Unit V **02 Hours**

3D Printing Technology: Introduction to Additive Manufacturing, Need for Additive Manufacturing, Generic AM process, Classification of AM Processes, 3D Printing process. Steps in AM process, Advantages of AM, Major Applications

Unit VI **04 Hours**

Study of Machining Processes: Introduction to machining processes, Different types of turning and grinding operations, by using turning operations making of simple fastener used in computer engineering.

Textbooks:

1. Khanna O.P. and Lal. M., " Production Technology", Dhanpatrai Publications (P) Ltd., New Delhi.
2. Jain R.K., "Production Technology", Khanna Publishers, Delhi
3. The Complete Reference PC Hardware, Craig Zacker, John Rourke

Reference Books:

1. Choudhary Hajra S. k., Choudhary Hajra A. k. "Elements of Workshop Technology Vol 2 Machine Tools, Publisher: Media Publishers & Promoters, India.
2. Rajput R. K ., "Manufacturing Technology", Laxmi Publications (P)Ltd, New Delhi..

List of Laboratory Exercise:

1. Practical on introduction to hardware and different tools used in workshop technology for computer engineering.
2. Experiment and demonstration of soldering processes on electronics components such as PCB assembly.
3. Practical on resistance welding processes.
4. Practical demonstration on shearing machine, bending machine, circular profile cutting machines used in sheet metal operations for manufacturing of cabinet used in computer.
5. Practical demonstration on Punching, blanking, shearing, bending, and piercing.
6. Practical demonstration on plastic molding machine.
7. Practical demonstration on 3 D printing machine
8. Practical demonstration on making fastener for computer by machining processes .
9. Industrial visit to the manufacturing industry.

B.Tech Information Technology
Semester II

Engineering Mathematics-II (Common for all Branches)

Teaching Scheme:	Examination Scheme:		Credits Allotted
Theory:- 03 Hours/ Week	End Semester Examination	60 Marks	Theory: 03
Tutorial :- 01 Hours/ Week	Internal Assessment	40 Marks	Tutorial: 01
Total : 4 Hours/ Week	Total	100 Marks	Total 04

Course Prerequisites:- The students should have knowledge of differential calculus.

Course Objective On completion of the course –

1. Fundamental theorems, concepts in Matrices, Demoivre's theorem and its applications in engineering.
2. Various techniques in Calculus, Explanation of functions and Infinite series.
3. Partial differentiation, maxima, minima and its applications in engineering

Course Outcomes:- After completion of the course students will be able to

1. Solve differential equations by different methods.
2. Apply different laws to solve Simple Harmonic Motion, One–Dimensional Conduction of Heat.
3. Solve integral calculus and Fourier series.
4. Solve integral calculus with error functions.
5. Determine position in solid geometry
6. Solve multiple integration problems.

Unit I: Differential Equation of First Order and First Degree: (06 Hrs)
Definition, Order and Degree of DE, Formation of DE, Solutions of Variable Separable DE, Exact DE, Linear DE and reducible to these types

Unit II: Applications of Differential Equations: (06 Hrs)
Applications of DE to Orthogonal Trajectories, Newton's Law of Cooling, Kirchoff‟s Law of Electrical Circuits, Motion under Gravity, Rectilinear Motion, Simple Harmonic Motion, One–Dimensional Conduction of Heat

Unit III: Fourier Series: (06 Hrs)
Definition, Dirichlet's conditions, Fourier Series and Half Range Fourier Series, Harmonic Analysis

Unit IV: Integral Calculus: (06 Hrs)
Reduction formulae, Beta and Gamma functions, Differentiation under the Integral Sign, Error functions

Unit V. Solid Geometry: (06 Hrs)
Cartesian, Spherical Polar and Cylindrical Coordinate Systems, Sphere, Cone and Cylinder

Unit VI: Multiple Integrals and their Application: (06 Hrs)

Double and Triple integrations, Applications to Area, Volume, Mean and Root Mean Square Values

PBL: Project Base Learning (Topics)

1	Formation of differential equation
2	Exact differential Equation
3	Linear differential equation
4	Newton's law of cooling
5	Newton's second law of motion
6	Fourier's law
7	Kirchhoff's voltage law
8	Fourier series
9	Harmonic analysis
10	Gamma and beta function
11	Reduction formulae
12	Locating position in three dimensional space
13	Multiple integrals applications
14	Error function
15	Differentiation under integral sign

Textbooks

1. Applied Mathematics (Volumes I and II) by P. N. Wartikar & J. N. Wartikar (Pune Vidyarthi Griha Prakashan, Pune),7th Edition, 1988, Reprint 2010.

Reference Books

1. Higher Engineering Mathematics by B.S. Grewal (Khanna Publication, Delhi), 42th Edition,2012
2. Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill), Edition, 2008
3. Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.), 8th Edition, 1999, Reprint 2010
4. Advanced Engineering Mathematics, 7e, by Peter V.O'Neil (Thomson Learning), Edition 2007
5. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education), 2nd, Edition, 2002

Unit Test –

Unit Test - I	**Unit I, II, III**
Unit Test - II	**Unit IV, V, VI**

Engineering Physics (Common for all Branches)

Teaching Scheme:	Examination Scheme:		Credits Allotted
Theory:- 03 Hours/ Week	End Semester Examination	60 Marks	Theory: 03
Practical :- 02 Hours/ Week	Internal Assessment	40 Marks	Practical: 01
Total:- 05 Hours/ Week	Term Work	50 Marks	Total 04
	Total	150 Marks	

Course Prerequisites:- Students are expected to have a basic understanding of physics and calculus.

Course Objective To impart knowledge of basic concepts in physics relevant to engineering applications in a broader sense with a view to lay foundation for the engineers.

Course Outcomes:- After completion of the course students will be able to

1. Analyze the properties of charged particles to develop modern instruments such as electron microscopy.
2. Understand the problems associated with architectural acoustics and give their remedies and use ultrasonic as a tool in industry for non destructive testing.
3. Apply quantum physics problems to micro level phenomena and solid state physics.
4. Understand the wave nature of light and apply it to measure stress, pressure and dimension etc.
5. Apply the principles of lasers and fiber optics for applications in the field of engineering.
6. Remember properties of solid matter and connect to applications in the field of engineering.

Unit I: Modern Physics (6 Hrs)

Motion of a charged particle in electric and magnetic fields, Electrostatic and Magnetostatic focussing, Electron microscopy, interaction of electron beam with the material, Wavelength and resolution, transmission electron microscope (TEM), scanning electron microscope (SEM), Separation of isotopes by Bainbridge mass spectrograph, cathode ray tube (CRT), CRT in cathode ray oscilloscope (CRO).

Unit II. Architectural Acoustics (6Hrs)

Elementary acoustics, Reverberation and reverberation time, Sabine's formula (without Derivation), Intensity level, Sound intensity level, Loudness, Sound absorption, Sound absorption coefficient, different types of noise and their remedies, basic requirement for acoustically good hall, factors affecting the architectural acoustics and their remedies, introduction to ultrasonics, Production of ultrasonics by magnetostriction and piezoelectric methods, applications (thickness measurement, flaw detection).

Unit III: Quantum mechanics (6hrs)

Dual nature of matter, concept of wave packet, group and phase velocity and relation between them, physical significance of wave function, Schrodinger's time dependant and time independent wave equation, Application of Schrodinger's time independent wave equation to the problems of Particle in a rigid box, concept of tunnelling at potential barrier (no derivation-only conceptual discussion).

Unit IV: Optics – I (Interference and Diffraction) (6 Hrs)

INTERFERENCE: Interference due to thin film of uniform thickness and nonuniform thickness, engineering applications of interference (optical flatness, non-reflecting coatings).

DIFFRACTION: Diffraction at a single slit (Geometrical method), Conditions for maximum and minimum, Diffraction at a circular aperture (Result only), Plane diffraction grating, Conditions for principal maxima and minima.

Unit V: Optics – II (Polarisation and Lasers) (6 Hrs)

POLARISATION: Introduction, Double refraction and Huygen's theory, Positive and negative crystals, Nicol prism.

LASERS: Lasers introduction, Characteristics of Lasers, Working principle and components of He-Ne Laser, Nd -YAG Laser, Semiconductor diode Laser, Applications in the field optical fiber (Principle, Acceptance angle and acceptance cone, Numerical aperture, Types of optical fibers, Fiber optic communication).

Unit VI. Solid State Physics (6Hrs)

Origin of band gap, Energy bands in solids, Fermi-Dirac probability function and position of Fermi level in intrinsic semi-conductors (with derivation) and in extrinsic semi-conductors, Formation and band structure of p-n junction, Hall effect and Hall coefficient.

Introductions of nanoparticles, properties of nanoparticles (Optical, electrical, Magnetic, structural, mechanical), synthesis of nanoparticles (Physical and chemical), quantum dots – wide band semiconductors, direct/indirect band gap semiconductors.

PBL : Project Based Learning (topics)

Sr. No.	Topic
1.	Tesla Coil
2.	Thin film interference in soap film-formation of colors
3.	LiFi- wireless data transfer system using light
4.	Need of medium for propagation of sound wave
5.	Possible effects of electromagnetic fields (emf) on human health
6.	Design and simulation of automatic solar powered time regulated water pumping

7. Solar technology: an alternative source of energy for national development
8. Measurement and effect of environmental noise in the college
9. Electronic eye (Laser Security) as auto-switch/security system
10. Electric power generation by road
11. Design and construction of distance measuring instrument using LASER
12. Design and construction of remote control devices – electronic bell, Fan etc
13. Absorption coefficient of sound absorbing materials
14. Velocity determination of O-ray and E-ray in double refracting materials
15. Velocity determination of O-ray and E-ray in double refracting materials
16. The design and construction of the hearing aid device
17. Study of Quantum confinement effect
18. Wind turbines - a source of electricity
19. Measurement of gravitational constant 'g'

Practical (Any Eight of the Following)

1. Determination of radius of planoconvex lens/wavelength of light/Flatness testing by Newton's rings
2. Determination of wavelength of light using diffraction grating
3. Determination of frequency of ac voltage by CRO.
4. Determination of refractive index for O-ray and E-ray
5. Determination of divergence of a laser beam
6. Particle size by semiconductor laser
7. Determination of wavelength of laser by diffraction grating
8. To study Hall effect and determine the Hall voltage
9. Calculation of conductivity by four probe method
10. Study of solar cell characteristics and calculation of fill factor
11. Determination of band gap of semiconductor
12. Synthesis of metal oxide nanoparticles (ZnO/ZnS/silver/Gold)
13. Measurement of average SPL across spherical wavefront and behaviour with the distance
14. Determination of velocity of sound in liquid by ultrasonic interferometer

15. Study of B-H curve of a sample.
16. Determination of Plank's constant.

Text Books

1. A Textbook of Engineering Physics, M N Avadhanulu, P G Kshirsagar and TVS Arun Murthy, S. Chand Publishing (2018).
2. Engineering Physics, R K Gaur and S L Gupta, Dhanpat Rai Publishing Co Pvt Ltd (2015).
3. Concepts of Modern Physics, Arthur Beiser, Shobhit Mahajan and S. Rai Choudhury, McGraw Hill Education (2017).

Reference Books

1. Fundamentals of Physics, Jearl Walker, David Halliday and Robert Resnick, John Wiley and Sons (2013)
2. Optics, Francis Jenkins and Harvey White, Tata Mcgraw Hill (2017)
3. Principles of Physics, John W. Jewett, Cengage publishing (2013)
4. Introduction to Solid State Physics, C. Kittel, Wiley and Sons (2004)
5. Principles of Solid State Physics, H. V. Keer, New Age International (1993)
6. Laser and Non-Linear Optics, B. B. Laud, New Age International Private Limited (2011)
7. Nanotechnology: Principles and Practices, Dr. S. K. Kulkarni, Capital Publishing Company (2014)
8. Science of Engineering Materials- C.M. Srivastava and C. Srinivasan, New Age International Pvt. Ltd. (1997)

Unit Test –

Unit Test - I	**Unit I, II, III**
Unit Test - II	**Unit IV, V, VI**

Content Management System

TEACHING SCHEME		EXAMINATION SCHEME		CREDIT SCHEME	
Theory:	**4 Hours/Week**	**End Semester Examination:**	**60 Marks**	**Theory:**	**04**
Practical:	**2 Hours/Week**	**Internal Assessment**	**40 Marks**	**Practical:**	**01**
		Term Work:	**50 Marks**		
Total:	**6 Hours/Week**	**Total:**	**150 Marks**	**Total Credits:**	**05**

Course Objectives:

To design a system for maintaining the content.

Course Prerequisites:

Students should have knowledge of

Fundamental understanding of the scripting languages.

Course Outcome:

Students will be able to:

1) Understand the fundamental concepts and principles of Content Management Systems.

2) Identify the features and functionalities of different CMS platforms.

3) Evaluate and select a suitable CMS for specific organizational requirements.

4) Develop skills to create, organize, and publish content using a CMS.

5) Gain knowledge of best practices for managing and maintaining a CMS.

6) Explore advanced topics such as customization, integration, and security in CMS.

UNIT-I **Introduction to Content Management Systems** **(08 Hours)**

Introduction to Content design, Introduction to CMS, Definition and overview of CMS, Benefits, and challenges of using a CMS, Types of CMS platforms, CMS vs. traditional web development.

UNIT-II **Selecting and implementing a CMS** **(08 Hours)**

Needs assessment and requirements gathering, Evaluating CMS options, Planning and executing CMS implementation, Data migration and content import.

UNIT-III **Content Creation and Organization** **(08 Hours)**

Creating and editing content in a CMS, organizing content using taxonomies and categories, managing multimedia content (images, videos, etc.), Working with templates and themes.

UNIT-IV **Content Publishing and Workflow** **(08 Hours)**

Content publishing process, Workflow management in CMS, Versioning and revision control, User roles and permissions.

UNIT-V **CMS Management** **(08 Hours)**

Managing a CMS, CMS maintenance and updates, Performance optimization, Backup and disaster recovery, Analytics, and reporting.

UNIT-VI **Orchestration Customization and Integration** **(08 Hours)**

Extending CMS functionality with plugins and modules, customizing themes and templates, Integrating third-party applications and services, CMS Security and User Experience, Security best practices in CMS, User authentication and access control

SEO optimization for CMS, Usability, and accessibility considerations. Tools: WordPress, Drupal, Joomla, Magento.

Project Based Learning Assignments*Note: - *Students in a group of 3 to 4 shall complete any one project from the following list

1) Use Blogger for publishing the resume.
2) Use WordPress plugins for publishing the contents of the blog.
3) CMS Evaluation Report: Students will research and evaluate different CMS platforms based on predefined criteria and write a comprehensive report recommending the most suitable CMS for a specific use case.
4) Content Creation Exercise: Students will create and publish a sample website using a chosen CMS platform. The website should demonstrate their understanding of content creation, organization, and publishing.
5) CMS Customization Project: Students will customize the design and functionality of a CMS website by modifying themes, templates, or plugins. They will document their modifications and present their customized website.
6) CMS Security Analysis: Students will analyze the security vulnerabilities of a CMS platform and propose measures to enhance its security. They will present their findings and recommendations in a written report.
7) Design and develop a fully functional CMS-driven website from scratch. They will present their project, demonstrating their ability to apply the concepts and skills learned throughout the course.
8) Publish the website using Blogger.
9) Publish the website on WordPress and apply the mapping of other third-party DNS.
10) Design a complete website and publish it on a third-party vendor.

Textbooks:

1) Professional WordPress: Design and Development by Brad Williams, David Damstra, and Hal Stern
2) Joomla! 3 Explained: Your Step-by-Step Guide by Stephen Burge

Reference Books:

1) Content Management Bible by Bob Boiko
2) Content Strategy for the Web by Kristina Halvorson and Melissa Rach
3) Pro Drupal Development by John K. VanDyk and Todd Tomlinson

Syllabus for Unit Tests:

Unit Test -1 Unit – I, Unit – II, Unit – III

Unit Test -2 Unit – IV, Unit –V, Unit - VI

Computer Communication and Networks

TEACHING SCHEME		EXAMINATION SCHEME		CREDIT SCHEME	
Lecture:	**4 Hours/Week**	**End Semester Examination:**	**60 Marks**	**Theory**	**4**
Practical:	**2 Hours/Week**	**Internal Assessment:**	**40 Marks**	**Practical**	**1**
		Term Work:	**25 Marks**		
Total	**6 Hours/Week**		**125 Marks**		**5**

Course Objective:

1. Introduction to the fundamental concepts of computer communication networks.
2. To understand the basic concepts of layered models, protocols and interworking between computer networks and switching components in telecommunication systems.
3. Gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Prerequisite: Students should have knowledge of

1. How computer networks operate and the fundamentals of data communication.
2. Concepts and fundamental design principles of modern computer networking in a top-down approach, focusing on the Internet's architecture and protocols.

Course Outcomes: On completion of the course, students will have the ability to:

1. Understand networks & their significance.
2. Use network protocol models to explain the layers of communications in data networks.
3. Describe the different types of network Transmission Media and Technologies.
4. Analyze the different types of network devices and their functions within a network.
5. Distinguish the basic network Layer services and Protocols associated with each network.
6. Identify the protocols and functions associated with the transport layer services.

Unit I **08 Hours**

Fundamentals of Computer communication: Computer Communication Architecture, Communication Models, Data Communication: Components, Representations, Data Flow, Protocols and Standards. Line Configuration, Transmission impairment, Data Rate Limits, Performance. Digital and Analog transmission Types.

Fundamentals of Networks: Physical Structures, Building Network and Network Types, Overview of Topology, Concepts of Communication Modes, and Transmission Modes.

Unit II **08 Hours**

Network Models and The Basics of Protocols: Reference Models: OSI Model, TCP/IP Protocol Suite: Layered Architecture, The OSI Model Versus TCP/IP. Network applications, Novell Networks, Arpanet, Internet, Connection oriented network, Network Hardwares and Softwares,

Protocol Layering: Scenarios, Principles, Logical Connections, Sockets and Ports, Encapsulation and D-encapsulation, Addressing. Types of Multiplexing and Demultiplexing.

Unit III **08 Hours**

Transmission Media: Types of Transmission Media**,** Specification of Medium, Performance and Impact of Transmission Impairments, Applications of different transmission media.

Switching: Circuit-switched Networks, Packet Switching, Datagram Switching and Datagram networks, Virtual circuit networks, Structure of circuit and packet switch. Connection oriented services (Virtual circuits), Connectionless services (Datagrams).

Unit IV **08 Hours**

Media Access Control and Data Link layer:

Networking Devices: Networking Devices: Hubs, Switch, Router, Repeaters, Bridges, Gateway, Modem and Access Point, Backbone networks.

Data-Link Layer: MAC Sub-layer, LLC, MAC Addressing Mechanism, Framing, Error control, Flow control, Token Ring, Ethernet, FDDI, Address Resolution Protocols.

Unit V **08 Hours**

Network Layer: Role of Network layer, Internetworking, Ip Address classes, IPV4 Addresses: Address Space, Classful Addressing, Classless Addressing, IPv4 & IPv6 Protocol Packet Format, IPv4 vs IPv6, Routing Protocols – Delivery, forwarding Types of Routing, Routing Protocols – Delivery, Concepts of OSPF, BGP, ICMP, Multicast Routing, Multicast routing protocols.

Unit VI **08 Hours**

Transport Layer: Transport Layer Services, Connectionless and Connection oriented Protocols, Transport Layer Protocols.

User Datagram Protocol, UDP Services, UDP Applications, Transmission Control Protocol, TCP Services, TCP Features, Segment, Connection, State Transition diagram, Flow control, Error control, TCP congestion control, Integrated services, Differentiated Services and Flow Characteristics.

Application Layer: Services of application layer, Protocols: DNS, Remote Logging (Telnet), SMTP, FTP, WWW, HTTP.

Textbooks

1. Computer Networks," by Andrew S. Tanenbaum, Nick Feamster, and David Wetherall. Published by Prentice Hall, 6th edition, 2020. ISBN-13: 978-0136764052
2. “Computer Networking: A Top-Down Approach,” by Jim Kurose and Keith Ross, Addison-Wesley.
3. Data Communications and Networking , Forouzan, 5th Edition, McGraw Hill, ISBN: 1-25-906475-3
4. Computer Networks: A system Approach: Larry L, Peterson and Bruce S. Davie,Elsevier, 4thEdition.
5. Data Communications and Networks, Achyut S. Godbole ,Tata McGraw Hill
6. Computer Networking, Tularam M Bansod Dreamtech, Wiley

Reference Books

1. Computer Networks, James J Kurose, Keith W Ross, Pearson Education, 2013, ISBN: 0-273-76896-4
2. Data and Computer Communications by William Stallings.
3. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, ―Computer Networks: An Open Source Approach‖, Mc Graw Hill Publisher.
4. Introduction to Data Communication and Networking, Wayarles Tomasi, Pearson Education, ISBN:0130138282
5. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education

List of Laboratory Exercises:

1. To connect and built computers in different ways in a LAN (Topologies-star, ring, bus, tree)
2. To connect and understand different network devices used in LAN- Hubs, Switches, Routers, Bridges, Repeaters, Gateways, Modems.
3. To create network cable using RJ 45 connectors.
4. To install a network interface card (NIC) and locate mac address of computer.
5. Implementation of CRC.
6. Study and execution of Network commands.
7. To discover and assign IP address in Windows & Linux.
8. Socket programming Client Server using RPC.
9. Perform Installation of LAN and troubleshooting of frequently occurred problems.
10. Study and demonstration of CISCO packet tracer with data transmission.

Project Based Learning Assignments*

Note:- *Students in a group of 3 to 4 shall complete any one project from the following list)

1. Learner's Interaction with Information and Communication Technologies.
2. Networking and Security Projects.
3. Use of Information-Centric Networks in Revision Control Systems.
4. Real-Time Networking based Computer Ideas
5. Network Admission Control (NAC) Securing End Point Devices.
6. Network Desktop Manager. Example Modules: Desktop Sharing, Desktop locking and unlocking, IP Port Scanning.
7. IP based Patient Monitoring System
8. An Internet Voting System Supporting User Privacy.
9. Network Traffic Monitoring & windows Remote Manager. Example Modules: Remote Desktop, Remote Chat, Monitoring.
10. TCP Performance in an EGPRS system

Syllabus for Unit Tests:

Unit Test -1	Unit – I, Unit – II, Unit – III
Unit Test -2	Unit – IV, Unit –V, Unit - VI

Object Oriented Programming

TEACHING SCHEME		EXAMINATION SCHEME		CREDIT CHEME	
Lecture:	**4 Hours/Week**	**End Semester Examination:**	**60 Marks**	**Theory**	**4**
		Internal Assessment:	**40 Marks**		
Total	**4 Hours/Week**		**100 Marks**		**4**

Course Objective:
The course focuses on the understanding of object-oriented concepts such as classes, objects, data abstraction, methods, method overloading, inheritance, and polymorphism.

Prerequisite:
Basics of C Programming.

Course Outcomes: On completion of the course, students will have the ability to:

1. Differentiate between procedural and object oriented programming approach
2. Understand the object-oriented programming approach
3. Understand operator overloading
4. Explore the concepts of inheritance
5. Explore the file stream functions
6. Understand the concepts of templates and exceptions.

Unit I **08 Hours**

Introduction to OOP: programming characteristics of object-oriented languages. Comparison between C and C++. Programming basics of C++: input, output, directives, program structure, data types, decision and loops structure, type conversions.

Unit II **08 Hours**

Functions: function prototyping, function overloading, inline function, friend function, scope resolution operator, static functions

Object and Classes: Encapsulation, Abstraction, Polymorphism, Classes, access specifiers, static data members, static member functions, implementation of class in C++, memory allocation of objects, types of constructors and destructor

Unit III **08 Hours**

Arrays and string: arrays as data member, arrays of objects, The standard C++ String class and library functions.

Operator overloading: rules for overloading operators, overloading unary and binary operators, overloading operators using friend function, manipulation of string using operators.

Unit IV **08 Hours**

I**nheritance**: concept of inheritance, derived class and based class, types of inheritance, virtual base class, abstract class, nesting of classes, constructors in derived classes.

Pointer, **Virtual Function and Polymorphism**: pointers, pointer to objects, this pointer, pointer to derived classes, virtual functions and pure virtual functions

Unit V **08 Hours**

Streams and Files: Stream classes for formatted and unformatted I/O operations, file stream operations, file pointers and their manipulations, sequential input and output file operations, random access to update a file, error handling.

Unit VI **08 Hours**

Templates: The Standard Template Library, class template with multiple parameters, function template with multiple parameters, overloading template functions, member function templates

Exceptions: basics, exception handling mechanism, mechanism for: throw, catch, rethrow, specify exception

List of Internal Assignment will be framed by respective Course Coordinator.

Textbooks:

1 Object Oriented Programming with C++ Author: E. Balagurusamy.
2 C++: The complete Reference Author: Herbert Schildt.

Reference Books:

1 Object Oriented Programming C++, Fourth Edition, By Pearson.
2 Object Oriented Programming in C++ Author: Robert Lafore.

Project Based Learning Assignments

Note:- *Students in a group of 3 to 4 shall complete any one project from the following list

1. Login and Registration System using C++
2. Car Rental System using C++
3. Bookshop inventory system using C++
4. Student Report Management System using C++
5. Sudoku Game using C++
6. Credit Card Validator using C++
7. Using Graphics to Draw and Move Shapes using C++
8. Banking Record System using C++
9. Hotel Management System using C++
10. Student Management System using C++
11. Bus reservation System using C++
12. Library Management System using C++

Syllabus for Unit Tests:

Unit Test -1	Unit – I, Unit – II, Unit – III
Unit Test -2	Unit – IV, Unit – V, Unit - VI

Universal Human Values (Common for all Branches)

Teaching Scheme:	**Examination Scheme:**		**Credits Allotted**	
Practical :- 02 Hours/ Week	Term Work	50 Marks	Practical:	01
	Total	50 Marks	Total	01

Course Prerequisites:- During the Induction Program, students would get an initial exposure to human values through Universal Human Values. This exposure is to be augmented by this compulsory full semester foundation course.

Course Objective Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence Strengthening of self-reflection.
Development of commitment and courage to act

Course Outcomes:- After completion of the course students will be able to

1. Create more awareness of themselves, and their surroundings (family, society, nature);
2. Understand the Human being is coexisting with self and body and able to recognize its different needs and fulfillment
3. Develop more responsible life with human relationships, while keeping in mind the human nature
4. Understand to imbibe sensitive approach towards society and understand the dimensions of harmony in the society
5. Understand the recycle structure of the nature and able to recognize the participation
6. Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Unit I: Introductions, Aspirations and Concerns (4Hrs)
Getting to know each other, Self-exploration, Individual academic, career Expectations of family, peers, society, and nation fixing one's goals Basic human aspirations Need for a holistic perspective, Role of UHV.

Unit II. Self-Management, Health (4Hrs)
Self-confidence, peer pressure, time management, anger, stress Personality development, Self-improvement Harmony in the human being. Health issues, healthy diet, healthy lifestyle Hostel life Harmony of the self and Body Mental and physical health.

Unit III: Relationships **(4Hrs)**

Home sickness, gratitude towards parents, teachers and others Ragging and interaction Competition and cooperation Peer pressure. Harmony in relationship Feelings of trust, respect, gratitude, glory, love.

Unit IV: Society **(4 Hrs)**

Participation in society. Harmony in the society Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals .Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Unit V: Natural Environment **(4 Hrs)**

Participation in nature Harmony in nature/existence Understanding the harmony in the Nature Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self regulation in nature.

Unit VI. Self-evaluation Strategy **(4 Hrs)**

Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers. At the level of society: as mutually enriching institutions and organizations review role of education Need for a holistic perspective

Text Book

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004. 3. The Story of Stuff (Book).
3. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi 5. Small is Beautiful - E. F Schumacher.
4. Slow is Beautiful - Cecile Andrews
5. Economy of Permanence - J C Kumarappa 8. Bharat Mein Angreji Raj - PanditSunderlal 9. Rediscovering India - by Dharampal
6. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi 11. India Wins Freedom - Maulana Abdul Kalam Azad
7. Vivekananda - Romain Rolland (English)

Information Technology Laboratory – II

TEACHING SCHEME		EXAMINATION SCHEME		CREDIT CHEME	
Practical:	**2 Hours/Week**	**Term Work :**	**25 Marks**	**Practical:**	**1**
Total	**2 Hours/Week**	**Oral:**	**25 Marks**	**Total:**	**1**
		Total:	**50 Marks**		

Course Objective:
The course focuses on the practical mastery of object-oriented concepts such as classes, objects, data abstraction, methods, method overloading, inheritance, and polymorphism.

Prerequisite:
Basics of C Programming.

Course Outcomes: On completion of the course, students will have the ability to:
1. Apply input output derivatives
2. Implement classes with their objects
3. Implement operator overloading.
4. Implement types of inheritance.
5. Apply file stream functions
6. Implement templates and exceptions.

Unit I **04 Hours**

C++ Programming basics: input output directives, variable declarations, input output of variables, type bool, setw manipulator, type conversions.

Unit II **04 Hours**

Object and Classes: Implementation of class and object in C++, implantation of types of constructors and destructors, implementing classes, objects and memory static class data, using Const keyword.
The default copy constructor, returning from function. Structures and classes..
Implementing Functions: Object as function arguments, Returning object from functions, implementing function overloading, inline and friend functions

Unit III **04 Hours**

Implementing Arrays and string: Arrays as class member, Arrays of object, Array of string, standard C++ String class
Implementation of Operator overloading: Implementing unary and binary operators, implementing explicit and mutable overloading.

Unit IV **04 Hours**

Implementing Inheritance: Implementing Derived class and based class, implementing multiple, multilevel, hierarchical inheritance, public and private inheritance, inheriting constructors

Implemtation of pointers: pointer to objects, this pointer, pointer to derived classes, implementation of virtual functions and pure virtual functions

Unit V **04 Hours**

Implementing Streams and Files: Implementing formatted and unformatted I/O operations, Implementing file stream operations for sequential and random access

Unit VI **04 Hours**

Implementing Templates: Implementing class and function template with multiple parameters, overloading template functions, templates for member function

Implementing Exceptions: Implement throw, catch, rethrow, with specifying exception

Textbooks:

1 Object Oriented Programming with C++ Author: E. Balagurusamy.
2 C++: The complete Reference Author: Herbert Schildt.

Reference Books:

1 Object Oriented Programming C++, Fourth Edition, By Pearson.
2 Object Oriented Programming in C++ Author: Robert Lafore.

List of Laboratory Exercise:

1. Implement classes and objects
2. Implement a program using array of object and array as data member using suitable programs
3. Implement binary and unary operator overloading
4. Implement types of constructors and destructors
5. Implement multilevel, multiple and hierarchical public and private inheritance
6. Implement this pointer and pointer to object
7. Implement types of functions and overloading of functions
8. Implement file pointers and file stream functions
9. Implement function and class templates with overloading
10. Implement user defined exception with throw, catch and rethrow

COMPUTER AIDED DRAWING & DESIGN

TEACHING SCHEME		EXAMINATION SCHEME		CREDIT CHEME	
Practical:	**2 Hours/Week**	**Term Work:**	**25 Marks**	**Practical:**	**1**
Total	**2 Hours/Week**		**25 Marks**	**Total:**	**1**

Prerequisite:
Basics of programming skill

Course Objective:
1. To have the knowledge of Orthographic and Isometric projections
2. To understand the basic principles of Engineering drawing
3. To have the knowledge of different AutoCAD commands
4. To understand the algorithm for generating different entities on the screen

Course Outcomes: On completion of the course, students will have the ability to:
1. Prepare and understand drawings.
2. Use the principles of orthographic projections.
3. Use the principles of Isometric projections.
4. Able to draw simple drawing using AutoCAD.
5. Generate the line by highlighting the pixels.
6. Fill the polygon.

Unit I **04 Hours**

Orthographic Projection

Dimensioning and conventions strictly as per SP 46:2003 (Revised). Orthographic projection of right regular solids such as cube and prism. Orthographic projection of simple machine blocks

Unit II **04 Hours**

Isometric Projections

Introduction, Isometric axes, Lines & planes, Isometric scale, Isometric projection and Isometric view, Conversion of Isometric to Orthographic Projections

Unit III **04 Hours**

Introduction to AutoCAD

Getting Started with AutoCAD. Line, polyline, Circle, arc Rectangle, polygon Ellipse, Elliptical arc, spline, Xline, Ray, Points Measure, Divide, Region Wipeout, Helix, Donut

Unit IV **04 Hours**

AutoCAD Modify Tools and Dimensioning

Move, copy, Rotate, scale Stretch, fillet, chamfer Erase, offset, explode Array, polar Array, path array Trim, extend, mirror. Annotations Dimensions, dimension setting Linear dimension, Aligned dimension Angular dimensions, arc length, Radius Diameter

Unit V **04 Hours**

Line Drawing Algorithm

The Digital Difference Analyser (DDA) algorithm to draw lines on a screen. Interpolation points based on the difference between the start and end points. Bresenham Line Drawing Algorithm. Numerical examples.

Unit VI **04 Hours**

Flood Fill Algorithm

Concept of seed point, four connected approaches and eight connected. Boundary colour and fill colour. Filling of different polygon.

Textbooks:

1. **"**Elementary Engineering Drawing" by Bhatt, N.D., Charotar publishing Co.
2. "Engineering Graphics" by K.L. Narayana and P.Kannaiah, SCITECH PUBLICATIONS (INDIA) PVT.LTD. October 2008
3. "Engineering Graphics with AutoCAD", D. M. Kulkarni, A. P. Rastogi, and A. K. Sarkar (2009), PHI Learning Private Limited, New Delhi.
4. "Engineering Drawing: With an Introduction to CAD," Jolhe, Dhananjay (2006), Tata Mc Graw Hill, India

List of Laboratory Exercise:

1. Drawing to half imperial size sheet with instruments. Drawing illustrating basic concepts of Orthographic projections and dimensioning.
2. From the given three views draw isometric
3. Introduction to AutoCAD. Student should get familiarise with the GUI of the software.
4. Commands for drawing basic entities
5. AutoCAD Modify Tools and Dimensioning
6. Digital Difference Analyser (DDA) algorithm
7. Bresenham Line Drawing Algorithm
8. Flood Fill Algorithm