



Pimpri Chinchwad Education Trust's
[PCET-A trusted brand in Education Since 1990]

Pimpri Chinchwad College of Engineering
(An Autonomous Institute, affiliated to Savitribai Phule Pune University)

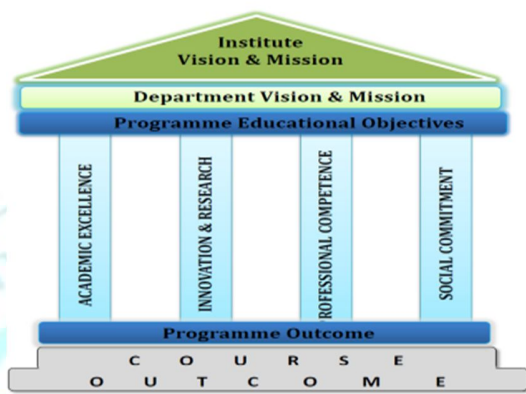
Curriculum Structure & Syllabus of
**Department of Applied Sciences and
Humanities**

[IT Engineering]

(UG Programme- F. Y. B. Tech.)
Effective from Academic Year 2020-21



Approved by
Academic Council, PCCoE, Pune.



Institute Vision

To Serve the Society, Industry and all the Stakeholders through the **Value-Added Quality Education**.

Institute Mission

To serve the needs of society at large by establishing State-of-the-Art Engineering, Management and Research Institute and impart attitude, knowledge and skills with quality education to develop individuals and teams with ability to think and analyze right values and self-reliance.

"Knowledge Brings Freedom"

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 Management System.

List of Abbreviations

SPPU	Savitribai Phule Pune University
A.Y.	Academic Year
HSMC	Humanities/ Social Sciences/Management Courses
B.Tech	Bachelor of Technology
Lec	Lecture
Prac/PR	Practical
Tut	Tutorial
Hrs	Hours
IE	Internal Evaluation
MTE	Mid Term Evaluation
ETE	End Term Evaluation
TW	Term work
OR	Oral
BSC	Basic Science Courses
ECC	Engineering Common Courses
PROJ	Project
HSMC	Humanities
LS	Life Skills
TW	Term Work
MTE	Mid Term Examination
CIE	Continuous Internal Evaluation /Examination
EME	Elementary Mechanical Engineering
UHV	Universal Human Values
Eng.	English
Jap.	Japanese
Ger.	German

Structure of B.Tech. First Year [IT Engineering]

B. TECH. Semester – I

Course Code	Course Type	Course Name	Teaching Scheme				Credit	Evaluation Scheme						
			Lec	Prac	Tut	Hrs		CIE		ETE	T W	P R	O R	Total
								IE	MTE					
BFE 1201	BSC	Linear Algebra & Univariate Calculus	3	-	1	4	4	20	30	50	50	-	-	150
BFE1204	BSC	Engineering Chemistry	4	-	-	4	4	20	30	50	-	-	-	100
BFE1304	ECC	Basic Electrical & Electronics Engineering	2	-	-	2	2	20	30	50	-	-	-	100
BFE1306	ECC	Computer programing & problem solving I	1	-	-	1	1	-	20	30	-	-	-	50
BFE1303	ECC	Workshop practices	-	2	-	2	1	-	-	-	50	-	-	50
BFE1701	PROJ	Mini project & basics of innovation	-	4	-	4	2	-	-	-	100	-	-	100
BFE1205	BSC	Engineering Chemistry Laboratory	-	2	-	2	1	-	-	-	50	-	-	50
BFE1305	ECC	Basic Electrical & Electronics Engineering Laboratory	-	2	-	2	1	-	-	-	50	-	-	50
BFE1307	ECC	Computer programing & problem solving I Laboratory	-	4	-	4	2	-	-	-	50	-	-	50
BFE1101/02/03	HSMC	HSMC-1(Eng./Jap./Ger.)	1	2	-	3	2	30		20		-	-	50
BFE1901	LS	Life Skill-1	-	2	-	2	-	Grade						
Total			11	18	1	30	20							750

B. TECH Semester – II

Course Code	Course Type	Course Name	Teaching Scheme				Credit	Evaluation Scheme							
			Lec	Prac	Tut	Hrs		CIE		ETE	T W	P R	O R	Total	
								IE	MTE						
BFE2206	BSC	Multivariate Calculus	3	-	1	4	4	20	30	50	50	-	-	150	
BFE2202	BSC	Engineering Physics	4	-	-	4	4	20	30	50	-	-	-	100	
BFE2310	ECC	Engineering Mechanics	2	-	-	2	2	20	30	50	-	-	-	100	
BFE2301	ECC	Engineering Graphics	1	-	-	1	1	-	20	30	-	-	-	50	
BFE2316	ECC	Computer Programing & Problem Solving II	2	-	-	2	2	20	30	50	-	-	-	100	
BFE2203	BSC	Engineering Physics Laboratory	-	2	-	2	1	-	-	-	50	-	-	50	
BFE2311	ECC	Engineering Mechanics Laboratory	-	2	-	2	1	-	-	-	50	-	-	50	
BFE2302	ECC	Engineering Graphics Laboratory	-	4	-	4	2	-	-	-	50	-	-	50	
BFE2317	ECC	Computer Programing & Problem Solving-II Laboratory	-	2	-	2	1	-	-	-	50	-	-	50	
BFE2104/05/06/07	HSMC	HSMC-2 (Eng./Jap./Ger./UHV)	1	2	-	3	2	30		20		-	-	50	
BFE2902	LS	Life Skill-2	-	2	-	2	-	Grade							
Total					13	14	1	28							20

Syllabi

B.Tech. First Year [2020 Course]

SEM I

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Course: Linear Algebra & Univariate Calculus						Code: BFE1201	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
3	-	-	3	20	30	50	100
				Evaluation Scheme			
				TW	OR	PR	Total
		1	1	50	-	-	50
Prerequisites:							
1. Elementary Mathematics. 2. Elementary Calculus.							
Course Objectives: This course aims at enabling students,							
1. To familiarize with concepts and techniques in Calculus and Matrices.							
2. To get acquainted with Mathematical Modelling of physical systems using differential equations.							
3. To acquire techniques of advanced level mathematics and its applications that would enhance analytical thinking power.							
Course Outcomes: After learning the course, the students will be able to:							
1. Apply the concept of rank to solve linear equation systems and problems related to Eigen Values and Eigen Vectors.							
2. Apply the intermediate value theorems for continuous functions.							
3. Expand a function in infinite series using Taylor's and Maclaurin's theorems and apply L'Hospital's rule to evaluate the limits of indeterminate forms.							
4. Solve ordinary differential equations of first order and first degree using appropriate techniques and analyze different problems related to electrical circuits, cooling problems, rectilinear motion and heat flow.							
Detailed Syllabus:							
Unit	Description						Duration (Hrs)
I	Matrices-I: Rank, normal form, system of linear equations, linear dependence and independence, linear and orthogonal transformations.						6
II	Matrices-II: Eigen values, Eigen vectors, Cayley – Hamilton theorem. application to problems in engineering (scaling, translation and rotation of matrix), diagonalization , canonical form.						6
III	Differential Calculus-I:Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Successive differentiation, Leibnitz theorem, application to find curvature.						6
IV	Differential Calculus-II: Taylor's series, Maclaurin's series, Indeterminate forms, L' Hospital's rule, evaluation of limits.						6
V	Differential equations: Exact differential equations, differential equations reducible to Exact form, Linear differential equations, differential equations reducible to Linear form.						6
VI	Application of DE: Applications of differential equations to orthogonal trajectories, Newton's law of cooling, Kirchoff's law of electrical circuits, rectilinear motion, one-dimensional conduction of heat.						6
	Total						36
Text Books:							
1. Higher Engineering Mathematics by B.V. Ramana , 34e, Tata McGraw-Hill.							
2. Advanced Engineering Mathematics by Erwin Kreyszig, 9e, Wiley Eastern Ltd.							
Reference Books:							
1. Higher Engineering Mathematics by H. K. Dass , 22e, S. Chand Publication, Delhi.							
2. Advanced Engineering Mathematics by S.R.K. Iyengar, Rajendra K. Jain, 4e, Alpha Science International, Ltd.							
3. Advanced Engineering Mathematics, by Peter V. O'Neil, 7e, Thomson Learning.							
4. Advanced Engineering Mathematics by M. D. Greenberg, , 2e, Pearson Education.							
5. Higher Engineering Mathematics by B. S. Grewal, 43e, Khanna Publication, Delhi.							

Course: Engineering Chemistry				Code: BFE1204			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
4	-	-	4	20	30	50	100
Prerequisites: <ol style="list-style-type: none"> 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. 							
Course Objectives: <ol style="list-style-type: none"> 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. 							
Course Outcomes*: After learning the course, students will be able to <ol style="list-style-type: none"> 1. Analyze the water quality, interpret techniques of water purification and compare green over traditional chemical synthesis. 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. Interpret the chemical structure, properties and synthesis of various polymers and nanomaterials and their uses. 5. Perceive and analyze fuel quality and identify the scope of derived alternate fuels. 6. Apply the preventive methods of corrosion to real-life problems. *Attainments of the above course outcomes shall be computed on the basis of the evaluation of theory and laboratory work of the same course.							
Detailed Syllabus							
Unit	Description						Duration (Hrs)
I	Water Technology and Green Chemistry. Impurities in water, hard water, 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. Numericals on EDTA method and alkalinity. Disadvantages of hard water in boilers. Water softening techniques: Permutit and Ion exchange method. Water purification by reverse osmosis and electro-dialysis. Dissolved oxygen (DO), biological oxygen demand (BOD) and Chemical oxygen demand (COD). Introduction of Green Chemistry: Definition, goals, principles and green synthesis of Polycarbonate.						8
II	Instrumental Analysis and battery technology. a) Electrochemistry: fundamentals of an electrochemical cell, EMF of cell, reference and indicator electrodes and Nernst Equation. b) Basic principles, instrumentation and applications of :- i) Conductometry: introduction, Kohlrausch's law, measurement of conductance and conductometric titrations of strong acid versus strong base, strong acid versus weak base and mixture of acids Vs Strong base. ii) pHmetry: theory of buffers and preparation, standardization of pH-meter, titration of weak acid versus strong base, simple and differential plots. Battery technology: introduction and types of batteries, construction, working and applications of Lithium ion battery, charging and discharging reactions at respective electrodes.						8
III	Spectroscopic techniques: Ultra Violet and IR spectroscopy a) UV Spectroscopy: nature of electromagnetic radiation and its characteristics. Interaction of matter with						8

	UV radiations leading to different electronic transitions. Beer's & 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. b) IR spectroscopy: principle, types of vibrations (stretching and bending), Hooks law. Different regions of IR spectrum such as fundamental group region, finger print region and aromatic region. Instrumentation of IR spectrophotometer with applications.	
IV	Chemistry of Polymers and Novel Carbon Compounds a) Polymers : definition, classification of polymers on the basis of thermal behavior, reaction mechanism of free radical and condensation polymerization with suitable examples. Advanced polymeric materials: Structure, properties and applications of liquid crystal polymer – Kevlar, conducting polymers - Polyacetylene, electroluminescent polymer - PPV, biodegradable polymers - PHBV, polymer composite - fibre reinforced polymer and recycling of polymers. b) Nanomaterials: definition, types of nanomaterials and properties of nanomaterials. Quantum dots, structure, synthesis, properties and applications of CNTs, Fullerenes and Graphene.	8
V	Fuels and combustion a) Fuels: definition, classification of fuels, 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 numericals. i) Solid fuels: coal, classification of coal, proximate and ultimate analysis of coal, numericals based on analysis of coal. ii) Liquid fuels: origin of petroleum, composition of petroleum, refining of petroleum, Octane number of petrol and Cetane number of diesel. Synthesis reaction, 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 coke, storage and transportation. H ₂ - O ₂ fuel cell. b) Combustion: chemical reactions, calculations on air requirement for combustion.	8
VI	Corrosion and Corrosion control a) Corrosion: introduction, types of corrosion, mechanism of atmospheric corrosion and wet corrosion. Electrochemical and galvanic series. Factors affecting corrosion: nature of metal and nature of environment. 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. Non-metallic coating - powder coating.	8
Total		48
Text Books: <ol style="list-style-type: none"> 1. Engineering Chemistry by S.S. Dara, S.Chand Publications (2010). 2. Engineering Chemistry by B.S. Chauhan, UnivSc Press.(2015). 3. A Text Book Of Engineering Chemistry by Shashi Chawla, Dhanpat Rai & Co. (2015). 4. Spectroscopy of Organic Compounds by P. S. Kalsi, New Age International (2007). 5. Nanotechnology: principles and practices by S.K. Kulkarni, Springer (2014). 6. Instrumental methods of Chemical Analysis by Gurdeep Chatwal, Himalaya publishing house (1996). 7. Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing Co.(2016). 8. Engineering Chemistry by Wiley India (2012). 9. Engineering Chemistry by O.G. Palanna, McGraw-Hill Education. 10. Introduction to Nanoscience and Nanotechnology by K. K. Chattopadhyay, A. N. Banerjee. PHI Learning (2009). 		
Reference Books: <ol style="list-style-type: none"> 1. Hydrogen as a fuel by Ram D. Gupta, C.R.C.Publication (2009). 2. Instrumental Methods of Analysis by H. H. Willard, L. L. Merritt, J. A. Dean, F. A. Settle, 6 th Edition, CBS Publisher. 3. Organic Spectroscopy by William Kemp, 3rd edition, , John Wiley and Sons, Palgrave publication. 4. Polymer Science by V.R.Gowariker,, New Age International Publication (2015). 5. Nanotechnology by T. Gregory, Springer Verlag New York (1999). 6. Introduction to Nanotechnology by Charles P. Poole, Frank Owens, John Wiley & Sons (2003) 7. Engineering Chemistry by Wiley India Pvt. Ltd, First edition 2011. 8. Inorganic Chemistry by Shriver and Atkins ,5e,Oxford University Press.. 9. Hydrogen fuel-production transport and storage by Ram Gupta,CRC Press. 10. Basic concepts of analytical Chemistry by S.M.Khopkar, 2e, New Age International Publications. 		

Course: Basic Electrical & Electronics Engineering						Code: BFE1304	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
2	-	-	2	20	30	50	100
Pre-requisites: 1. Electron theory 2. Ohms law 3. Magnetism 4. Number system 5. Semiconductor theory							
Course Objectives: 1. To provide working knowledge for the analysis of basic DC circuits. 2. To build strong conceptual understanding of single phase and polyphase AC circuits with phasor diagram representation. 3. To provide hands on experience for conceptual understanding of DC and AC machines. 4. To introduce fundamental concepts of analog and digital electronics.							
Course Outcomes*: After learning the course, students will be able to 1. Analyze DC circuits as well as compare electric and magnetic circuits. 2. Analyze single phase and three phase circuits to determine various computed electrical parameters. 3. Demonstrate the constructional features and operational details of DC and AC machines. 4. Identify type of diodes, transistor configurations as well as to build and test digital circuits using logic gates and flipflops. *Attainment of the above course outcomes shall be computed on the basis of evaluation of theory and laboratory work of the same course.							
Detailed Syllabus							
Unit	Description						Duration (Hrs)
I	Electric and magnetic circuit Electric Circuits: Classification of electrical networks, ideal and practical voltage and current sources, Source transformation, Simplification of networks using series and parallel combinations, Star delta transformation, Kirchhoff's laws (loop Current analysis), Magnetic Circuit: Flux, flux density, reluctance, MMF, permeability and field strength, their units and relationships; comparison of electric and magnetic circuit, Series magnetic circuit						6
II	Single and three phase AC circuits Single phase AC Circuits: Elementary idea about power generation, transmission and distribution, Generation of single-phase sinusoidal A.C voltages, AC Quantities, Single phase ac circuit analysis (R, L, C, R-L-C series) on the basis of impedance, admittance, concept of active, reactive, apparent power and power factor etc. Three phase AC Circuits: Introduction to 3 phase supply and its necessity, balance three phase system, relation between line and phase quantities (with phasor diagram), power in three phase circuits for star and Delta connection						6
III	DC and AC machines DC Machines: Construction, working principle of D.C. generator, emf equation of D. C. generator (derivation not expected), working principle of D.C. motor, types of D.C. motor, Back emf (Numerical), Industrial applications. AC Machines: Single phase transformers: Construction, operating principle, emf equation, voltage and current ratios. Losses, Efficiency and regulation, Concept of ideal transformer, Auto-transformer						6
IV	Analog and digital electronics Analog Electronics Diode: Ordinary Diode, LED, Photodiode and Zener Diode: Construction, symbol, working, charac-						6

	<p>teristics, applications etc.</p> <p>Transistor: construction, types, operation; transistor configuration (CE, CB and CC): characteristics.</p> <p>Digital Electronics</p> <p>Logic Gates: Fundamental, derived and exclusive logic gates: symbol, operation, truth table, timing diagram; concept of universal gates</p> <p>Combinational Logic Circuit: Reduction of digital expressions by Boolean algebra and De Morgan's Theorem, half and full adder</p> <p>Sequential Logic Circuit: Flip – Flop (SR, D, JK & T): construction, working, truth table; types of triggering, 2 bit synchronous & asynchronous counter: construction and operation</p>	
	Total	24
<p>Text Books:</p> <ol style="list-style-type: none"> 1. Theory and problems of Basic Electrical Engineering by I. J. Nagrath and Kothari ,Eastern Economy edition, PHI learning Pvt.Ltd. 2. Fundamentals of Electrical Engineering by AshfaqHusain , 4e, DhanpatRai&Co. 3. Basic Electrical Engineering by V. N. Mittal and Arvind Mittal,2e, McGrawHill. 4. Basic Electrical Engineering by V.K. Mehta ,1st revised edition, S. Chand & Co. Pvt. Ltd. New Delhi. 5. Electronics Devices by Thomas. L. Floyd, 9e,Pearson. 6. Modern Digital Electronics by R.P. Jain, 4e, Tata McGrawHill 		
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Basic Electrical Engineering by D. C. Kulshreshta,1 e, Tata McGraw hill. 2. A textbook of Electrical Technology (Vol I & II) by B. L. Theraja and A. K. Theraja, 1st edition, S. Chand & Co. Pvt. Ltd. New Delhi. 3. Electrical Technology by Edward Hughes ,10e,Pearson. 4. Digital Fundamentals by Thomas L Floyd, 10e, Pearson. 5. Digital design by M. Morris Mano, 3e, Pearson. 6. Fundamentals of digital circuits by Anand Kumar, 2e, Prentice Hall of India 		

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Course: Computer Programing & Problem Solving-I					Code: BFE1306		
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
1	-	-	1	-	20	30	50
Prerequisites: Students are expected to have a good understanding of basic computer principles.							
Course Objectives: 1. To acquaint with problem solving and problem solving aspects. 2. To develop problem solving ability with computers. 3. To acquaint with programming and various program design tools. 4. To develop competency for the design, coding and debugging. 5. To build the programming skills using 'C'.							
Course Outcomes: After learning the course, the students will be able to: 1. Apply skills of problem solving for finding solutions to real life problems. 2. Analyze the methods and apply the most appropriate method for solving problems. 3. Apply programming logic/logical constructs of C language for problem solving. 4. Demonstrate significant experience with the 'C' program development environment.							
Detailed Syllabus:							
Unit	Description						Duration (Hrs)
I	Problem Solving Using Computers: General problem solving strategies, Top down design, Introduction to program Planning tools- algorithm, flowcharts, and pseudo codes. Introduction to Logic Structures: Sequential structure, Decision Structure, Loop Structure.						2
II	Introduction to C Programming: Features of C, basic concepts, structure of C program, program, declarations, variables, data types, expressions, operators assignment, arithmetic, relational, logical, increment and decrement, precedence of operators, type conversions, scanf and printf functions. Case Study: Exchanging the values of two variables, summation of a set of numbers.						2
III	Decision Control Structures in C: if-else, nested if-else, cascaded if-else and switch statement. Case Study: Finding square root of a number. Loop Controls Structures in C: Conditional control structures: for, while do-while Unconditional control structures: break, continue, goto statement. Case Study: Factorial of a given number, Generation of the Fibonacci Sequence, Reversing the digits of an integer.						4
IV	Arrays: Declaration initialization of one dimensional Array, two dimensional array, accessing array elements, Character Array/String, Character - Handling Library Functions, Standard Input/Output Library Functions for string. Case Study: Finding maximum number from given array, removal of duplicates from an ordered array.						4
	Total						12
Text Books: 1. How to Solve it by Computer by R. G. Dromey, 1e, Pearson Education. 2. ANSI C Language by Kernighan., Ritchie, 2e, Prentice Hall. 3. Programming in ANSIC by E. Balagurusamy, 6e, McGraw Hill Publication..							
Reference Books: 1. Problem solving and programming concepts by MaureenSprankle, 7e, Pearson Education. 2. Let Us C by Yashavant Kanetkar, 13e, BPB Publication. 3. C: The Complete Reference by Herbert Schildt.							

Course: Workshop Practices				Code: BFE1303			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	OR	PR	Total
-	2	-	1	50	-	-	50
Prerequisites: <ol style="list-style-type: none"> 1. Algebra 2. Geometry 							
Course Objectives: <ol style="list-style-type: none"> 1. To introduce various machine tools and demonstration on machining 2. To introduce different materials in engineering practices with respect to their workability, formability and machinability. 3. To develop skills through hands on experience. 							
Course Outcomes: After learning the course, the students will be able to: <ol style="list-style-type: none"> 1. Identify and choose various manufacturing processes for given material. 2. Use various hand tools and basic measuring instrument used for carpentry, welding, fitting, and sheet metal operation. 3. Identify advanced manufacturing processes. 4. Follow safety practices on shop floor. 							
List of Experiments: <ol style="list-style-type: none"> 1. Introduction to safety measures. 2. Demonstration of Manufacturing processes (Machining: Turning, Drilling, Milling and grinding using one simple machine component and sheet metal operations): Working, operation and types 3. Demonstration of sand casting and plastic molding: Preparation of sand mold and molding of simple plastic component 4. Finishing, inspection and assembly of machine components using different tools (Finishing, assembly) and measuring instruments. (For jobs made during preceding practical) 5. Demonstration of Advanced Manufacturing processes (CNC Machining, Additive manufacturing using one simple machine component) 6. Demonstration of electrical and electronic component assembly 7. Carpentry-1 Job involving joint and wood turning 8. Fitting – 1 Job involving fitting to size, male female fitting with drilling and tapping. 9. Joining – 1 Job involving welding (Arc), soldering, brazing etc. 10. Dismantling and Assembly of simple machines. 							
Note: <ol style="list-style-type: none"> 1. Assignment one is mandatory. 2. Any four from experiment number 2 to 6. 3. Students will perform any two utility jobs from experiment number 7 to 10. 							
Submission: Two jobs as mentioned above and write up of demonstration with sketches/illustration.							

Course: Mini Project and Basics of Innovation					Code: BFE1701		
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	OR	PR	Total
-	4	-	2	100	-	-	100
Prerequisites: Knowledge of basic sciences till higher secondary level.							
Course Objectives: 1. To develop innovative thinking, research attitude and project-based learning ability. 2. To provide every student the opportunity to get involved either individually or as a group so as to develop the team skills and learn professionalism.							
Course Outcomes: After learning the course, the students will be able to: 1. Understand concepts of Research, Innovation, Invention and IPR. 2. Identify projects relevant to societal needs/conservation of environment/scope of the subject. 3. Apply the technological knowledge to find feasible solutions for the selected problem.							
Detailed Syllabus:							
Unit	Description						Duration (Hrs)
I	Introduction to Research, Innovation & Invention: What is Research, Innovation and Invention, inter-disciplinary view, fundamental and applied research with examples and importance of both, engineering inventions, Information about some great inventions (In form of videos).						2
II	Literature Review: Effective searching of literature, a summary of literature review. Research Ethics: Plagiarism, authorship, use of language, protecting confidentiality, conflicts of interest. Publication Platforms: Conferences (national and international), journals (national and international), the meaning of impact factor and citation index, Web of Science, Scopus, etc.						2
III	Structure of Concept Note: Title of an idea, introduction, brief description with sketch, goal and objectives, impact and uniqueness of the idea, time required for developing the prototype, approximate cost analysis. Structure of Research Paper: Research paper (national and international), Title and abstract, introduction, method, evaluation, conclusion, references, writing a research paper-style of writing and formatting.						2
IV	Introduction to Design Thinking (DT): What is Design Thinking? Phases of DT, DT or 'Out of the Box' thinking, DT: an iterative and non-linear process, SCAMPER technique for DT, Case studies.						2
V	Intellectual property (IP): Introduction to IPR, patents, copyrights, role in commerce, overview and importance, case studies in IPR. Patent Search: What is a patent search? Types of patent search, step to start a patent search, patent search in Google patent search						2
VI	Basics of Entrepreneurship: Introduction, types of entrepreneurship, the process of entrepreneurship, theories of entrepreneurship, social responsibility of entrepreneur, startup policies.						2
	Total						12
Activities: (Any 3 of the following) 1. Assignment on Identifying International/National Journals in your project domain. 2. Assignment on patent search in your project domain through Google patents. 3. Presentation/Report based on literature survey for the project. 4. Small activity based on SCAMPER technique for DT.							
Mini Project: 1. Idea Inception. 2. Model/poster (A3 Size)/report writing/research article based on the project. 3. Demonstration/exhibition based on carried out work.							

Course: Engineering Chemistry Laboratory					Code: BFE1205		
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	OR	PR	Total
-	2	-	1	50	-	-	50

List of Experiments: (Any 10 experiments from the following list)

1. Determination of total hardness of water sample by EDTA method.
2. Determination of total alkalinity of the water sample.
3. Titration of a mixture of weak acid and strong acid with st. base using a Conductivity meter.
4. To determine the dissociation constant of a weak acid (acetic acid) using pH meter
5. Study Practical:- A) Potentiometric titration of ferrous versus Cerium.
6. To determine the maximum wavelength of absorption of CuSO₄, verify Beer's law and find unknown concentration in the given sample.
7. Study Practical:- B) Structural identification of unknown compounds by UV and IR.
8. To prepare the Phenol formaldehyde resin or polypropylene.
9. Proximate analysis of Coal.
10. To determine the electrochemical equivalent (ECE) of Cu.
11. Chromatographic separation of Ortho and Para nitro-phenol .
12. Study of corrosion of metals in a medium of different PH

Laboratory manual :

1. Vogels 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.

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Course: Basic Electrical & Electronics Engineering Laboratory						Code:BFE1305	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	OR	PR	Total
-	2	-	1	50	-	-	50

List of Experiments: Group A

From following any **three** Practical are to be study:

1. To study of various wiring accessories, earthing system and safety precautions while working with electrical systems.
2. Study of Electricity bill of LT consumer.
3. Study of Single Line diagram of Power System
4. To study various electronics circuit components and allied accessories
5. To study digital multimeter, digital trainer kit and CRO

Group B

From following any **seven** Practical are to be performed:

1. To verify Kirchhoff law in a DC network
2. To measure steady state response of series RL and RC circuits on AC supply and observations of voltage and current waveforms.
3. To verify the relation between phase and line quantities in three phase balanced star and delta connections of load.
4. Perform load test on DC Shunt Motor to plot characteristics
5. To determine efficiency and regulation of single-phase transformer by direct loading test.
6. To Plot V-I characteristics of P-N Junction Diode and Zener Diode
7. To Plot input and output characteristics of CE Transistor configuration
8. Implementation of Half Adder & Full Adder using Logic Gate IC's
9. Verify its truth table SR, D, JK & T flipflops.

Course: Computer Programing & Problem Solving-I Laboratory					Code: BFE1307		
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	OR	PR	Total
-	4	-	2	50	-	-	50
Assignment No.	Suggested List of Assignments (Write a program in C)						Duration (Turns)
	GROUP A (Any 5)						
1	Write a program to calculate salary of an employee given his basic pay (take as input from user). Calculate gross salary of employee. Let HRA be 10% of basic pay and TA be 5% of basic pay. Let employee pay professional tax as 2% of total salary. Calculate net salary payable after deductions.						1
2	Write a program to accept an object mass in kilograms and velocity in meters per second and display its momentum. Momentum is calculated as $e=mc^2$ where m is the mass of the object and c is its velocity						1
3	Write a program to accept two numbers from user and compute smallest divisor and Greatest Common Divisor of these two numbers.						1
4	Given a number N and a power P, write a program to find the exponent of this number raised to the given power, i.e. N^P .						1
5	Write a program to accept total number of minutes as input and then output as hrs + minutes. Ex:- 90 minutes = 1 hour 30 minutes						1
6	Write a program to read the coordinates (x, y) (in Cartesian system) and find the quadrant to which it belongs (Quadrant -I, Quadrant -II, Quadrant -III, Quadrant -IV).						1
7	Write a program that will read an integer number and check whether it is an EVEN or ODD number.						1
8	A hotel has a pricing policy as follows:- Stay for 2 person : 2500Rs. per night Stay for 3 person : 3500Rs. per night Stay for 4 person : 4500Rs. per night Additional person : 1000Rs. per person per night If the customer is staying on company business tour, there is a 20% discount. Take the number of people, number of night staying, if it's business tour or not as input from user. Write a program to calculate and print the cost of the room.						1
9	Write a program that extracts and prints the rightmost digit of the integer value.						1
10	Write a program to accept marks of five courses and compute the result. If student scores aggregate greater than 75%, then the grade is distinction. If aggregate is $60 \geq$ and < 75 then the grade is first division. If aggregate is $50 \geq$ and < 60 , then the grade is second division. If aggregate is $40 \geq$ and < 50 then the grade is third division. If aggregate is < 40 then student is fail.						1
11	Write a program to check two given integers, and return true if one of them is 30 or if their sum is 30 using conditional operator.						1
12	Write a program to find the largest number using ternary operator among : two numbers, three numbers, four numbers.						1
13	Write a program to print the number of months (use 30 days to a month) and remaining days given the number of days between two dates.						1
14	Write a program to accept number from 1 to 7 and print equivalent day of the week (i.e. 1 Monday).						1
15	Write a program to simulate simple calculator that performs basic tasks such as addition, subtraction, multiplication and division with special operations like computing x^y and $x!$						1
	GROUP B (Any 2)						
16	Accept details of a student like name and address. Write a program to print the details in						1

	uppercase.	
17	Accept bank account number from user and identify the last four digits of the account number. Write a program to print the last four digits from the account number separately. For example:- Input: 1000678954 Output:- 8 9 5 4	1
18	Write a program to check whether given number is Prime or not. Take a number as input from user.	1
19	Write a program to print the Fibonacci series. Accept the range of Fibonacci series from user as input.	1
20	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 cube of the three digits is equal to the number itself. Example :- 371	1
21	Write a program to calculate the sum of all numbers from 1 to 100 that are divisible by 4	1
22	Write a program to generate a series of numbers from 1 to 10 and print these series in the shape of a pyramid.	1
23	An instructor calculates the grade percentage based on the highest score on a test. Given the highest score and one student's score, write a solution to calculate and print that students test percentage.	1
	GROUP C (Any 3)	
24	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.	1
25	Write a program to accept details of two matrices. Add and multiply given matrices and print the result.	1
26	Accept a string from user. Write a program to find the frequency of characters in a string.	1
27	Write a program to accept a string from user. Using a loop iterate over the character of the string and remove all characters from string except the alphabets. Print the final string.	1
28	Write a program to find the length of a string, concatenate two strings, copy string using string library functions.	1
29	Consider you have created a website in which you are accepting details of users where you have to take password from user. Write a program to accept password from user with following condition: 1. Minimum characters 6 and maximum are 12. 2. Atleast one digit and one characters. 3. Atleast one special symbol (@, \$, #) .	2
30	Write a program to accept a string and replace all the vowels in the string with '*'. Display the updated string.	1
	Total	24
Implement a Mini Project to use all the concepts of C Programming and Problem solving.		
Remark: Implementation of all assignments is encouraged.		
Text Books:		
4. How to Solve it by Computer by R. G. Dromey, 1e, Pearson Education. 5. ANSI C Language by Kernighan., Ritchie, 2e, Prentice Hall. 6. Programming in ANSI C by E. Balagurusamy, 6e, McGraw Hill Publication..		
Reference Books:		
4. Problem solving and programming concepts by Maureen Sprankle, 7e, Pearson Education. 5. Let Us C by Yashavant Kanetkar, 13e, BPB Publication. 6. C: The Complete Reference by Herbert Schildt.		

Course: HSMC-1 (English)				Code: BFE1101			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
1	2	-	2	30	-	20	50
Prerequisites: <ol style="list-style-type: none"> 1. Basic knowledge of grammar and phonetics 2. Basic reading and writing skills 							
Course Objectives: <ol style="list-style-type: none"> 1. To apply the basics of grammar accurately and appropriately to develop Language skills. 2. To enhance the skills of reading, writing, listening to English for its accurate and appropriate use. 3. To enhance Language competence. 							
Course Outcomes: After learning the course, students will be able to <ol style="list-style-type: none"> 1. To acquire a strong foundation in grammar and enhance their vocabulary skills. 2. To develop good listening skills. 3. To write appropriately and communicate effectively. 4. To speak confidently in English 							
Detailed Syllabus							
Unit	Description						Duration (Hrs)
I	Grammar: Introduction, Usage-based understanding of Grammar structures - Tenses, articles, prepositions, conjunctions and sentences						9
II	Building Word Power: Word formation, Words often Confused - Pairs of Words, Synonyms, Antonyms, idioms and phrases, one-word substitution, Foreign Phrases.						9
III	Speaking Skills enhancement: Pronunciation, stress, intonations, pauses and pace, effective use of speech, Comprehension and summation of technical passages and building technical vocabulary.						9
IV	Listening Skill development: Basics of Listening, ways to improve, Difference between talking and speaking, barriers to effective speaking, extempore, presentation skills, public speaking, hearing and listening difference.						9
Total						36	
Reference Books: <ol style="list-style-type: none"> 1. English for Engineering Students by Sharma, G.V.L.N. 2. Essential English Grammar (Elementary & Intermediate by Raymond Murphy, CUP 3. English Grammar and Compositions by Martin, S. Chand Publications 4. Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson) 							

Course: HSMC-1 (Japanese)				Code: BFE1102			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
1	2	-	2	30	-	20	50
Prerequisites: 1. To make use of learned English/Marathi/Hindi language for learning the Japanese language. 2. Willingness to learn a foreign language and a positive attitude towards the language and culture of Japan.							
Course Objectives: 1. To familiarise students to basics of the Japanese language . 2. To develop an ability to understand and articulate themselves in day to day real-life situations.							
Course Outcomes: After learning the course, students will be able to 1. Read and write Japanese Scripts (Hiragana, Katakana) and Kanjis. 2. Use the Japanese language in day-to-day life. 3. Develop language skills namely listening, speaking, reading, and writing skills for socializing, providing and obtaining information.							
Detailed Syllabus							
Unit	Description						Duration (Hrs)
I	Introduction Speaking: Greeting and introducing yourself, alphabets, numbers (0-10), Song of greetings and body parts. Listening: Short skit on self-introduction. Writing: Japanese scripts (Hiragana and Katakana) Reading: Lesson reading (1,2,3) Grammar: Particles (は、か、の、も) Test on grammar						11
II	How much is for one flower? Speaking: Framing sentences using counters and prepositions. Listening: Short clips based on counters and prepositions. Writing: Picture description Reading: Lesson reading (4,5,6) Grammar: Prepositions, counters, particles (に、と、や、など、なにも、なにか), introduction to verbs. Test on grammar, listening						11
III	What do you do on Sunday? Speaking: Framing sentences using days and dates. Listening: Video clips for days and dates. Writing: Daily routine writing. (Diary writing) Reading: Lesson reading (6,7,8,9) Grammar: Verbs (past, negative form) introduction to adjectives.						10
IV	I wake early every morning. Speaking: Talking about the daily routine. Listening: Video clips for days and dates. Writing: Daily routine writing. Reading: Lesson reading (6,7,8) Grammar: Verbs (past, negative form) introduction to adjectives. Test on grammar, listening						11
	Total						43
Text Books Minna no Nihongo Part I and II , NihongoShoho							
Reference Books: 1. MO MO Japanese for Class VII							

2. MO MO Japanese for Class VIII
3. MO MO Japanese for Class VII workbook
4. MO MO Japanese for Class VIII workbook
5. Genki I, I
6. Japanese for busy people.



Course: HSMC-1 (German)					Code: BFE1103		
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
1	2	-	2	30	-	20	50
Prerequisite: Positive attitude towards and interest in foreign cultures.							
Course Objectives: 1. To familiarise students to the basics of the German language. 2. To develop an ability to understand and articulate themselves in day to day real-life situations							
Course Outcomes: After learning the course, students will be able to 1. Understand and use familiar everyday expressions and very simple sentences, which relate to the satisfaction of concrete needs. 2. Introduce oneself and others; ask and answer questions about personal details such as where he/she lives, people he/she knows, things he/she owns and respond to questions of this nature. 3. Interact in a simple way provided the other person talks slowly and is willing to help.							
Detailed Syllabus							
Unit	Description						Duration (Hrs)
I	Good Day Speaking: greeting and bidding farewell, introducing oneself and other person, spelling names and telling telephone numbers and email address. Vocabulary: numbers 0 to 20, names of countries and languages Listening: information on the origin and languages, telephone numbers and email address Writing: filling up the information in a table Reading: introduction of people Grammar: verbs and personal pronouns in singular, Wh-questions, Statements, Verbs						7
II	Hobbies, Work and Professions Speaking: talking about Hobbies, work and Profession Vocabulary: hobbies and professions, numbers 20 to 100 Listening: making a free time plan Writing: filling up personal data in a form Reading: profiles of working people Grammar: personal pronouns in the plural, irregular verbs and verb conjugations, Yes-No questions						7
III	In the city Speaking: talking about places and buildings in a city, asking for and explaining the direction Vocabulary: names of places and buildings in a city, vehicles, directions, numbers 100 onwards Listening: descriptions of paths Writing: description of cities Reading: events in a city Grammar: definite and indefinite article, negative article Test training and cultural and regional information						9
IV	Food and beverages Speaking: talking about eating habits, playing shopping situations Vocabulary: meal times, food items and beverages, shopping centres Listening: prices Writing: list with Prices, shopping list Reading: profile of a chef Grammar: nominative and Accusative case, Singular and Plural						7

V	Daily routine Speaking: asking for clock time and week days, speaking about day-to-day activities Vocabulary: routine activities, clock time, days, months, seasons Listening: dialogues on free-time activities, schedules Writing: daily schedule, reply on an invitation Reading: appointment schedule Grammar: prepositions with time data, possessive determiners, modal auxiliaries Test training and cultural and regional information	9
Total		39
Text Books: Netzwerk A1		
Reference Books: <ol style="list-style-type: none"> 1. Linie A1 2. Studio d A1 3. Tangram aktuell 1 4. Fit für Goethe-Zertifikat A1 5. Mit Erfolg zu Start Deutsch 1 6. Prüfungstraining A1 7. Grammatik-Intensivtrainer A1 		

Course Type: Life Skills		Code: BFE1901
Course Objectives: <ol style="list-style-type: none"> 1. To understand importance of physical activities and awareness about the health. 2. To provide platform to express their mind, body and the emotions through performing arts. 		
Detailed Syllabus:		
Unit	Description	Duration (Hrs)
I	Yoga: Physical activities and Meditation Sports: Basketball, Table tennis, Football and Volleyball	8
II	Performing arts Music Photography and Short Movie Making Painting/ Sketching/ Drawing Theatre Arts	8
III	Guest lecture Motivational lectures, Guest lectures by Eminent personality and Industry person	2
IV	Club activity Activities organized by different clubs like Matholics, Chemistry Club, Wall magazine, Readers club, Physics club, Techno-science club, Coding club	2
V	ISR activity Social awareness activities to understand the social responsibility	2
VI	Industrial Visit Visit to nearby industries as per the core domain	2
	Total	24

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SEM II

Course: Multivariate Calculus						Code: BFE2206	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
3	-	-	3	20	30	50	100
				Evaluation Scheme			
				TW	OR	PR	Total
-	-	1	1	50	-	-	50
Prerequisites:							
1. Elementary Mathematics.							
2. Elementary Calculus.							
Course Objectives:							
1. To strengthen the concepts of multivariable calculus and its application in maxima & minima, error & approximation area, volume, CG and MI.							
2. To familiarize the students with continuous and discrete systems, where knowledge of Fourier series and Harmonic analysis is required.							
3. To make students acquainted with advanced techniques to evaluate integrals.							
Course Outcomes:							
After learning the course, the students will be able to:							
1. Evaluate Partial Differentiation and apply the concept of PD in Euler's theorem, Jacobian, Maxima & Minima, and Error & Approximation.							
2. Apply Fourier series to represent the periodic time domain function to signal form.							
3. Evaluate definite integrals using techniques like reduction formula, Gamma, Beta function, DUIS, and Error function.							
4. Apply multiple Integration techniques to analyze area, volume, CG & MI.							
Detailed Syllabus:							
Unit	Description						Duration (Hrs)
I	Partial Differentiation: Partial derivatives, Euler's theorem on homogeneous functions, implicit functions, and variable treated as constant, total derivatives, change of independent variables.						6
II	Jacobian: Jacobians and their applications, errors and approximations. Maxima and Minima: maxima and minima of functions of two and three variables.						6
III	Fourier Series: Definition, Dirichlet's conditions, full range Fourier series, half range Fourier series, Harmonic analysis and application to the engineering.						6
IV	Integral Calculus: Beta and Gamma functions, Reduction formula, differentiation under integral sign (DUIS), Error functions.						6
V	Multiple Integral-I: Double integration, change of order of integration, conversion into polar form, rectification of curves, application of double integration to area, CG, MI						6
VI	Multiple Integral-II: Triple integration, Dirichlet's theorem, application of triple integration to Volume, CG, and MI						6
	Total						36
Text Books:							
1. Higher Engineering Mathematics by B.V. Ramana, 34e, Tata McGraw-Hill.							
2. Advanced Engineering Mathematics by Erwin Kreyszig,9e, Wiley Eastern Ltd.							
Reference Books:							
1. Higher Engineering Mathematics by H. K. Dass, 22e, S. Chand Publication, Delhi.							
2. Advanced Engineering Mathematics by S.R.K. Iyengar, Rajendra K. Jain, 4e, Alpha Science International, Ltd.							
3. Advanced Engineering Mathematics by Peter V. O'Neil, 7e, Thomson Learning.							
4. Advanced Engineering Mathematics by M. D. Greenberg, 2e, Pearson Education.							
5. Higher Engineering Mathematics by B. S. Grewal, 43e, Khanna Publication, Delhi.							

Course: Engineering Physics				Code: BFE2202			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
4	-	-	4	20	30	50	100
Prerequisites: <ol style="list-style-type: none"> 1. Wave theory of light 2. Elasticity 3. Atom, molecule & nuclei 4. Current, electricity & magnetism 5. Electromagnetic Induction 							
Course Objectives: <ol style="list-style-type: none"> 1. To build a strong conceptual understanding of Optics, Semiconductor Physics & Quantum Physics. 2. To explore advances in Physics with the introduction of Lasers, Nanotechnology & Superconductivity. 3. To provide consciousness about the importance of Physics principles in various engineering applications. 4. To provide hands on experience for better understanding of concepts as well as the development of experimental skills. 							
Course Outcomes*: After learning the course, students will be able to <ol style="list-style-type: none"> 1. Analyze intensity variation due to optical phenomena like interference and relate these concepts to various engineering applications 2. Apply the working principle of lasing action & interpret working of lasers with its prominent applications 3. Analyze & interpret electrical behavior of materials & relate the working of semiconductor devices with the concept of Fermi level 4. Interpret wave-like behavior of matter and apply Schrodinger's wave equation to study the quantum mechanical phenomenon 5. Interpret properties of superconductors & their applications in advanced technologies 6. Recognize properties, preparation methods of nanomaterials & explore their applications in various engineering fields. *Attainments of the above course outcomes shall be computed on the basis of the evaluation of theory & laboratory work of the same course.							
Detailed Syllabus							
Unit	Description						Duration (Hrs)
I	Wave Optics Interference: Interference at parallel thin film, conditions of maxima and minima, interference at wedge shaped film, anti-reflection coating Diffraction: Types of diffraction, single slit diffraction (Derivation), diffraction grating (Qualitative), introduction to X-Ray diffraction Polarization: Law of Malus, Double refraction, Huygens' theory of double refraction, photo elasticity.						8
II	Laser Physics & Fiber Optics Laser Physics: Introduction, absorption, spontaneous emission, stimulated emission, population inversion, characteristics of laser, semiconductor hetero-junction laser, carbondioxide laser, applications of laser-industrial, defense & medical; introduction to holography Fiber Optics: Propagation of light in optical fibers, acceptance angle, numerical aperture, modes of propagation, types of fibers- step index, graded index, single mode & multimode; Losses -attenuation, dispersion; application in fiber optic communication link.						8
III	Semiconductor Physics Limitations of classical free electron theory, Kronig -Penny model (qualitative), band theory of solids, electrical conductivity of conductors & semiconductors, influence of external factors on conductivity (temperature, light & impurity), Hall effect (with derivation), Fermi Dirac probability distribution function, Fermi energy, position of Fermi level in intrinsic semiconductors (with derivation) & in extrinsic semiconductors, dependence of Fermi level on temperature & doping concentration, energy band diagram of P-N Junction diode, solar cell I-V characteristics and applications.						8
IV	Quantum Mechanics Wave particle duality of radiation & matter, De Broglie hypothesis, De Broglie wavelength in terms						8

	of kinetic & potential energy, concept of wave packet, phase and group velocity, properties of matter waves, Heisenberg's uncertainty principle, wave function & probability interpretation, well behaved wave function, Schrodinger's time independent wave equation, application of independent wave equation to the problem of (i) particle in rigid box (ii) particle in a non rigid box(qualitative), Tunneling effect, example of tunneling in tunnel diode & scanning tunneling microscope (STM).	
V	Magnetism and Superconductivity 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-optical recording, magnetocaloric effect, adiabatic demagnetization Superconductivity: Properties of superconductors-zero resistance, Meissner effect, isotope effect, BCS theory, type I and II superconductors, low T _c and high T _c superconductors, Josephson effect, construction, working and applications of DC-SQUID, applications - superconducting magnets, maglev trains	8
VI	Introduction to Nanoscience Origin of nanoscience, 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 vapour deposition; chemical methods-colloidal method, applications- medical, sensors, space, defense, introduction to quantum computing.	8
	Total	48
Text Books: <ol style="list-style-type: none"> 1. A text book of Engineering Physics by Dr. M.N. Avadhanulu, Dr.P.G.Kshirsagar, Revised edition 2015, S. Chand & Company Pvt.Ltd. 2. Engineering Physics by R.K.Gaur, S. L Gupta, 8e 2012, Dhanpatrai Publications(P) Ltd. 		
Reference Books: <ol style="list-style-type: none"> 1. Lasers & nonlinear Optics by B. B. Laud-Third edition, New Age International (P)Ltd. Publishers. 2. Fundamentals of Optics by Francis A. Jenkins, Harvey E. White, 4e, McGraw Hill Education (India)Pvt.Ltd. 3. Introduction to Fiber Optics by AjoyGhatak, K. Thyagarajan, First South Asian edition 1999, Cambridge University Press. 4. An introduction to Lasers theory and applications by Dr. M. N. Avdhanulu, Dr.P.S. Hemne, Revised edition 2017, S. Chand & Company Pvt.Ltd. 5. Introduction to Quantum Mechanics by David J. Griffiths, Darrell F. Schroeter, Third edition, Cambridge University Press. 6. Introduction to solid states Physics by Charles Kittel, 8e, Wiley India Pvt Ltd. 7. Nano: The Essentials by T. Pradeep, 1e, 2007, McGraw Hill Education. 8. Nanotechnology -Principles & Practices by SulbhaK.Kulkarni, 3e, Capital Publishing Company. 		

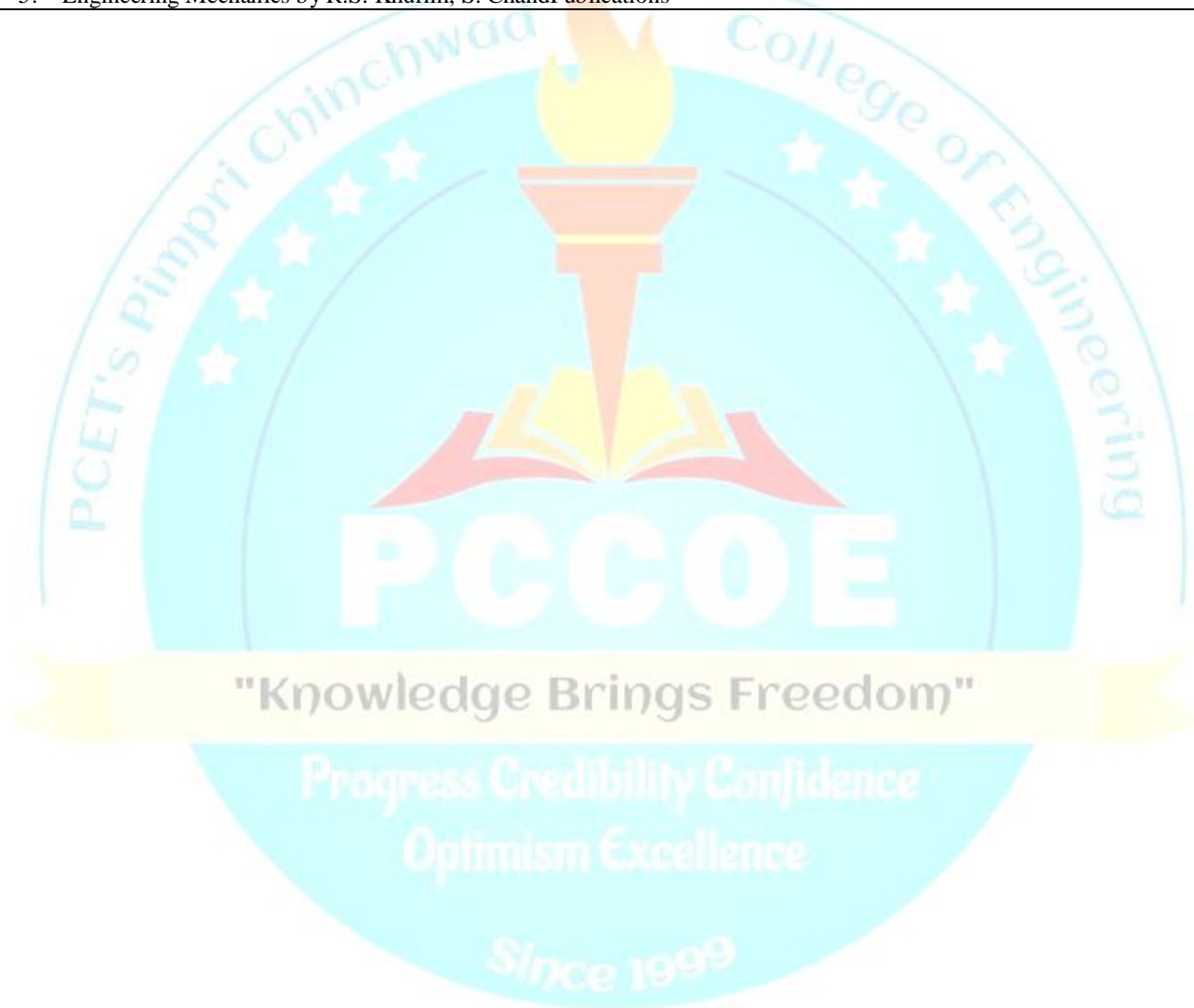
Course: Engineering Mechanics						Code: BFE2310	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
2	-	-	2	20	30	50	100
Prerequisites: 1. Basic principles of trigonometry 2. Geometry 3. Algebra 4. Linear differentiation and integration 5. Principles of Physics (equations of motions)							
Course Objectives: 1. To provide adequate knowledge of mechanics to formulate and analyze problems based on real life situations. 2. To make aware about basic concepts of statics and dynamics for rigid bodies. 3. To impart fundamental knowledge of analysis of structures, equilibrium of force system and friction. 4. To build conceptual understanding of principles of kinetics and kinematics to solve various engineering problems.							
Course Outcomes*: After learning the course, students will be able to 1. Draw Free Body Diagram (FBD),resolve and compose forces and analyze simple and compound beams. 2. Apply concept of equilibrium to analyze friction, trusses, cables and space force system. 3. Determine centroid of plane lamina & moment of Inertia for standard shapes and composite figures. 4. Apply equation of motion and Newton's second law in different forms like work energy principle and impulse momentum equation. *Attainment of the above course outcomes shall be computed on the basis of evaluation of theory and laboratory work of the same course.							
Detailed Syllabus:							
Unit	Description						Duration (Hrs)
I	Resultant and Equilibrium of Coplanar Force System Introduction and Principle of statics, force systems, resolution and composition of forces, resultant of concurrent forces, moment of a force, Varignon's theorem, couple, resultant of general force system, free body diagram, equilibrium of three forces in a plane, equilibrium of concurrent forces, types of beams: simple and compound beams, type of loads, types of supports, equilibrium of general force system.						6
II	Analysis of Structures , Friction and Space forces Two force members: analysis of plane trusses by method of joint, analysis of plane trusses by method of section, cables subjected to point loads, Friction: laws of friction, ladders friction and application to flat belt, equilibrium of concurrent and parallel forces in a space, resultant of concurrent and parallel forces in a space.						6
III	Centroid of Plane Lamina and Moment of Inertia Centroid of plane lamina, applications of centroid, moment of inertia (MI), perpendicular axis theorem, parallel axis theorem, MI of Standard Shapes, MI of composite figures.						6
IV	Dynamics of Particle Kinematics of particle: constant acceleration, motion under gravity, equations of motions in cartesian and path coordinates for curvilinear motion, projectile motion, kinetics of particle: Newton's second Law and its applications to rectilinear motion, curvilinear motion, introduction to work energy principle and impulse momentum equation, direct and central impact, coefficient of restitution.						6
	Total						24

Text Books:

1. Vector Mechanics for Engineers STATICS by Beer & Johnston, Tata McGrawHill Publications
2. Vector Mechanics for Engineers DYNAMICS by Beer & Johnston, Tata McGrawHill Publications
3. Engineering Mechanics by A. K. Tayal, Umesh Publications
4. Engineering Mechanics by Bhavikatti, Newage Publications

Reference Books:

1. Engineering Mechanics by Singer Harper & Row, Hill Publishers
2. Engineering Mechanics by Meriam and Cragg, Wiley Publications
3. Engineering Mechanics by Timoshenko and Young, McGraw Hill Publications
4. Introduction of Engineering Mechanics by S. Rajshekar and G Sankarasubramanian, Vikas Publications
5. Engineering Mechanics by R.S. Khurmi, S. Chand Publications



Course: Engineering Graphics					Code: BFE2301		
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
1	-	-	1	-	20	30	50
Prerequisites: 1. Basic geometry such as different types of planes, solids etc. 2. Virtual imagination.							
Course Objectives: 1. Develop imagination of physical objects to be represented on paper for engineering communication. 2. Develop the interpretation and manual drawing skills. 3. Develop the physical realization of the dimension of the objects. 4. Get basic hands-on training on computer aided drafting (CAD) tool.							
Course Outcomes*: After learning the course, students will be able to 1. Interpret and draw different types of engineering curves and their application. 2. Imagine, interpret, analyze and draw different orthographic views of solids 3. Imagine, interpret, analyze and draw Isometric view from given orthographic view. 4. Draw, edit and modify basic drawings by using various tool bars of CAD software. *Attainment of the above course outcomes shall be computed on the basis of evaluation of theory and laboratory work of the same course.							
Detailed Syllabus							
Unit	Description						Duration (Hrs)
I	Part A: Introduction to engineering drawing Importance of engineering drawing, introduction to drawing instrument and their uses, drawing sheet layout and its sizes, types of lines and their applications, dimensioning terminology and methods, quadrant and its positions, first angle and third angle projection method and their comparison. Part B: Engineering curves Ellipse, parabola, hyperbola by focus-directrix method and rectangle method, cycloid, involute, spiral & helix.						3
II	Orthographic projections Orthographic projection of given pictorial view by first angle method of projection, types of sections, sectional orthographic projection (only full sectional orthographic view)						4
III	Part A: Isometric view Isometric axes, scale, difference between isometric projection and isometric view, isometric view of simple solids and its dimensioning. Part B: Free hand sketching of innovative product Free hand sketching of any existing/innovative product e.g. concept vehicles, computer hardware, bridge design etc.						4
IV	Part A: Development of lateral surface of solids Development of cut section of prism, pyramid, cylinder and cone using single cutting plane. Part B: Introduction to computer aided drafting Introduction to GUI of CAD software, basic operation of CAD software, use of various commands for drawing, dimensioning, editing, modifying and plotting.						2
	Total						13
Note: Hands on practice will be completed during practical sessions. Text Books: 1. Engineering Drawing with an introduction to AutoCAD byDhananjay A. Jolhe, 3 rd Edition 2017, Tata Magraw Hill							

publishing company Ltd. New Delhi, India

2. A text book of Engineering Drawing by R.K. Dhawan, Revised Edition 2012, S. Chand and company ltd. New Delhi, India
3. Engineering Drawing by Basant Agarwal and C.M.Agarwal, 2nd Edition 2015, Tata Magraw Hill publishing company ltd. New Delhi, India

Reference Books:

1. Engineering Drawing, Plane and solid geometry by N.D.Bhatt and V.M.Panchal, 53rd edition 2019, Charotor publication house.
2. Engineering Drawing by M.B Shah and B.C Rana, 2nd edition 2009, Pearson Publications.
3. Engineering Graphics by P.J. Shah, Revised edition 2014, S Chand Publications.
4. Fundamentals of Engineering Drawing by Warren J. Luzzader, 11th edition 2015, Prentice Hall of India New Delhi.
5. Engineering Graphics for Degree by K.C.John, 2nd edition 2009, PHI learning Pvt. Ltd. New Delhi.
6. Auto CAD 2012 by Prof. Sham Tickoo and GauravVerma, 7th edition 2012, (For engineers and Designers)", Dreamtech Press New Delhi.



Course: Computer Programing & Problem Solving-II						Code: BFE2316	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
2	-	-	2	20	30	50	100
Prerequisites: Computer Programming and Problem Solving-I							
Course Objectives: 1. To acquaint with the fundamental principles, concepts and constructs of computer programming. 2. To develop competency for the logic, design, coding and debugging. 3. To build the programming skills using 'C' to solve real world problems. 4. To develop a simple application using C language.							
Course Outcomes: After learning the course, the students will be able to: 1. Demonstrate the skills of C programming language to implement various algorithms. 2. Analyze the solution to a problem using C programming language. 3. Analyze the developed solution to check its precision. 4. Develop a mini project based on real life examples using 'C' construct.							
Detailed Syllabus:							
Unit	Description						Duration (Hrs)
I	User defined Functions in 'C': Need for user defined functions, Definition of function, Return values and their types, function calls. function declaration, Category of functions, No arguments and no return values, Arguments with return values, no arguments but returns a value, function that return multiple values, nesting of functions, Recursion.						6
II	Pointers in 'C': Declaring a pointer variable, Initialization of pointer variable, Accessing a variable through its pointer, pointer expressions, Pointers and Arrays, Pointer and character strings, Array of Pointers, Pointer as function arguments. functions returning pointers, pointers to functions, call by reference, passing array as function parameter, passing string as a function parameter, recursive function.						6
III	Structure and Union in C: Introduction to structure and enumeration, declaration of structure, initialization, declaration of structure variables and accessing members, structure and function, declaration of union and accessing members, array of structure, type-def.						5
IV	Searching and Sorting Techniques: Searching Techniques (Linear search, binary search) and Sorting Techniques (Insertion sort, selection sort ,bubble sort)						7
	Total						24
Text Books: 1. How to Solve it by Computer by R. G. Dromey, 1e, Pearson Education. 2. ANSI C Language by Kernighan., Ritchie, 2e, Prentice Hall. 3. Programming in ANSI C by E. Balagurusamy, 6e, McGraw Hill Publication..							
Reference Books: 1. Problem solving and programming concepts by MaureenSprankle, 7e, Pearson Education. 2. Let Us C by Yashavant Kanetkar, 13e, BPB Publication. 3. C: The Complete Reference by Herbert Schildt.							

Course: Engineering Physics Laboratory				Code: BFE2203			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	OR	PR	Total
-	2	-	1	50	-	-	50
List of Experiments: (Any 10 experiments from the following list) <ol style="list-style-type: none"> 1. Experiment based on Newton's rings (determination of the wavelength of monochromatic light, determine the radius of curvature of Plano-convex lens) 2. To determine unknown wavelength by using the plane diffraction grating 3. To verify Malus Law 4. Any experiment based on Double Refraction (Determination of refractive indices, identification of types of the crystals) 5. Any experiment based on Laser (Thickness of wire, determination of the number of lines on the grating surface) 6. To study IV characteristics of Solar Cell and determine fill factor and efficiency 7. To determine the band gap of a given semiconductor 8. To determine Hall coefficient and charge carrier density 9. To find out magnetic susceptibility of a given material 10. Determination of velocity of ultrasonic waves in given liquid and its compressibility using an ultrasonic interferometer 11. Determination of specific rotation of a solution with Laurent's Half Shade Polarimeter 12. Determination of electrical resistivity of given semiconductor using four-probe method 13. Determination of sound absorption coefficient of a given material 							

Course: Engineering Mechanics Laboratory						Code: BFE2311	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	OR	PR	Total
-	2	-	1	50	-	-	50

List of Experiments:

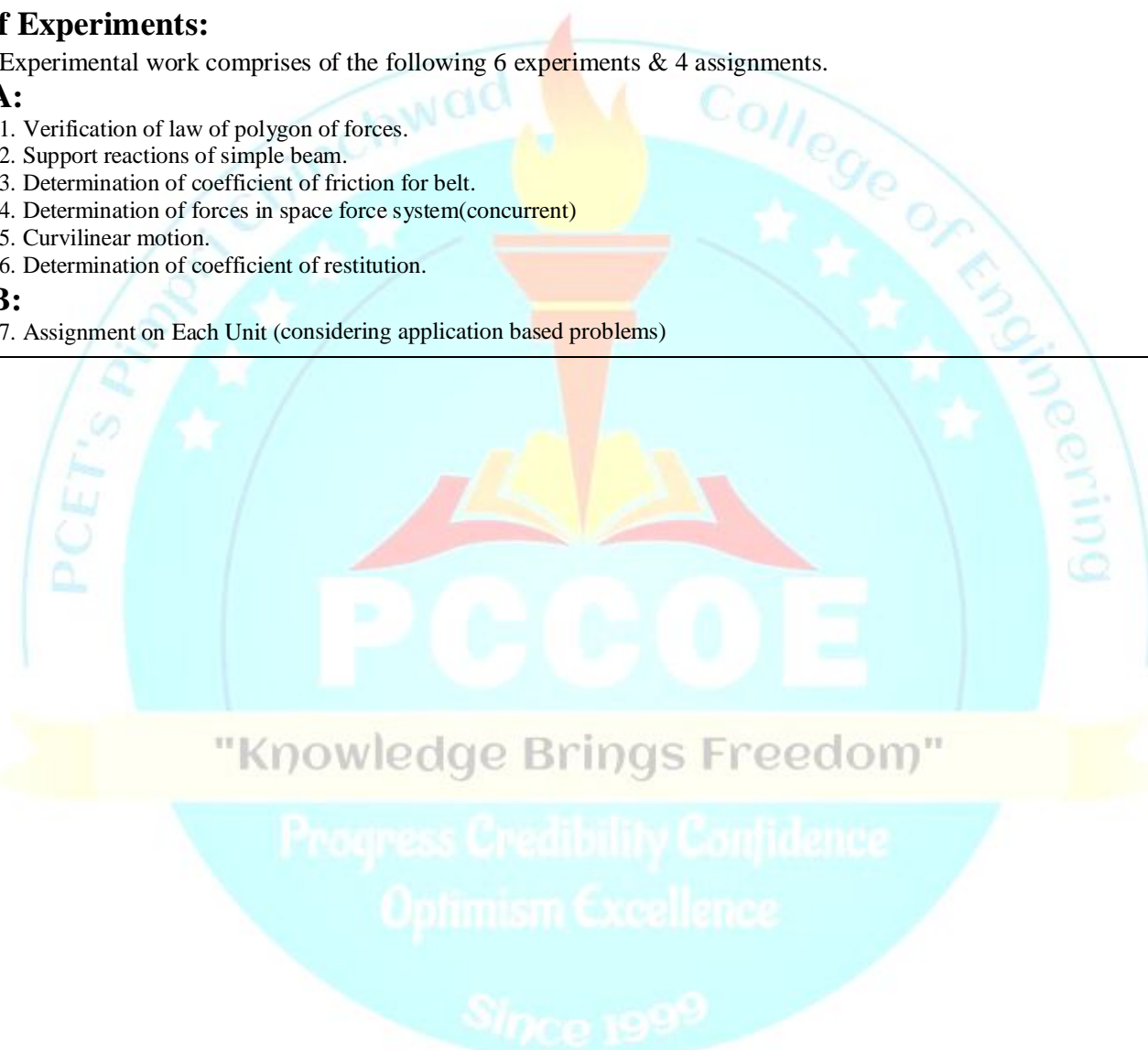
Experimental work comprises of the following 6 experiments & 4 assignments.

Part A:

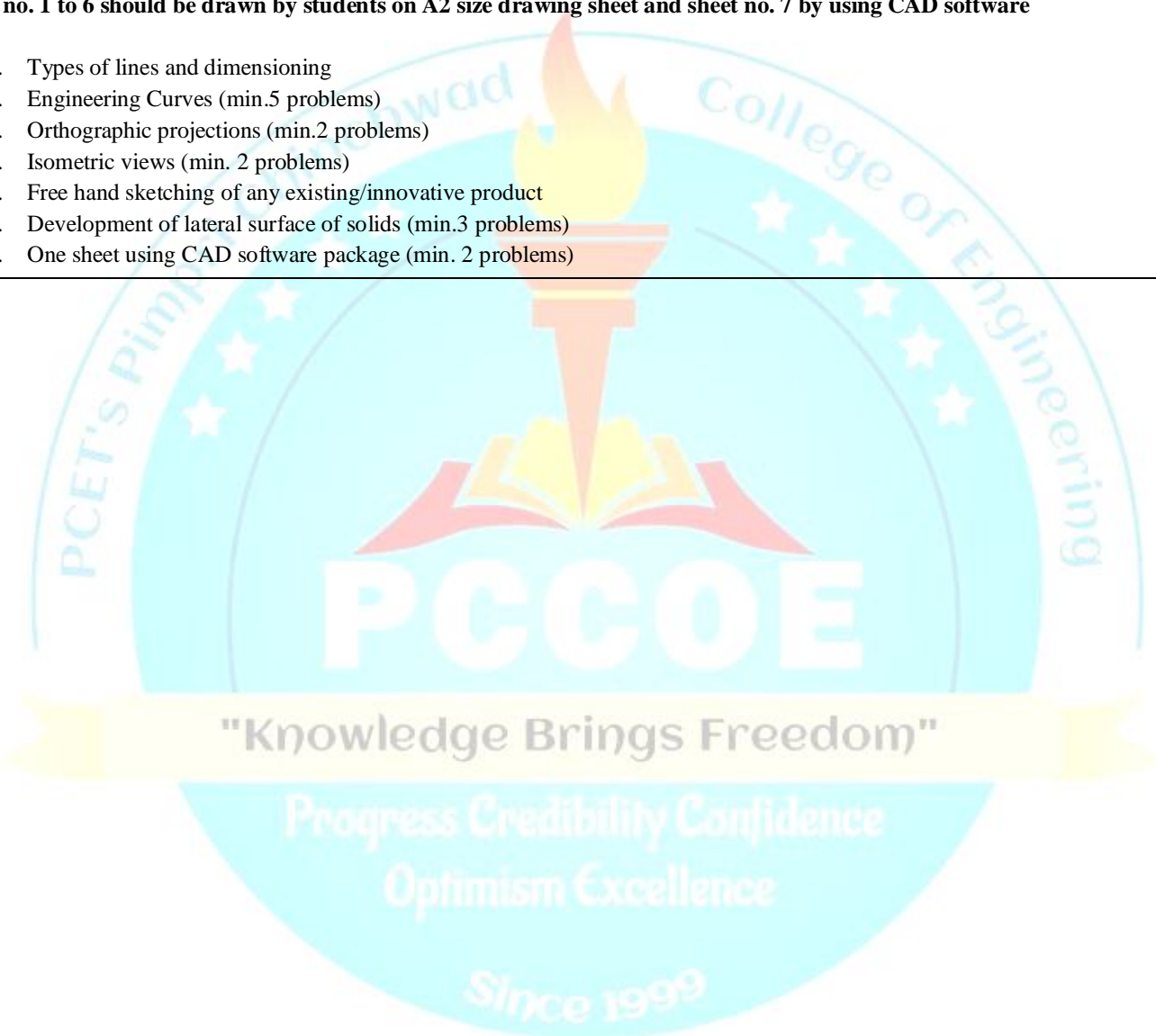
1. Verification of law of polygon of forces.
2. Support reactions of simple beam.
3. Determination of coefficient of friction for belt.
4. Determination of forces in space force system(concurrent)
5. Curvilinear motion.
6. Determination of coefficient of restitution.

Part B:

7. Assignment on Each Unit (considering application based problems)

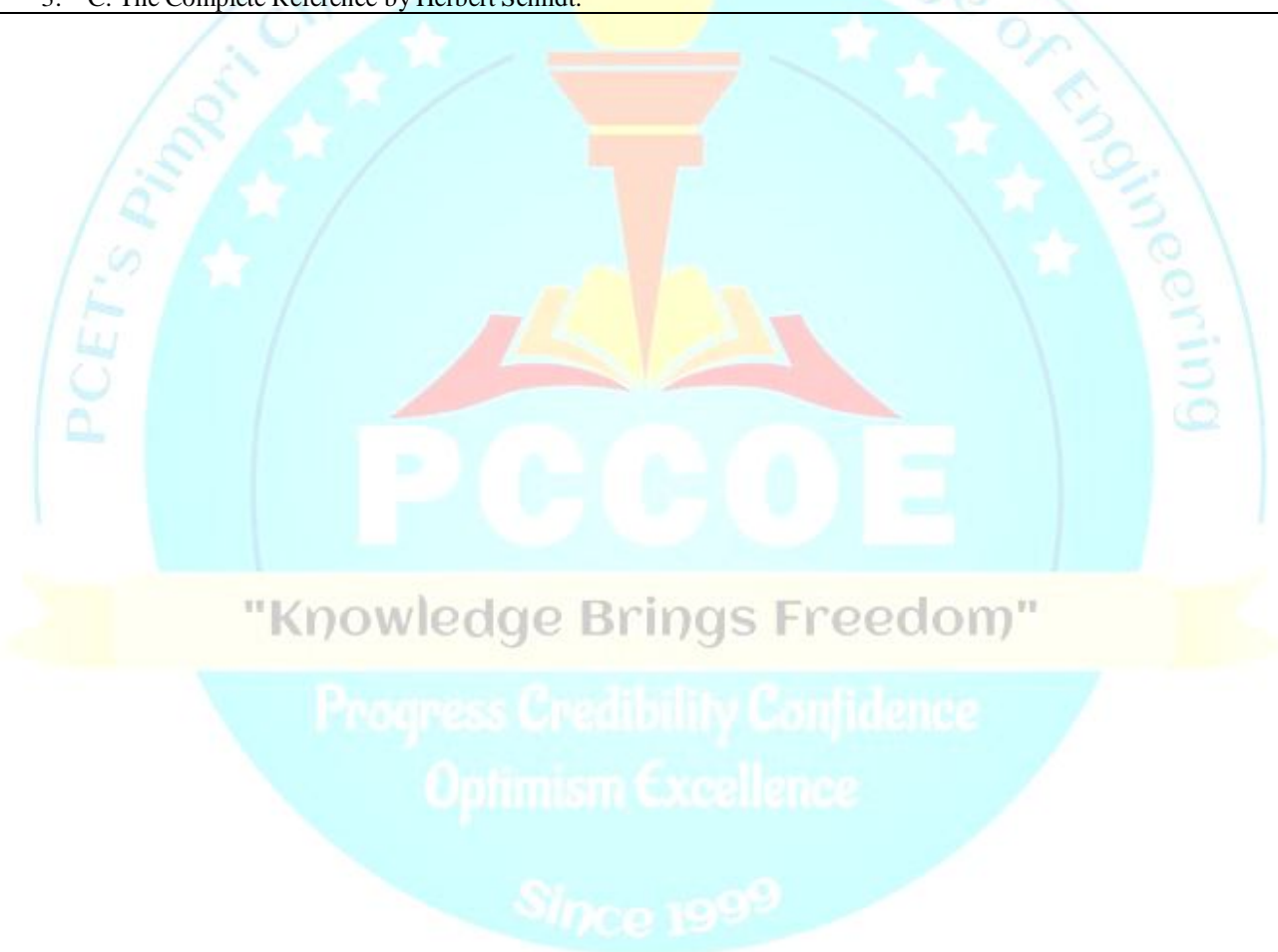


Course: Engineering Graphics Laboratory					Code: BFE2302		
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	OR	PR	Total
-	4	-	2	50	-	-	50
List of Drawing Sheets: Sheet no. 1 to 6 should be drawn by students on A2 size drawing sheet and sheet no. 7 by using CAD software							
<div><div></div><div>1. Types of lines and dimensioning</div><div>2. Engineering Curves (min.5 problems)</div><div>3. Orthographic projections (min.2 problems)</div><div>4. Isometric views (min. 2 problems)</div><div>5. Free hand sketching of any existing/innovative product</div><div>6. Development of lateral surface of solids (min.3 problems)</div><div>7. One sheet using CAD software package (min. 2 problems)</div></div>							



Course: Computer Programing & Problem Solving-II Laboratory					Code: BFE2317		
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	OR	PR	Total
-	2	-	1	50	-	-	50
Assignment No.	Suggested List of Assignments						Duration (Turns)
1	Write a program to compute the factorial of the given positive integer using function.						1
2	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 function that displays a) Name of the student with highest marks in a particular subject. b) Overall percentage result of the class c) Total number of passing students in the class, d) Total number of students failing in one subject e) Total number of distinctions in the class.						1
3	Write a program to swap values of two elements. Use function and pass argument using call by reference.						1
4	Write a program generate fibonacci series using recursive function.						1
5	Perform following string operations on arrays (without using the library functions and using pointers) a) substring, b) palindrome, c) compare, d) copy, e) reverse.						1
6	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 .						1
7	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). a) Read account details for N customers. b) Identify the golden, silver and general customers. c) Golden customers: Balance > 10,00000. Silver Customers: Balance > 500000 and < 10,00000. General customers: Balance <500000. c) Display the list of customers availing the internet banking facility. d) Display the customers belonging to a particular geographical location depending on postal code. e) Display the customer list as per their account type.						1
8	Write a program using array of structure for maintaining departmental library information book record (Accession number, title, edition, author and tag). The tag can be either purchase cost or name of the donor. Use union within structure for tag & display list of purchased and donated books separately. OR Write a menu driven program for a cricket player's display board. The information of the cricketer can be (not limited to) name, age, country, category (batsman, bowler, wicket keeper, all rounder), number of ODI's played, number of International 20-20's played, average batting score, total number of wickets taken, etc. (Use array of structure) perform following queries. a) Number of batsman of a particular country b) Batsman with highest average score c) Number of bowlers of a particular country d) Bowler that has taken maximum no of wickets e) Show a particular players entire " Display board information".						2
9	Accept an array of integers; arrange the elements of this array in such a way that each element is smaller than its successor. As an example, array of integers: [5, 1, 4, 2, 3] Sort the array using insertion/selection/bubble sort, so that the final array obtained is [1, 2, 3, 4, 5].						1
10	Write a program to store student information (e.g. Roll No, Name, Percentage etc.). Display the data in descending order of Percentage (bubble sort).						2

	Display data for roll no specified by user (linear search).	
	Total	24
Implement a Mini Project to use all the concepts of C Programming and Problem solving.		
Remark: Implementation of all assignments is encouraged.		
Text Books: <ol style="list-style-type: none"> 1. How to Solve it by Computer by R. G. Dromey, 1e, Pearson Education. 2. ANSI C Language by Kernighan., Ritchie, 2e, Prentice Hall. 3. Programming in ANSI C by E. Balagurusamy, 6e, McGraw Hill Publication.. 		
Reference Books: <ol style="list-style-type: none"> 1. Problem solving and programming concepts by Maureen Sprankle, 7e, Pearson Education. 2. Let Us C by Yashavant Kanetkar, 13e, BPB Publication. 3. C: The Complete Reference by Herbert Schildt. 		



Course : HSMC-2 (English)					Code :BFE2104		
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
1	2	-	2	30	-	20	50
Prerequisites: 1. Basic knowledge of grammar and phonetics 2. Basic word power, speaking and listening skills							
Objectives: To develop reading and writing skills for effective communication. To develop a sense of confidence among students to present themselves at professional as well as societal level. To enhance the language competence.							
Outcomes: Learning the course, students will be able to 1. Demonstrate an ability to articulate themselves in an appropriate manner. 2. Demonstrate their intellectual ability to think, review, express on various societal concerns. 3. Write and communicate effectively in formal and informal scenarios. 4. Present themselves in front of large audiences in a variety of situations related to group communication and effective writing and oral presentation skills.							
Unit Syllabus							
Unit	Description						Duration (Hrs)
I	Review of basic concept/ fundamentals of English proficiency-I Introduction, overview of Grammar, word power, enhancement of reading and writing skills.						9
II	Reading skill enhancement: Importance of reading with punctuations, types of readings, types of reading, Reading between and beyond the lines, Barriers to Reading and Techniques to improve reading, focus on syllable stress intonation and pitch, Reading Comprehension, Active & Passive voice.						9
III	Writing skill enhancement: Focus on writing structure, stages of writing (Pre, while and post), effective writing, mechanics of writing, importance of punctuations.						9
IV	Communication as a skill: Importance of communication, process of communication, Barriers in communication, ways to improve, importance of effective communication. [Business letters, CV, email, report writing, technical writing, Presentation (written/ oral) (During Lab hours)]						9
	Total						36
Reference Books: 1. Effective Technical Communication by Rizvi,M. Ashraf. McGraw – Hill 2. Communication Skills for Engineers by S. Mishra & C. Muralikrishna, Pearson Education 3. English for Technical Communication by K.R Lakshminarayana, SCITECH 4. Creative English for Communication by Krishnaswami, N. and Sriraman, T., Macmillan. 5. Written Communication in English by Saran Freeman,Orient Longman							

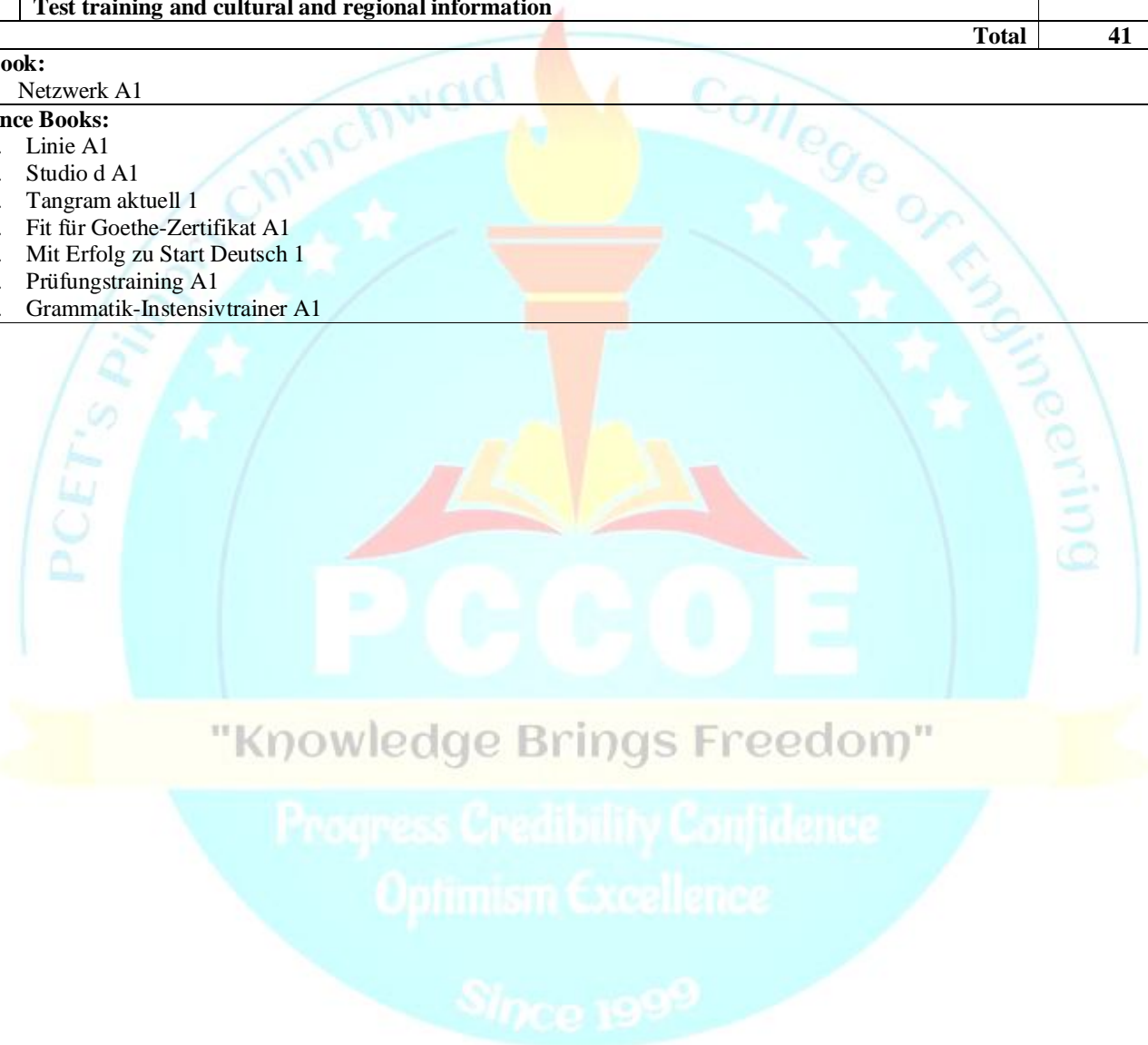
Course : HSMC-2 (Japanese)						Code :BFE2105	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
1	2	-	2	30	-	20	50
Prerequisites: 1. To make use of learned English/Marathi/Hindi language for learning Japanese language. 2. Willingness to learn a foreign language and positive attitude towards the language and culture of Japan.							
Course Objectives: 1. To familiarise students to basics of Japanese language . 2. To develop an ability to understand and articulate themselves in day to day real life situations.							
Course Outcomes: After learning the course, students will be able to 1. Read and write Japanese Scripts (Hiragana, Katakana) and Kanjis. 2. Use Japanese language in day-to-day life. 3. Develop language skills namely listening, speaking, reading, and writing skills for socializing, providing and obtaining information.							
Detailed Syllabus							
Unit	Description						Duration (Hrs)
I	Please do / do not do. Speaking: Requesting someone to do or not to do something. Listening: Video clips based on grammar. Writing: Dialogue writing (at shop / library.) Reading: Lesson reading (9,10,11,12) Grammar: Verbs (conjugation form) Test on grammar, listening						11
II	What do we call this in Japanese language? Speaking: Asking the things / meanings in Japanese. Listening: Video clips Writing: Describing a person wearing accessories. Reading: Lesson reading (13,14,15,16) Grammar: Special verbs, transitive and intransitive verbs.						11
III	What is your hobby? Speaking: Talking about a future plan. Listening: Video clips Writing: Writing about an experience of something. Reading: Lesson reading (17,18,19,20) Grammar: Verb's 'form .root verbs. Test on grammar , listening						11
IV	I also think the same. Speaking: Telling about how to reach the place. Listening: Video clips Writing: Dialogue writing in casual form (plain form). Reading: Lesson reading (21-24) Grammar: Verb's casual form, pattern, あげる、くれる、もらう(verbs).						11
	Total						44
Text Book Minna no Nihongo Part I and II , NihongoShoho							
Reference Books: 1. MO MO Japanese for Class VII							

2. MO MO Japanese for Class VIII
3. MO MO Japanese for Class VII workbook
4. MO MO Japanese for Class VIII workbook
5. Genki I, I
6. Japanese for busy people.



Course: HSMC-2 (German)						Code: BFE2106	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	Internal Evaluation	MTE	ETE	Total
1	2	-	2	30	-	20	50
Prerequisites: Positive attitude and interest in foreign cultures.							
Course Objectives: 1. To familiarise students to basics of German language. 2. To develop an ability to understand and articulate themselves in day to day real life situations.							
Course Outcomes: After learning the course, students will be able to 1. Understand and use familiar everyday expressions and very simple sentences, which relate to the satisfaction of concrete needs. 2. Introduce oneself and others; ask and answer questions about personal details such as where he/she lives, people he/she knows, things he/she owns and respond to questions of this nature. 3. Interact in a simple way provided the other person talks slowly and is willing to help.							
Detailed Syllabus							
Unit	Description						Duration (Hrs)
I	Leisure Time Speaking: talking about leisure time and party planning Vocabulary: free time activities, calendar date Listening: birthdays of people, radio article, Writing: invitation email Reading: an invitation to surprise party Grammar: separable verbs, personal pronouns in accusative case, simple past: had and was						7
II	New in Company Speaking: taking an official appointment Vocabulary: departments and positions in company Listening: schedule agreements, conversation in company Writing: formal email Reading: formal email Grammar: dative case, dative prepositions						7
III	The Living Speaking: describing one's living area Vocabulary: rooms of a house, furniture, household goods Listening: planning of furnishing a new house Writing: writing invitation to housewarming party, replying to the invitation Reading: apartment advertisements Grammar: Changing prepositions, adjectives Test training and cultural and regional information						10
IV	Clothing and Fashion Speaking: likes and dislikes about clothes, handling shopping conversations Vocabulary: types of clothes, floors and departments in a mall Listening: shopping conversations Grammar: verbs with dative case, personal pronouns in dative case						7

V	Health Speaking: visiting a doctor, making requests and suggestions Vocabulary: body parts, ailments Listening: explaining health problems Writing: writing invitation to housewarming party, replying to the invitation Reading: health problems and Tips Grammar: imperative Test training and cultural and regional information	10
Total		41
Text Book: Netzwerk A1		
Reference Books: <ol style="list-style-type: none"> 1. Linie A1 2. Studio d A1 3. Tangram aktuell 1 4. Fit für Goethe-Zertifikat A1 5. Mit Erfolg zu Start Deutsch 1 6. Prüfungstraining A1 7. Grammatik-Intensivtrainer A1 		



Course Type : Life Skills		Code: BFE2902
Course Objectives: <ol style="list-style-type: none"> To understand importance of physical activities and awareness about the health. To provide platform to express their mind, body and the emotions through performing arts. 		
Detailed Syllabus:		
Unit	Description	Duration (Hrs)
I	Yoga: Physical activities and Meditation Sports: Basketball, Table tennis, Football and Volleyball	8
II	Performing arts Music Photography and Short Movie Making Painting/ Sketching/ Drawing Theatre Arts	8
III	Guest lecture Motivational lectures, Guest lectures by Eminent personality and Industry person	2
IV	Club activity Activities organized by different clubs like Matholics, Chemistry Club, Wall magazine, Readers club, Physics club, Techno-science club, Coding club	2
V	ISR activity Social awareness activities to understand the social responsibility	2
VI	Industrial Visit Visit to nearby industries as per the core domain	2
Total		24

"Knowledge Brings Freedom"

Progress Credibility Confidence
Optimism Excellence

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