JSPM's
RAJARSHI SHAHU COLLEGE OF ENGINEERING
TATHAWADE, PUNE-33
(An Autonomous Institute Affiliated to Savitribai Phule Pune University, Pune)

Department of Engineering Sciences

Structure & Syllabi

F. Y. B. Tech (2023 Pattern)

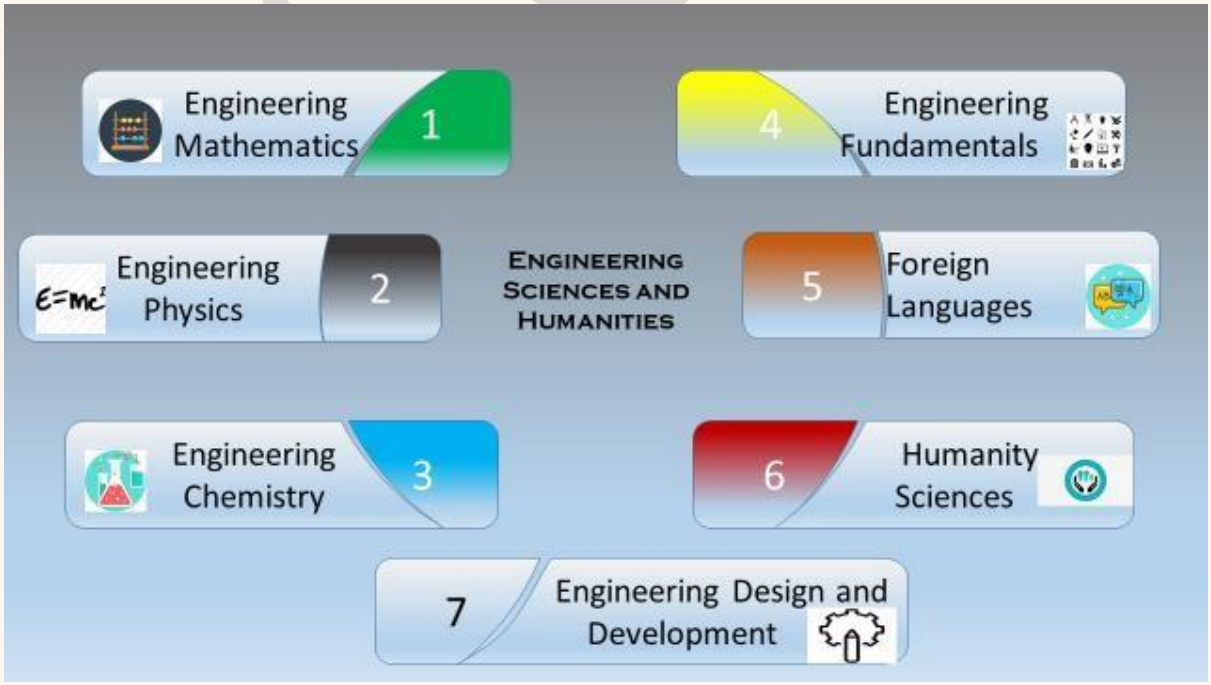
DEPARTMENT OF F.Y.B.TECH ENGINEERING

Vision

To satisfy the aspirations of youth force, who wants to lead nation towards prosperity through techno-economic development.

Mission

To provide, nurture and maintain an environment of high academic excellence, research and entrepreneurship for all aspiring students, which will prepare them to face global challenges maintaining high ethical and moral standards.



Dr. S M Yadav
H.O.D, Engg. Science

Dr. Ram Joshi
Dean Academics

Dr. R. K. Jain
Director RSCOE, Pune

DEPARTMENT OF F.Y.B.TECH

Program Outcomes (POs)

1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem Analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern Tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological challenges.

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DEPARTMENT OF F.Y.B.TECH

Highlights of the Syllabus

Curriculum of F. Y. B. Tech Department is designed in consultation with experts like:

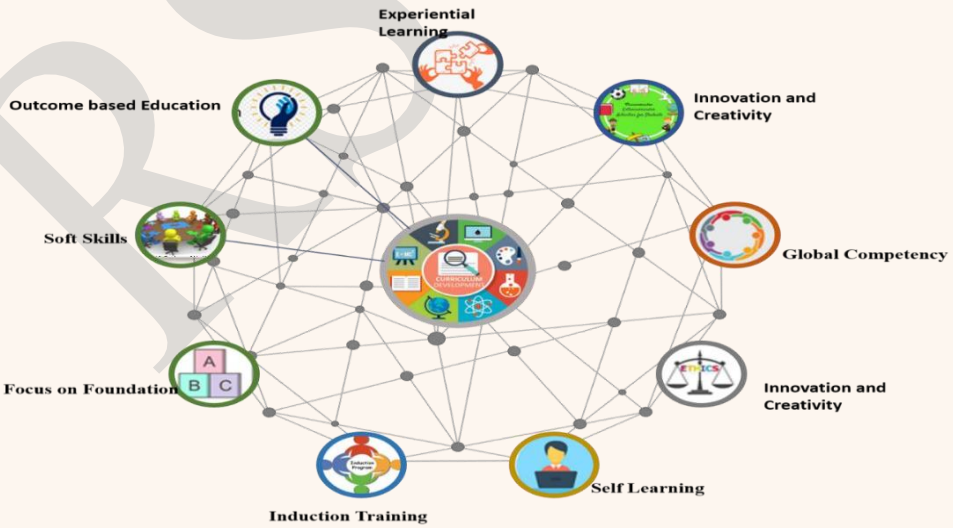
Academic Experts

Industry/Corporate Experts

Distinguished Alumni

The curriculum of the F.Y.B. Tech comprises of Four groups and designed in association with the Tata Consultancy Services, Pune, IIT Ropar, KPIT (Automotive Electronics), Bentley System and Persistent Systems Pvt. Ltd. Pune.

Group 1: Civil Engineering, Mechanical Engineering, Electronics and Telecommunication Engineering, Electrical Engineering and Automation & Robotics Engineering
Group 2: Computer Engineering.
Group 3: Information and Technology Engineering
Group 4: Computer science and Business System



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Unique features of the curriculum:

1. **Curriculum centered at Outcome Based Education**: The new curriculum is focused on **student-centered instruction models** that concentrate on evaluating student success by outcomes. The outcomes include topic awareness, industry required skills and attitude.

2. **Foundation Courses:** The **Basic Science** subjects and **Fundamental Engineering** subjects are pivotal for Engineering Education. These courses are structured in the sense of implementing the respective streams with a more realistic approach.

3. **Contemporary Curriculum:** Curriculum focuses on learning using **modern tools and technologies** such as Survey using Unmanned Aerial Vehicle: drone, robotics, biomedical engineering, CAD latest apps, hands-on experience on 3D printing technology and CNC / VMC machine, conceptualization of recent **Education 4.0** trends like Machine Learning, AI, Data Science

4. **Induction Training**: It's a well-planned three-week event to **acquaint** new aspirants about the atmosphere in the organization, connect them with the people in it, help themselves to unfold and get settled with an innocuous everyday routine. Training will also gain awareness, sensitivity and perception of oneself, individuals around them, society at large, and nature.

5. **Engineering Design and Development**: **Experiential learning** is the main aspect in information gain by experience. This gives students the opportunity to collaborate or develop their own learning skills, such as problem solving, critical thinking and time management. Students are exposed to various design and working models of Engineering Products such as AC, Refrigerator, CPU, 3D-Printer, reciprocating and rotary compressors using **Introduction to Engineering and Engineering Products (IEEP).**

6. **Self-Learning:** The curriculum provides students the **flexibility** to take initiatives satisfy their learning needs with the support of online learning platforms such as MOOCs, NPTEL, Swayam, MHRD, etc.

7. **Global Competence**: Curriculum aims to build **cognitive skills** that enable access to opportunities for personal and professional development. Foreign language training like English, German, Japanese and French enables to gain insight into the problems and solutions that arise from **different cultures**.

8. **Blend of Curricular and Extra-Curricular Activities**: The curriculum has a good blend of activities like co-curricular, extra-curricular, sports, culture etc. for the **overall development** of students.

9. **Inculcating Ethics and Values**: The curriculum included attempts to target **ethics and values** in order to improvise student conduct, helping them make the right choices, lead their professional lives and become ethical individuals.

10. **Internship Program:** The program involves internships with the goal of acquiring various **discipline-related skills and technologies** and developing their technical and professional knowledge.

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F. Y. B. Tech
Structure for Group 1
1. Civil Engineering 2. Mechanical Engineering 3. Electronics and Telecommunication 4. Electrical Engineering 5.A&R Engineering

Academic Year -2023-2024 (Semester –I/II)

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks						Total	Credits
					Theory			laboratory				
		TH	Tut	Lab	ISE	MSE	ESE	ISE	MSE	ESE		Total
ES1202	Engineering Mathematics- II	3	1	-	20	30	50	10	5	10	125	4
ES1206	Physics for Engineers	3	-	2	20	30	50	20	10	20	150	4
ME1202	Engineering Drawing	2	-	2	15	20	35	20	10	20	120	3
EC1201	Basic Electronics Engineering	2	-	2	15	20	35	20	10	20	120	3
CE1201	Engineering Mechanics	3	-	2	20	30	50	20	10	20	150	4
CS1202	Fundamentals of Data Structure	1	-	2	30	-	-	20	10	20	80	2
HS1207	Indian Knowledge Systems	1	-	-	30	-	-	-	-	-	30	1
Total		15	01	10	150	130	220	110	55	110	775	21

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F. Y. B. Tech
Structure for Group 2
Computer Engineering

Academic Year -2023-2024 (Semester –I)

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks						Total	Credits
					Theory			laboratory				
		TH	Tut	Lab	ISE	MSE	ESE	ISE	MSE	ESE		Total
ES1203	Introduction to Statistics, Probability and Calculus	3	1	-	20	30	50	10	05	10	125	4
ES1206	Physics for Engineers	3	-	2	20	30	50	20	10	20	150	4
ES1204	Discrete Mathematics	3	1	-	20	30	50	10	5	10	125	4
EC1201	Basic Electronics Engineering	2	-	2	15	20	35	20	10	20	120	3
ME1203	Product visualization	-	-	2	-	-	-	20	10	20	50	1
CS1203	Fundamentals of Computer Programming	2	-	4	15	20	35	40	20	40	170	4
HS1207	Indian Knowledge Systems	1	-	-	30	-	-	-	-	-	30	1
HS1201	Induction Training	Non-Credit course										
Total		14	02	10	120	130	220	120	60	120	770	21

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F. Y. B. Tech
Structure for Group 2
Computer Engineering

Academic Year -2023-2024 (Semester –II)

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks						Total	Credits
					Theory			laboratory				
		TH	Tut	Lab	ISE	MSE	ESE	ISE	MSE	ESE		Total
ES1205	Statistical Methods	3	1	-	20	30	50	10	05	10	125	4
ES1207	Chemistry for Engineers	3	-	2	20	30	50	20	10	20	150	4
HS1202/ HS1203/ HS1204/ HS1205	Professional English Communication/ English Language skills German/ Japanese	2	-	2	15	20	35	20	10	20	120	3
EE1201	Introduction to Electrical Engineering	2	1	2	20	30	50	20	10	20	150	4
HS1206	Science of Learning	-	-	2	-	-	-	20	10	20	50	1
ES1208	Introduction to Engineering and Engineering Products	-	-	2	-	-	-	20	10	20	50	1
CS1204	Object Oriented Programming	2	-	4	15	20	35	40	20	40	170	4
Total		12	02	14	90	130	220	150	75	150	815	21

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F. Y. B. Tech
Structure for Group 3
Information Technology Engineering

Academic Year -2023-2024 (Semester –I)

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks						Total	Credits
					Theory			laboratory				
		TH	Tut	Lab	ISE	MSE	ESE	ISE	MSE	ESE		Total
ES1203	Introduction to Statistics , Probability and Calculus	3	1	-	20	30	50	10	05	10	125	4
ES1207	Chemistry for Engineers	3	-	2	20	30	50	20	10	20	150	4
HS1202/ HS1203/ HS1204/ HS1205	Professional English Communication / English Language skills German/ Japanese	2	-	2	15	20	35	20	10	20	120	3
EE1201	Introduction to Electrical Engineering	2	1	2	20	30	50	20	10	20	150	4
HS1206	Science of Learning	-	-	2	-	-	-	20	10	20	50	1
ES1208	Introduction to Engineering and Engineering Products	-	-	2	-	-	-	20	10	20	50	1
CS1203	Fundamentals of Computer Programming	2	-	4	15	20	35	40	20	40	170	4
HS1201	**Induction Training**	**Non-Credit course**										
Total		**12**	**2**	**14**	**90**	**130**	**220**	**150**	**75**	**150**	**815**	**21**

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F. Y. B. Tech
Structure for Group 3
Information Technology Engineering

Academic Year -2023-2024 (Semester –II)

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks						Total	Credits
					Theory			laboratory				
		TH	Tut	Lab	ISE	MSE	ESE	ISE	MSE	ESE		Total
ES1205	Statistical Methods	3	1	-	20	30	50	10	5	10	125	4
ES1206	Physics for Engineers	3	-	2	20	30	50	20	10	20	150	4
ES1204	Discrete Mathematics	3	1	-	20	30	50	10	5	10	125	4
EC1201	Basic Electronics Engineering	2	-	2	15	20	35	20	10	20	120	3
ME1203	Product visualization	0	0	2	-	-	-	20	10	20	50	1
CS1204	Object Oriented Programming	2	-	4	15	20	35	40	20	40	170	4
HS1208	Indian Knowledge Systems	1	-	-	30	-	-	-	-	-	30	1
Total		14	02	10	120	130	220	120	60	120	770	21

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F. Y. B. Tech
Structure for Group 4
Computer Science and Business System Engineering

Academic Year -2023-2024 (Semester –I)

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks						Total	Credits
					Theory			laboratory				
		TH	Tut	Lab	ISE	MSE	ESE	ISE	MSE	ESE		Total
ES1204	Discrete Mathematics	3	1	-	20	30	50	10	5	10	125	4
ES1206	Physics for Engineers	3	-	2	20	30	50	20	10	20	150	4
ES1203	Introduction to Statistics , Probability and Calculus	3	1	-	20	30	50	10	5	10	125	4
EE1202	Principles of Electrical Engineering	2	-	2	15	20	35	20	10	20	120	3
HS1209	Business Communication and Value Science-I	-	-	2	-	-	-	20	10	20	50	1
CS1203	Fundamentals of Computer Programming	2	-	4	15	20	35	40	20	40	170	4
HS1207	Indian Knowledge Systems	1	-	-	30	-	-	-	-	-	30	1
HS1201	**Induction Training**	**Non-Credit course**										
		14	2	10	120	130	220	120	60	120	770	21

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F. Y. B. Tech
Structure for Group 4
Computer Science and Business System Engineering

Academic Year -2023-2024 (Semester –II)

Course Code	Course	Teaching Scheme			Semester Examination Scheme of Marks						Total	Credits
					Theory			laboratory				
		TH	Tut	Lab	ISE (15)	MSE (25)	ESE (60)	ISE	MSE	ESE		Total
HS1210	Introduction to Universal Human Values	3	-	-	20	30	50	-	-	-	100	3
ES1205	Statistical Methods	3	1	-	20	30	50	10	5	10	125	4
HS1202/ HS1203/ HS1204/ HS1205	Professional English Communication / English Language skills German/ Japanese	2	-	2	15	20	35	20	10	20	120	3
EC1201	Basic Electronics Engineering	2	-	2	15	20	35	20	10	20	120	3
HS1208	Fundamentals of Economics	2	-	-	15	20	35	-	-	-	70	2
ES1208	Introduction to Engineering and Engineering Products	-	-	2	-	-	-	20	10	20	50	1
CS1204	Object Oriented Programming	2	-	4	15	20	35	40	20	40	170	4
CB1201	Design Thinking	-	-	2	-	-	-	20	10	20	50	1
Total		14	1	12	100	140	240	130	65	130	805	21

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Instructions:

1. Every student should appear for Physics for Engineers, Chemistry for Engineers, Basic Electronics Engineering, Introduction to Electrical Engineering, Engineering Mechanics, Engineering Drawing during the year.
2. Every student should appear for language Proficiency-I and Introduction to Engineering and Engineering Product (IEEP), Indian Knowledge Systems(IKS), Science of Learning(SL) during the year.
3. ISE, MSE and ESE indicates Internal Semester Evaluation, Mid Semester Evaluation and End Semester Evaluation respectively.

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F. Y. B. Tech
Academic Year – 2023-2024

Course Code	Course
ES1201	Engineering Mathematics-I
ES1202	Engineering Mathematics-II
ES1203	Introduction to Statistics, Probability and Calculus - added in mech
ES1204	Discrete Mathematics
ES1205	Statistical Methods
ES1206	Physics for Engineers
ES1207	Chemistry for Engineers
ES1208	Introduction to Engineering and Engineering Products
CE1201	Engineering Mechanics
CS1201	Introduction to Computer Programming
CS1202	Fundamentals of Computer Programming
CS1203	Fundamentals of Computer Programming
CS1204	Object Oriented Programming
EC1201	Basic Electronics Engineering
EE1201	Introduction to Electrical Engineering
EE1202	Principles of Electrical Engineering
ME1201	Workshop Practice
ME1202	Engineering Drawing
ME1203	Product visualization
HS1206	Science of Learning
HS1207	Indian Knowledge Systems
HS1208	Principles of Economics
HS1209	Business Communication and Value Science-I
HSI210	Universal Human Values
CB1201	Design Thinking
Common Courses for Group 1 to Group 4	
HS1201	Induction Training
HS1202	Professional English communication
HS1203	English Language skills
HS1204	German
HS1205	Japanese

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F.Y.B.Tech (Group 1&2)
Academic Year 2023-24 Semester I
[ES1201} Engineering Mathematics-I

Teaching Scheme: **TH: - 3** **Hours/Week TU:-** **1 Hour/Week**	**Credit TH:3** **Tut:1**	**Examination Scheme:** **In Sem. Evaluation: 20 Marks** **Mid Sem. Exam : 30 Marks** **End Sem. Exam : 50 Marks**

Course Prerequisites : .Determinants, Matrices, Limits, continuity, Differentiation, Integration, Maxima, Minima.

Course Objective: To familiarize the students with concepts and techniques in Linear algebra, Fourier series and Calculus. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance thinking power, useful in their disciplines.

Course Outcome:
After successful completion of the course, students will able to
CO1: Apply the essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations, finding linear and orthogonal transformations. Eigen values and Eigen vectors applicable to various engineering problems.
CO2: Apply Mean value theorems and its generalization leading to Taylor's and Maclaurin's series useful in the analysis of engineering problems.
CO3: Apply the technique of Fourier series representation and harmonic analysis for design and analysis of continuous and discrete periodic system.
CO4: Deal with partial derivative of functions of several variables that are essential in various branches of engineering.
CO5: Apply the concept of Jacobian to find partial derivative of implicit function and functional dependence. Use of partial derivatives in estimating error and approximation and finding extreme values of the function.

Course Contents

UNIT-I	**Linear Algebra-Matrices, System of Linear Equations**	**7 Hours**
Rank of a Matrix, System of Linear Equations, Linear Dependence and Independence, Linear and Orthogonal Transformations, Application to problems in Engineering.		
UNIT-II	**Linear Algebra-Eigen Values and Eigen Vectors, Diagonalization**	**7 Hours**
Eigen Values and Eigen Vectors, Cayley Hamilton theorem, Diagonalization of a matrix, Reduction of Quadratic forms to Canonical form by Linear and Orthogonal transformations, Nature of quadratic form.		
UNIT-III	**Differential Calculus**	**7 Hours**
Rolle's Theorem, Mean Value Theorems, Infinite series, Alternating series, Power series, test for convergence, Taylor's Series, Maclaurin's Series, Indeterminate Forms, L' Hospital's Rule, Evaluation of Limits and Applications.		

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Dr. R.B.Joshi Dean Academics

Dr. R. K. Jain Director
RSCOE, Pune 29

UNIT-IV	Fourier Series	7 Hours
Definition, Dirichlet's conditions, Full range Fourier series, Half range Fourier series, Harmonic analysis and Applications to problems in Engineering.		
UNIT-V	**Multivariable Calculus-Partial Differentiation**	**7 Hours**
Introduction to functions of several variables, Limit, Continuity, Partial Derivatives, Euler's Theorem on Homogeneous functions, Partial Derivative of Composite Function, Total Derivative, Change of Independent variables.		
UNIT-VI	**Applications of Multivariable Calculus**	**7 Hours**
Jacobian and its applications, Errors and Approximations, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.		

Guidelines for Tutorial and Term Work

1) Tutorial shall be engaged in three batches (batch size of 20 students maximum) per division.
2) Term work shall be based on continuous assessment of six assignments.

Text Books:

T1. Higher Engineering Mathematics by B. V. Ramana (Tata MacGraw Hill)
T2. Higher Engineering Mathematics by B.S. Grewal (Henna Publication, Delhi)

Reference Books:

R1. Advanced Engineering Mathematics, 10e, by Erwin Kreyszig (Wiley India).

R2. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education).

R3. Advanced Engineering Mathematics, 7e, by Peter V. O'Neil (Cengage Learning).

R4. Differential Equations, 3e by S. L. Ross (Wiley India).

R5. Complex Variables and Applications, 8e, by J. W. Brown and R. V. Churchill (McGraw-Hill Inc.)

R6. Schaum's Outline of Complex Variables by Murray R. Spiegel, Seymour Lipschutz (McGraw-Hill Education)

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F. Y. B. Tech (Group 1)
Academic Year – 2023-2024 Semester -II
[ES1202]: Engineering Mathematics-II

Teaching Scheme: TH: - 3 Hours/Week TU:- 1 Hour/Week	**Credit TH:3 TUT:1**	**Examination Scheme: In Sem. Evaluation: 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50 Marks**

Course Prerequisites : Solution of ODE by VS method, Two-dimensional Cartesian and polar coordinate systems, Jacobian, Integration**.**

Course Objective: To make the students familiarize with Mathematical Modeling of physical systems using differential equations, advanced techniques of integration, tracing of curve, multiple integrals and their applications. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance thinking power, useful in their disciplines.

Course Outcome:

After successful completion of the course, students will able to

CO1: Apply the effective mathematical tools for solution of first order differential equations that model physical Processes such as Newton's law of cooling, electrical circuit, rectilinear motion, mass spring system, Heat transfer, etc.

CO2: Apply advanced integration techniques such as reduction formulae, Beta function, Gamma function, Differentiation Under Integral Sign (DUIS) and Error function, useful in evaluation of multiple integrals and their applications.

CO3: Trace the approximate shape of curve for given equation and measure arc length of various curves

CO4: Use the concept of solid geometry to understand sphere, cone and cylinder in comprehensive manner.

CO5: Evaluate multiple integrals and its applications to find area bounded by curves, volume bounded by surfaces, center of gravity and moment of inertia.

Course Contents

UNIT-I	**First Order Ordinary differential Equations**	**7 Hours**

Exact differential equations, Equations reducible to exact form. Linear differential equations, Equations reducible to linear form, Bernoulli's equation, Equation solvable for *p*, *y*, *x* and Clairaut's form.

UNIT-II	**Applications of Differential Equations**	**7 Hours**

Applications of Differential Equations to Orthogonal Trajectories, Newton's Law of Cooling, Kirchhoff's Law of Electrical Circuits, Rectilinear Motion, Simple Harmonic Motion, One dimensional Conduction of Heat.

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UNIT-III	Integral Calculus	7 Hours
Reduction Formulae, Beta and Gamma functions, Differentiation Under Integral Sign and Error functions		
UNIT-IV	**Curve Tracing**	**7 Hours**
Tracing of Curves – Cartesian, Polar and Parametric curves, Rectification of curves.		
UNIT-V	**Solid Geometry**	**7 Hours**
Cartesian, Spherical polar and cylindrical coordinate systems and relation, Sphere, Cone and Cylinder		
UNIT-VI	**Multiple Integrals and their Applications**	**7Hours**
Double and Triple integrations, Change of order of integration, Transformation of integral to polar form, Applications to find Area, Volume, Mass, Centre of Gravity and Moment of Inertia.		

Guidelines for Tutorial and Term Work

1) Tutorial shall be engaged in three batches (batch size of 20 students maximum) per division.

2) Term work shall be based on continuous assessment of six assignments.

Text Books:

T1. Higher Engineering Mathematics by B. V. Ramana (Tata MacGraw Hill)

T2. Higher Engineering Mathematics by B.S. Grewal (Henna Publication, Delhi)

Reference Books:

R1. Advanced Engineering Mathematics, 10e, by Erwin Kreyszig (Wiley India).

R2. Advanced Engineering mathematics, 2e, by M.D. Greenberg (Pearson Education)

R3. Advanced Engineering Mathematics,7e, by Peter V. O'Neil (Thomson Learning)

R4. Differential Equations, 3e by S. L. Ross (Wiley India).

R5. Thomas's Calculus by J. Hass, M. D. Weir, G. B. Thomas (Pearson,2014)

R6. Applied Mathematics (Volume I and II) by P.N. Wartikar and J.N. Wartikar Vidyarthi Griha Prakashan, Pune.

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F. Y. B. Tech (Group 2, 3 & 4: Comp / IT / CSBS)
Academic Year: 2023-24 Semester –I (2023 Course)
[ES1203]: Introduction to Statistics, Probability and Calculus Syllabus

Teaching Scheme:	Credit	Examination Scheme:
TH: 03 Hours/Week TU: 01 Hours/Week	TH:03 TU:01	In Sem. Evaluation:20 arks Mid Sem. Exam: 30 Marks End Sem. Exam: 50 Marks Laboratory: 25 Marks (ISE: 10 Marks + MSE: 05 Marks + ESE : 10 Marks)

Course Prerequisites: Permutation and Combinations, Differentiation, Definite and Indefinite Integration.

Course Objective: To make the students familiarize with concepts and techniques in Statistics, Probability, Differential and Integral calculus. The aim is to equip them with the tools to understand advanced level Statistics and its applications that would enhance thinking power in their discipline.

Course Outcome:

After successful completion of the course, students will able to:

CO1: apply statistical methods like correlation, regression, in forecasting and interpreting experimental data useful in data analysis.

CO2: learn the essential tools like mathematical Expectation, variance and moment generating functions useful in finding parameters of various probability distributions required in statistical inferences.

CO3: Apply advanced Integration techniques useful in evaluation of Multiple Integrals and its applications.

Course Contents

UNIT-I	Descriptive Statistics	07 Hours

Introduction, Collection of data, Representation of data, Marginal and Conditional frequency distribution, Measures of central tendency, Measures of dispersion, Coefficient of variation, Moments, Skewness and Kurtosis.

UNIT-II	Correlation and Regression	07 Hours

Scatter diagram, Correlation and Regression, Multiple Correlation, Curve fitting by method of Least squares: fitting of straight line, parabolas and more general curves, Linear and Multiple Regression, Reliability of Regression Estimates.

UNIT-III	Probability	08 Hours

Probability, Theorems on Probability, Conditional probability, Bayes Theorem, Reliability of system. Random variables (r.v.), discrete and continuous r.v., Probability mass function, Probability density function, Mathematical expectation, variance and its properties, higher order moments and moments generating function.		
UNIT-IV	**Probability Distributions**	**07 Hours**
Binomial distribution, Poisson distribution, Normal distribution. Geometric, Uniform distribution, Exponential distribution, Chi-Square distribution, Students-t distributions, F-distributions.		
UNIT-V	**Integral Calculus**	**07 Hours**
Reduction Formulae, Gamma function, Beta function, Error function and Differentiation under integral sign.		
UNIT-VI	**Multiple Integrals and its Applications**	**08 Hours**
Introduction, Curve tracing and surfaces, Double and Triple integrations, Change of order of integration, Transformation to polar, Applications to find Area and Volume.		

BOOKS

Text:

T1: B.V. Ramana "Higher Engineering Mathematics" , Tata McGraw-Hill
T2: S. M. Ross, "Introduction of Probability Models", Academic Press, N.Y.

References:

R1. Walpole, Myers, Myers, ye, "Probability and statistics for Engineers and Scientists", 9e, (Pearson new International edition)
R2 Parimal Mukhopadhyaya , "Applied Statistics", 2e, (New central Book Agency)
R3. I. R. Miller, J.E. Freund and R. Johnson, "Probability and Statistics for Engineers", (Fourth Edition), PHI.
R4. A. M. Mood, F.A. Graybill and D. C. Boes, "Introduction to the Theory of Statistics", McGraw Hill Education.
R5. Erwin Kreyszig, "Advanced Engineering Mathematics" (Wiley Eastern Ltd.)
R6 B. S. Grewal, "Higher Engineering Mathematics", Khanna Publication, Delhi.

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F. Y. B. Tech (Group 2&3)
Academic Year 2021-2022 Semester -I
[ES1204]: Discrete Mathematics

Teaching Scheme: TH: 03 Hours/Week **TU: 01 Hours/Week**	**Credit TH:03** **TU: 01**	**Examination Scheme:** **In Sem. Evaluation:20 Marks** **Mid Sem. Exam : 30 Marks** **End Sem. Exam : 50 Marks**

Course Prerequisites : Basic Mathematics, Permutations & Combinations and Matrix algebra

Course Objective:
To make the students familiarize with concepts and techniques in Logic, Set, Relation, Functions, Algebraic Structure, Coding Theory, Combinatorics and Graph theory. The aim is to equip them with the tools to understand discrete mathematics and its application that would enhance thinking power and useful in their discipline.

Course Outcome: After completion of this course, students will able to,

CO1: Analyze real world engineering problems, using concepts of propositional logic
CO2: Specify, manipulate and apply equivalence relations; construct and use functions and apply these concepts to solve new problems.
CO3: Analyze the properties of binary operations, apply abstract algebra in coding theory and evaluate the algebraic structures.
CO4: Apply principles of combinatorics to solve counting problems.
CO5: Apply the concept of Graph theory to solve problems in network theory.
CO6: Apply tree models and methods for obtaining solutions of applications involving searching, prefix code and vertex connectivity.

Course Contents

UNIT-I	Logic	07 Hours

Propositions and Connectives, Truth table, lows of Propositions, Logical Equivalence, Normal Forms, Logical implication, Rules of Inference, Validity and satisfiability, Compactness and resolution, Quantifiers, Application of Propositional logic.

UNIT-II	Set, Relations and Functions	07 Hours

Set Theory:- Set, types, operations and laws, principle of inclusion and exclusion, multi- set.
Relation and Functions:- Relation, representation of relation, types, n- ary relation and their application, Equivalence relation, Equivalence class, Partitions, Partial ordering relation, Hasse diagram, Lattice, chain and antichain, Function and types of Functions.

UNIT-III	Algebraic Structure and Coding Theory	07 Hours

Introduction, Algebraic structures, Semi group, Monod, Group, abelian group, cyclic group, Congruence relation, Homomorphism, Normal subgroup. Ring, Integral domain. Field, Galois Theory, Coding Theory.

UNIT-IV	Combinatorics	07 Hours

Introduction, Basic Counting, The rule of sum and product, Permutation, Combination, Binomial Coefficients and identities, Pigeonhole Principle, Generating functions, Recurrence relations, Principle of Mathematical induction.

UNIT-V	Graph and Applications	07 Hou
ntroduction, Graph models, Hand shaking lemma, Types of graphs, Matrix representation of Graphs, adjacency and incidence Matrix, Isomorphism, Connectivity, Eulerian and Hamiltonian Graphs, Shortest path, Travelling Salesman Problem, Dijkstra's algorithm, Planar graph and Euler formula, colouring of graph, Chromatic number Dual of Graph, Clique number.		
UNIT-VI	**Trees**	**07 Hours**
Introduction, properties, Rooted tree, Tree Traversal, path length, weighted tree, prefix code, Huffman coding, Binary search tree, spanning tree, Minimal spanning tree, Kruskal algorithm, prims algorithm, Cut set, The Max flow- Min cut Theorem (Transport Network) Application of tree.		
Guidelines for Tutorial and Term Work		
i) Tutorial shall be engaged in four batches (batch size of 20 students maximum) per division. ii) Term work shall be based on continuous assessment of six assignments (one per each unit).		
Text Books: **T1:** Kenneth H. Rosen, "Discrete Mathematics and its applications", Tata McGraw Hill. **T2:** C. L. Liu. "Elements of Discrete Mathematics", Tata McGraw Hill.		
Reference Books: **R1 :** Bernard Kolman, Robert C. Busby, Sharon Ross. "Discrete Mathematical structures", Prentice Hall. **R2 :** Ralph P. Grimaldi. "Discrete and Combinatorial Mathematics" Pearson Addison Wesley. **R3 :**T. Veerarajan, "Discrete Mathematics, with Graph Theory and Combinatorics", Tata McGraw Hill. **R4 :** Narsingh Deo, "Graph Theory with Applications to Engineering and Computer Science", Prentice Hall. **R5 :** C. V. Sastry and Rakesh Naik, "A text book on discrete Mathematics" **R6 :** A R Vasishtha.		

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F. Y. B. Tech (Group: 2, 3 & 4: Comp /IT /CSBS)
Academic Year: 2023-24 Semester –II (2023 Course)
[ES1205]: Statistical Methods Syllabus

Teaching Scheme:	Credit	Examination Scheme:
TH: 03Hours/Week **TU: 01Hours/Week**	**TH:03** **TU:01**	**In Sem. Evaluation** Theory (M. Quiz + Notes) **20 Marks** **Mid Sem. Exam : 30 Marks** **End Sem. Exam : 50 Marks** **Laboratory: 25 Marks (Oral):** (ISE (Assign.)10 Marks + MSE 05 Marks + ESE 10 Marks)

Course Prerequisites: Collection, Classification and Representation of data, Measures of Central Tendency and Dispersion, Probability and Probability Distributions.

Course Objective: To make the students familiarize with concepts and techniques in Sampling distribution, Linear Statistical models, Estimation, Hypothesis testing, Non Parametric Tests, Time series analysis, Forecasting and Statistical programming use R language. The aim is to equip them with the tools to understand advanced level Statistics and its applications that would enhance thinking power in their discipline**.**

Course Outcome:
After successful completion of the course, students will able to:
CO1: Apply the techniques of Sampling distributions of Sample mean, Sample proportion and Central limit theorem.
CO2: Estimate the parameters, Confidence intervals for Sample mean and Sample proportion useful in statistical inferences..
CO3: Apply the concept of testing of hypothesis useful in modern software computing.
CO4: Use Non-Parametric tests for inferences in data analysis.
CO5: Explain Time Series trend by ARIMA Models for forecasting data.

Course Contents

UNIT-I	**Sampling Techniques**	**07 Hours**

Random sampling, Sampling from finite and infinite populations, with and without replacement, central limit theorem, Standard error of sampling, Sampling distribution of sample mean and proportion, stratified random sampling.

UNIT-II	**Estimation**	**07 Hours**

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Introduction, Types of estimation, Interval estimation, Point estimation: Maximum likelihood function, Method of moments, Criteria for good estimates: Unbiasedness, Consistency, Sufficiency by Neyman factorization theorem and Efficiency, MVBUE and their applications in estimation.

UNIT-III	Test of Hypothesis-I	07 Hours

Introduction, Hypothesis, Simple and composite hypothesis, Type I and Type II errors, Level of significance, Critical region, Students-t test, Z-test, Test of hypothesis for small & large sample: mean, proportion, correlation, and standard deviation.

UNIT-IV	Test of Hypothesis-II	07 Hours

Neyman Pearson lemma, Best critical region, Power of test, Degree of freedom, F-Test, Analysis of variance (ANOVA): one-way, two-way (with and without interactions), P-Value.

UNIT-V	Non Parametric Inference	08 Hours

Non-parametric Inference, Comparison with parametric inference, order statistics, Tolerance region, Sign test, Mann-Whitney test, Wilcoxon signed rank test, Run test, Kolmogorov-Smirnov test. Spearman's rank correlation test, Kendall's tau test, Chi-square test.

UNIT-VI	Time Series Analysis & Forecasting	08 Hours

Introduction , Components, models, Time series plot, deterministic and Stochastic approach, white-noise process, Random Walk, Lag operator, differencing operator, Stationary process, ACF, PACF, , AR(p) models, Yule-Walker equation, MA(q) models, inevitability, ARMA(p, q) models, ARIMA(p, d, q) models, Box-Jenkins method, Augmented Dickey Fuller test (ADF), Parameter estimation by Method of moments, Confidence interval, Exponential smoothing method of forecasting.

Guidelines for Tutorial and Term Work:

1) Tutorial shall be engaged in batches (batch size of 20 students maximum) per division.
2) Term work shall be based on continuous assessment of six assignments (one per each unit).

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Textbooks:

T1: I.R. Miller, J.E. Freund and R. Johnson, "Probability and Statistics for Engineers" (Fourth Edition), Prentice Hall India Learning Private Limited.

T2: Chris Chatfield, Chapman &Hall, "The Analysis of Time Series: An Introduction".

Reference Books:

R1: Erwin Kreyszig, "Advanced Engineering Mathematics" (Wiley Eastern Ltd.)

R2: A.M. Mood, F.A. Graybill and D.C. Boes, "Introduction to the Theory of Statistics", McGraw-Hill.

R3: Schaum's Outlines, "Probability and Statistics" Murry R Spiegel and Others.

R4:B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw-Hill.

R5. T. Veerarajan, "Probability, Statistics and Random Process" 3e.Tata McGraw-Hill.

R6 Gareth Games, Daniela Written, Trevor Hastie, Robert Tibshirani, "An Introduction to Statistical Learning With Applications to R" Springer Texts in Statistics.

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F. Y. B. Tech (Group 1)
Academic Year – 2023-2024 Semester -II
[ES 1206]: Physics for Engineers

Teaching Scheme: TH: - 3Hours/Week TU:- 1 Hour/Week	Credit TH:3	Examination Scheme: In Sem. Evaluation: 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50Marks

Course Prerequisites: Basic concept of physics, laws of optics and modern physics..

Course Objectives: The Objective of this course is to make students learn and understand basic concepts and principles of waves and oscillations, to apply the knowledge gained to analyze practical engineering problems involving waves and oscillations, and also to evaluate and create solutions effectively and meaningfully. This coursewill be especially useful in understanding devices and equipment based on Optics, Quantum Mechanics or Modern Physics in general, which are frequently used by Mechanical Engineers.

Course Outcome: After successful completion of the course, students will able to
CO1- To inculcate the concept of SHM under various configurations and to learn industrialApplication of SHM.
CO2- Summarize concepts of Acoustics in Buildings and explain the concept in Radiation andPhotometry.
CO3-Discuss the principles of Photonic Devices and application relevant to Engineering.
CO4-To understand quantum mechanical phenomenon and their industrial application.
CO5-Apply the principles of Optics to determine intensity distribution of Interference, Diffraction pattern.
CO6- Describe various natural hazards and safety precaution.

Course Contents

UNIT-I	Oscillation and Shock Waves	7 Hours

Oscillations – SHM, Differential equation of SHM (No derivation) , Springs stiffness Factor and its physical significance, series and parallel combination of Springs (Derivation) Types of Springs and their applications, Theoryof Damped oscillation (Qualitative)Types of Damping (Graphical approach) Engineering applications in Damped Oscillation, Theory of forced oscillation (Qualitative), Resonance , Sharpness of Resonance , Numerical problem Shock Wave – Mach number and Mach angle , Mach Regimes , Definition and characteristics of shock waves ,construction and working of Reddy shock tube ,Applications of shock waves , Numerical problem..

UNIT-II	Acoustics , Radiometry and Photometry	7 Hours

Acoustics – Introduction to Acoustics , Reverberation and Reverberation Time , Absorption power andabsorption coefficient , Requisites for Acoustics in Auditorium , Sabine's formula (Derivation) , Measurement of absorption coefficient , Factors affecting the Acoustics and remedial measures , Soundinsulation and it's measurements , Noise and it's measurements , Impact of noise in multistoried buildings.Radiometry and Photometry – Radiation quantities ,Spectral quantities , Relation betweenluminance and Transmittance ,Photometry (Cosine law and Inverse square Law)

UNIT-III	Photonics and Modern Physics	7 Hours

LASER – Properties of LASER beam , Interaction of radiation with Matter , LASER action Population Inversion ,Metastable state , Requisite of LASER system , Semiconductor LASER , LASER range finder , LIDAR , Roadprofiling , Bridge Deflection , Speed checker , Numericals.

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Optical Fiber – Principle and construction of Optical Fibre , Acceptance angle and Numerical Aperture (NA) ,Expression for NA , Modes of propagation, Attenuation and Fibre losses , Fibre Optic displacement Sensor ,Fibreoptic Temperature sensor , Numerical Problem		
UNIT-IV	**Quantum Mechanics**	**7 Hours**
Wave particle duality ,De-Broglie wavelength Heisenberg's-Uncertainty-Principle, Schrodinger's wave equation , It'stime independent and time dependent form ,Free particle, Concept of Normalized wave packet , Particle in Box problem ,it's solutions ,Related concepts Finite potential barrier , bound and scattering states ,reflection and transmission coefficients , Quantum tunneling.		
UNIT-V	**Optics and Modern Physics**	**7 Hours**
Optics - Huygens's Principle and Superposition of waves , Concept of phase and group velocity Interference by division of wave front (Fresnel biprism) and amplitude (Newton's ring) Coherence of light , Diffraction of light bysingle slit Modern Physics – Black body radiation, Stefan-Boltzmann law, Photoelectric Effect , Compton Effect		
UNIT-VI	**Natural Hazards and Safety**	**7 Hours**
Introduction, Earthquake (General characteristics , Physics of Earthquake , Richter Scale of measurement and Earthquake resistant measure) ,Tsunami Causes of Tsunami , Characteristics, adverse effect , risk reduction measures, Engineering structure to withstand Tsunami), Landslide (Causes such as excess rainfall ,geological structure, human excavation etc., Types of landslide , adverse effects , Engineering solution for landslides) , Forest fires and detection using remote sensing Fire hazards and fire protection , Fireproofing material , Fire safety regulations and Fire fighting equipments , prevention and safety measure , Numerical Problems.		

Lab Content	
Guidelines for Assessment	
1) Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division. 2) Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.	
List of Laboratory Experiments	
1	Damped Oscillations .
2	Stefan-Boltzmann effect.
3	To find a fault / Crack in a solid using Echo-Sounding technique.
4	Hall effect experiment.

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5	Absorption Coefficient.
6	Determination of Band gap using four-Probe Method.
7	Magnetic susceptibility using Quinines method.
8	Experiment based on laser.
9	Newton's ring .
10	Photo-electric Effect.

Text Books:
Suggested texts and reference materials (If any)
Text Books (Please mention author, title, name of publisher, edition and year of publication)

T1. Daniel Kleppner, An introduction to Mechanics [Cambridge University Press; 2nd Ed.]T2. H. J. Pain, Physics of Vibrations and Waves [Wiley; 6th Ed.]
T3. Eugene Hecht, Optics [Addison-Wesley; 4th Ed.]
T4. D. J. Griffith, Introduction to Electrodynamics [PHI Learning Pvt. Ltd.; 4th Ed. (2015)]
T5. Arthur Bieser, Concepts of Modern Physics [McGraw Hill Education; 6th Ed. (2009)].

Reference Books:

R1. Principles of Physics, J. Walker, D. Halliday, R. Resnick, *Wiley Student Edition* (10thEdition)
R2. Fundamentals of Physics, Resnick and Halliday (John Wiley and Sons)
R3. Introduction to Solid State Physics, Kittel C(Wiley andSons)
R4. Laser and Non-Linear Optics, B.B. Loud (Oscarpublication)
R5. Engineering Physics by GaurGupta
R6. Introduction to Nanotechnology, Sulabha Kulkarni.

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F. Y. B. Tech (Group 1&2)
[ES1207]:Engineering Chemistry

Teaching Scheme: TH: - 3 Hours/Week PR:- 2 Hours/Week	**Credit TH: 3 PR:1**	**Examination Scheme: In Sem. Evaluation: 20 Marks Mid Sem. Exam : 30 Marks End Sem. Exam : 50Marks Lab Evaluation : 50Marks**

Course Prerequisites: Volumetric analysis, Primary Reference Electrode – Standard hydrogen electrode, Electrochemical series, Electromagnetic Spectrum and Characteristics of Electromagnetic radiation.

Course Objective: To study chemical analysis and techniques for testing and improving quality of water for its domestic and Industrial use. To understand electro analytical techniques for chemical analysis with reliability and reproducibility in measurements and importance of batteries in engineering applications. To understand structure, properties and applicationsof speciality.
polymers and nano materials. To study Fossil Fuels and alternative fuels with their properties and applications. To study science of corrosion and preventive methods used for minimizing corrosion. To understand spectroscopic techniques like UV-Visible and IR for analysisof chemical compounds.

Course Outcome:
After successful completion of the course, students will able to:
CO1: Utilize different methodologies for analysis of water, technique for softening water.
CO2: Utilize different analytical methods for analysis of various chemical compounds and explain different types of batteries and their applications.
CO3: Demonstrate the knowledge of advanced engineering materials for various engineering applications.
CO4: Analyze fuel and suggest alternative fuel on the basis of their properties andapplications.
CO5: Identify nature of conjugation and functional group of chemical compounds using UV-Visible and IR techniques respectively.
CO6: Explain different causes for corrosion and suggest preventive methods.

Course Contents

UNIT-I	Water Technology	6 Hours

Introduction, Impurities in water, Concept of Hardness, Types of Hardness, Units and numerical – Determination of hardness by EDTA method–numerical by using molarity concept, Alkalinity of water and numerical based on alkalinity. Ill effects of hard water in boiler: Priming and foaming, Boiler corrosion, Scales

F. Y. B. Tech (Group 1&2)
[ES1207]:Engineering Chemistry

and Sludge's, Caustic Embrittlement. External treatment – Zeolite or Permutit method and numerical based on it, Ion Exchange or Deionization or Demineralization Method, Desalination of brackish water by Reverse Osmosis and Electrodialysis, waste water treatment.

UNIT-II	Electroanalytical Techniques	6 Hours

[Part-I]

Introduction:– Types of reference electrodes – Calomel electrode, Indicator electrode (Glass electrode), Ion selective Electrodes – Ion Selective membranes such as solid membrane, enzyme based membrane and gas sensing membrane, (A) p^{H}metry – Standardization of pH meter, pH metric titration of strong acid Vs strong base with titration curve and calculations.

(B) Conductometry –,Introduction, Types of Conductances, Different terms in Conductometry, Conductometric titrations of acid versus base with titration curve.

[Part-II]

Batteries- lithium ion and fuel cell (PEMFC) principle, construction, working ,applications and limitation

UNIT-III	Engineering Materials	6 Hours

A] Specialty Polymers:Introduction,Preparation,Properties and applications of the followingpolymers: Engineering Thermoplastic: Polycarbonate, Conducting polymers -Polyacetylene, Biodegradable polymer – Polyhydroxybutyrate – hydroxyvalerate, Electroluminiscent Polymers - Polyphenevinylene, polymer composites – Fibre Reinforced Plastic (FRP) – Glass Reinforced and Carbon Reinforced polymer composite.B] Nanomaterials: Introduction, Classification of nanomaterials based on dimensions (zero-dimensional. One-dimensional, two-dimensional and three-dimensional), structure,
properties and applications of grapheme and carbon nanotubes.

UNIT-IV	Fuels and Combustion	6 Hours

F. Y. B. Tech (Group 1&2)
[ES1207]:Engineering Chemistry

Introduction: Definition of fuel, Classification of fuel based on chemical reactions and Characteristics of ideal fuels, Calorific Value (CV) : Higher Calorific Value (HCV) and Lower Calorific Value (LCV) and its units, Determination of calorific value – Principle, construction and working of Bomb calorimeter and Boy's gas calorimeter and numericals. Solid fuel – Coal-proximate and ultimate analysis of coal and numericals, Liquid fuel – Petroleum, Refining of petroleum/crude oil, composition, boiling point range and uses of various fractions. Octane number of petrol, cetane number of diesel, Alternative fuels: Power alcohol and Biodiesel.

Gaseous fuel: Composition, properties and applications of CNG. Calculation of air for combustion.

UNIT-V	**Spectroscopic Techniques**	**6 Hours**

Introduction to spectroscopic techniques and types of spectroscopy.

A] **UV-Visible Spectroscopy:** Introduction, Interaction of electromagnetic radiation with matter, statement of Beer's and Lambert's law, absorption of UV radiations by organic molecule leading to different electronic transitions, Terms involved in UV-Visible Spectroscopy –Chromophore, auxochrome, bathochromic shift, hypsochromic shift, hyperchromic effect and hypochromic effect. Fundamentals and types of spectroscopy, Instrumentation and basic principle of Single beam UV- Visible spectrophotometer, Applications of UV-Visible spectroscopy.

B] **IR spectroscopy:** Introduction, Principle of IR Spectroscopy (Selection Rule), Types of vibrations: Stretching (symmetric and asymmetric) and bending (scissoring, rocking, wagging and twisting), Conditions of absorption of IR radiations, vibration of diatomic and polyatomic molecules. Factors affecting IR group frequencies. Instrumentation with block diagram. Parts of IR Spectrum, fundamental group region, fingerprint region, applications of IR spectroscopy.

UNIT-VI	**Corrosion Science and Its Preventions**	**6 Hours**

Introduction – Types of corrosion, Dry corrosion - mechanism – Pilling-Bedworth rule (PBR), Wet corrosion-mechanism–H^2 evolution and O^2 absorption, Factors affecting the rate of for corrosion, Methodsof corrosion control, cathodic and anodic protection, Metallic coatings – Types of coating, Methods of applications (Hot Dipping, metal cladding, cementation and electroplating).

Lab Contents

Guidelines for Assessment

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[ES1207]:Engineering Chemistry

1) Practical for the subject shall be engaged in minimum three batches (batchsizeof22students maximum) per division.
2) Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

	List of Laboratory Experiment
1	Estimation of alkalinity of given water sample.
2	Determination of total hardness of water using EDTA method.
3	Determination of Chloride content of water.
4	Determination of normality of acid in a titration of strong acid and strong base using p^Hmeter.
5	Conductometric titration of strong acid with strong base.
6	Preparation of Phenol formaldehyde or Urea formaldehyde resin.
7	Determination of moisture, volatile matter and ash content of a given coal sample by proximate analysis.
8	To verify Beer's law for solution of $CuSO_4$ using colorimeter and determine concentration in their solutions of unknown concentration.
9	Study of electroplating of copper on iron/stainless steel surface for corrosion protection.
10	Determination of molecular weight of Polyvinyl Alcohol (PVA) by using Ostwald's Viscometer.
	Preparation of biodiesel from oil.
12	Simultaneous spectroscopic determination (Chromium and Manganese)

Text Books:

T1. Engineering Chemistry by O. G. Palanna, Tata Mcgraw Hill Education Pvt. Ltd.
T2. Textbook of Engineering Chemistry by Dr. S. S. Dara, Dr. S. S. Umare, S. Chand & Company Ltd.
T3. Textbook of Engineering Chemistry by Dr. Sunita Rattan, S. K. Kataria& Sons Publisher.

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F. Y. B. Tech (Group 1&2)
[ES1207]:Engineering Chemistry

Reference Books:

R1. Engineering Chemistry, Jain and Jain, DhanpatRai Publishing Company Edition.
R2. Engineering Chemistry, Wiley India Pvt. Ltd.
R3. Basic concepts of Analytical Chemistry, S. M. Khopkar, New Age International Publishers.
R4. Instrumental Methods of Chemical analysis, G. R. Chatwal& S. K. Anand, Himalaya Publishing House.
R5. Analytical Chemistry, B. K. Sharma, Educational Publishers.
R6. Polymer Science, V. R. Govarikar ,N.V. Vishwanathan, JayadevSreedhar, New Age International Publishers.
R7. Spectroscopy of Organic Compounds, 2 ed P. S. Kalsi, New Age-International Ltd., Publisher.

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F. Y. B. Tech Semester-I (Group 1,2&3)
[HS1208]: Introduction to Engineering and Engineering Products

Teaching Scheme:
Practical: 2 Hrs. /Week

Credit: 01

Examination Scheme:
CA: 20 Marks
MSE: 10 Marks
ESE: 20 Marks

Course Objective:

The objective of the course is to explore the state of the art of frequently used engineering products such as motorcycle, refrigerator, TV, computer, mobile phone etc. by disassembling the product, studying the structure and function of the components, and assembling them back. The focus will be on identification of materials, technology and costs involved in the product, and also on investigation of possibilities to improve the product in terms of its value for money, safety, comfort and environmental-friendliness.

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

CO1: To explore the state of the art of frequently used engineering products by disassembling, studying the structure and function of the components, and assembling them back.

CO2: To identify materials, technology and costs involved in the product.

CO3: To investigate the possibilities to improve the product in terms of its value for money, safety, comfort and environmental-friendliness.

Course Content:

Unit (Module) No.	Unit (Module) Title	Unit (Module) Description	No. of Lecture Hours	No. of Lab hours
1	History of	Nature		4

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	Technology	and Science and Technology: India and the West, Mediation of Technology, Discipline centered Historical Evaluation		
2	Basics of all Discipline	Discuss basics of core discipline (Mechanical, Civil, Electrical and Electronics). Visit to various labs in core departments.		6
3	Study of technology of common household products	Some of the following products and their components will be extensively studies with respect to their design, structure, function, materials, applied science, technology, economics, safety, environmental impact, social impact, current and future trends/innovation etc: 3D Printer, Diesel Engine, Refrigerator, Washing Machine, Air Conditioner, Motorcycle, Mobile Phone, Automatic Blood Pressure Monitor, Desktop Computer, Microwave Oven, Sewing Machine, Bicycle / Manual Rickshaw, Laser Printer, Television.		20

Week-wise brief description of laboratory/practical activities:

Sr. no.	Unit No.	Description of Laboratory/Practical Activity	Approx. Hours Required
1.	1	Indus Valley Civilization, Nature and Science and Technology: India and the West	2
2.	1	Mediation of Technology, Discipline Centered Historical Evaluation	2
3.	2	Discuss basics of core discipline (Mechanical, Civil, Electrical and Electronics).	3
4.	2	Visit to various labs in core departments.	3
5.	3	Diesel Engine	2

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6.	3	Refrigerator	2
7.	3	Washing Machine/ Motors Cut Section	2
8.	3	**Mid-semester examination**	2
9.	3	Air Conditioner/Irrigation System Models (Dams and spillway models)	2
10.	3	Motorcycle / Car/ Civil Foundation Models	2
11.	3	Mobile Phone/ Bicycle / Manual Rickshaw	2
12.	3	Automatic Blood Pressure Monitor	2
13.	3	Desktop Computer / Highway models	2
14.	3	Laser Printer /Civil Traffic model	2
15.	3	Television, Smart Manufacturing	2
16.	3	**End semester examination**	2

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Academic Year – 2023-2024 Semester –I

[CE1201]: Engineering Mechanics

F. Y. B. Tech (Group 1)

Teaching Scheme: **TH: - 3** **Hours/Week PR:- 2** **Hours/Week**	**Credit TH: 3** **PR:1**	**Examination Scheme:** **In Sem. Evaluation: 20 Marks** **Mid Sem. Exam : 30 Marks** **End Sem. Exam : 50Marks** **Lab Evaluation : 50 Marks**

Course Prerequisites: Elementary applied calculus- topics include graphs, derivatives and integral functions. Introductory Algebra and Trigonometry based course on classical mechanics. Introductory Physics, Newtons laws and conservation of energy and momentum for solving problems in dynamics. UseoflawofUniversalgravitationtoanalyzethebehavioroffallingobjectsandobjects in orbital motion.

Course Objective: The objectives of this course is to make students to learn basics of engineering Mechanics concepts and its application to the real world problems, solve problems involving Forces, loads and Moments and know their applications in allied subjects.

Course Outcome:

After successful completion of the course, students will able to:

CO1: Understand basic concepts of forces, moments, and couples in two dimensions.
CO2: To apply concepts of centroid, M.I. and to understand the concept of space force system.
CO3: To analyze rectilinear and curvilinear motion under action of constant and variable forces.
CO4: Apply concept of Free body Diagram for static equilibrium in 2D force system.
CO5: Apply energy and momentum principles for various problems.
CO6: Analyze trusses, cables, frames and to apply the concept of friction.

Course Contents

UNIT-I	**Fundamentals of Mechanics and Force systems**	**7 Hours**
Principle of statics, force systems, resolution and composition of forces. Resultant of general forces, Moment of force, Varignon's theorem, resultant of parallel force system. Couple, Equivalent force couple system.		
UNIT-II	**Equilibrium of space forces, Moment of Inertia and centroid**	**7 Hours**
Resultant of concurrent and parallel forces in space, Equilibrium of concurrent and parallel forces in space, Moment of forces in space. Centroid of plane lamina and wire bends, Moment of inertia.		
UNIT-III	**Motion of Particles**	**7 Hours**

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Kinematics:-Basic concepts, equations of motion for constant acceleration and motion under gravity. Variable acceleration and motion curves. Relative motion. **Curvilinear motion:-** Rectangular coordinate system (Projectile Motion), n-t coordinate system, polar coordinate		
UNIT-IV	**Equilibrium of Force System**	**7 Hours**
Free body diagram, equilibrium of concurrent, parallel and general forces in plane. Distributed forces, Types of beam: Simple and compound beams, Types of supports and reactions.		
UNIT-V	**Energy and Momentum**	**7 Hours**
Work, power, energy conservatives and non- conservative forces. Conservation of energy and work energy principle for motion of particle. Impulse momentum, conservation of momentum and impulse momentum principle of particle. Direct central impact and coefficient of restitution.		
UNIT-VI	**Analysis of Trusses, Cables, Frames and Friction**	**7 Hours**
Friction: Laws of friction, application of friction on inclined plane, Application of flat belt. Two force members: analysis of plane truss by method of joints, method of sections. Cables subjected to point loads. Analysis of Frames.		

Lab Contents

Guidelines for Assessment

1) Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2) Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Laboratory Experiments

1	Verification of Lami's theorem for three coplanar forces acting at a point in equilibrium.
2	To determine the mass moment of inertia of different circular bodies.
3	Verification of location of Centroid of plane laminas and wire bends.
4	To verify the equilibrium of concurrent forces in space.
5	To study Projectile Motion.
6	To determine Coefficient of restitution for a given pair of material.
7	To determine support reactions for simply supported beams.
8	To determine coefficient of friction for various pairs of surfaces in contact.

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Text Books:

1. A Text book of Engineering Mechanics by R. S. Khurmi, S. Chand publications,ISBN: 9788121926164.
2. A textbook of Engineering Mechanics by R. K. Bansal, Sanjay Bansal , Laxmi publications,8th edition**.**
3. Introduction to Statis and Dynamics, Andy Ruina and Rudra Pratap, Oxford University Press. 2008.
4. Engineering Mechanics Statics and Dynamics, I. H. Shames , PHI; 4th edition (1996), ISBN-10: 81-203-1127-2

Reference Books:

R1. F.P. Beerand E.R.Johnston"VectorMechanicsforEngineersVol.IandII",10thedition, Tata McGraw-Hill Education, 2012, ISBN:978-0077402327
R2. Engineering Mechanics: S Timoshanko, Dtp Young and J.V. Rao, Tata McGraw Hill Education Pvt. Ltd. New Delhi
R3. A. Nelson "Engineering Mechanics: Statics and Dynamics", 1st edition Tata McGraw-Hill Education, 2009, ISBN: 978-0-07-014614-3
R4. Ferdinand Singer,"EngineeringMechanicsStaticsandDynamics",3rdeditionHarperandRow, 1994ISBN:0063506610
R5. Engineering Mechanics by Basudeb Bhattacharyya- Oxford University Press
R6. Principle of Dynamics, Donald T. Greenwood, Pearson; 2 edition (13 July 1987) ISBN-13: 978-0137099818
R7. Engineering Mechanics: Statics (vol 1), J. L. Meriam, L.G. Kraige; Wiley; Seventh edition (20 September 2013), ISBN-13: 978-8126543960.
R8. Engineering Mechanics: Dynamics (vol 2); J. L. Meriam, L.G. Kraige; Wiley; Seventh edition (25 September 2013); ISBN-13: 978-8126543953

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F. Y. B. Tech (Group 1)

Academic Year – 2023-2024 Semester -I

[CS1201]: Introduction to Computer Programming

Teaching Scheme: TH:- 1 Hour/Week PR:-2 Hours/Week	**Credit TH:1 PR:1**	**Examination Scheme: In Sem. Evaluation: 30 Marks Lab Evaluation : 50 Marks Total : 80 Marks**

Course Prerequisites: Basic Computer Knowledge, Analytical and Logical skills.

Course Objective: The Objective of this course is to make students learn and understand basics of programming, data structure and algorithms using C programming language, and to apply the knowledge gained to solve computational problems.

Course Outcome:

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

CO1: To test and execute the programs and correct syntax and logical errors.
CO2: To implement conditional branching, iteration and recursion.
CO3: To decompose a problem into functions and synthesize a complete program using divide-conquer approach
CO4: To use arrays and structures to formulate algorithms and programs.
CO5: Implement strings and pointers in your C program
CO6: Understand the basics of file handling mechanisms.

Course Contents

UNIT-I	**Introduction to C Programming**	**2 Hours**
A history of computing systems and its applications. Introduction to C programming language: identifiers, keywords, variables, datatypes, Operators and expressions: Arithmetic operators, Assignment operators, Comparison operators, Logical operators, Bitwise operators		
UNIT-II	**Control Structures**	**4 Hours**
Control structure and flow of programming, Decision control structure if, else- if, nested-if, switch. Loop control structure: for loop, while loop and do-while loop		
UNIT-III	**Functions in C**	**2 Hours**
Basics of functions, parameter passing and returning type, Functions and parameter: Function definition, accessing function and parameter passing, recursion		
UNIT-IV	**Arrays and Structures**	**3 Hours**
Array declaration, definition, Access the Elements of an Array, types of arrays. Introductions to Structures in C:		
UNIT-V	**String and Pointers**	**2 Hours**
Character data and string manipulation, problem solving with strings. Fundamentals of pointers,Pointers and address		

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UNIT-VI	File handling in C	2 Hours
File Handling: Input and Output: Standard I/O , File operations: fopen(), fwrite(), fread(), fseek(), fprintf(), etc		

Lab Content

Guidelines for Assessment

1) Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2) Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Assignments

1	Write a C Program using operators
2	Write a C Program using control statement
3	Write a C Program to demonstrate function
4	Write a C Program to demonstrate array
5	Write a C Program to demonstrate structure
6	Write a C Program to demonstrate pointers
7	Write a C Program to demonstrate string and string related functions
8	Write a C Program to perform file handling operations

Text Books:

T1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
T2. Dromey, R. G., How to Solve it by Computer. Pearson Education India.
T3. Let Us C, Yashavant Kanetkar, BPB Publication
T4. Programming in ANSI C, Balaguruswamy, McGraw-Hill

Reference Books:

R1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

R2. Sumitabha Das, Computer Fundamentals and C Programming, McGraw- Hill

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F. Y. B. Tech (Group 1)
Academic Year – 2023-2024 Semester -II
[CS1202] Fundamentals of Data Structures

Teaching Scheme: TH:-1 Hour/Week PR:-2 Hours/Week	Credit TH:1 PR:1	Examination Scheme: TH In-Sem. Evaluation: 30 Marks Lab Evaluation : 50 Marks Total : 80 Marks

Course Prerequisites: Introduction to Computer Programming

Course Objective: To understand importance of data structures in context of writing efficient programs and develop skills to apply appropriate data structures in problem solving.

Course Outcome:
After successful completion of the course, students will be able to:

- **CO1:** Analyze the concepts of algorithm evaluation and find time and space complexities for searching and sorting algorithms.
- **CO2:** Apply appropriate sorting and searching technique for given problem.
- **CO3:** Implement linear data structure such as stacks, queues, linked lists and their applications.
- **CO4:** Implement various non-linear data structures to solve complex problems on tree and graph.

Course Contents

UNIT-I	**Introduction to Algorithms and Analysis**	**2 Hours**
Overview and importance of algorithms and data structures. Fundamentals of algorithm analysis, Space and time complexity of an algorithm, Types of asymptotic notations		
UNIT-II	**Sorting and Search Techniques**	**4 Hours**
Searching - Linear Search and binary search , Sorting – Insertion sort - Selection sort – Bubble sort		
UNIT-III	**Linear Data Structures – Stack and Queue**	**3 Hours**
Stack – Operations and Applications of stack. Queue – Operations, Types of Queue , Circular Queue		
UNIT-IV	**Linear Data Structures- List**	**2 Hours**
List – Operations on Singly linked lists , Operations and Applications of List		
UNIT-V	**Non-linear Data Structures –Trees**	**2 Hours**
Tree - Terminology, Binary Tree – Terminology and Properties		
UNIT-VI	**Non-linear Data Structures –Graph**	**2 Hours**
Graph – basic definition and Terminology – Representation of Graph		

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F. Y. B. Tech (Group 1)
Academic Year – 2023-2024 Semester -II
[CS1202] Fundamentals of Data Structures

Lab Content	
Guidelines for Assessment	
Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division. Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.	
List of Assignments	
1	Implementation of bubble sorting
2	Implementation of insertion or selection sort
3	Implementation of searching algorithms
4	Implementation of stack in C
5	Implementation of queue in C
6	Implementation of linked list in C
7	Implementation of binary tree
8	Implementation of graph in C

Text Books:

T1. Data Structure Using C, E. Balagurusamy

T2. Data Structures using C", Y. Langsam, M. Augenstin and A. Tannenbaum, First Edition, 2002, Pearson Education Asia, ISBN 978-81-317-0229-1

T3. Art of Computer Programming, Volumes 1, Donald Knuth

Reference Books:

R1. Gilberg and Forouzan: "Data Structure- A Pseudo code approach with C" by Thomson Publications

R2. "Fundamental of Data Structure" (Schaums Series) Tata-McGraw-Hill.

R3. "Fundamentals of data structure in C" Horowitz, Sahani & Freed, Computer Science Press

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F. Y. B. Tech Semester-I (Group 1,2,3&4)
[CS1203]: Fundamentals of Computer Programming

Teaching Scheme:	Credit	Examination Scheme:
TH: 02Hours/Week	TH:02	In Sem. Evaluation : 15 Marks Mid Sem. Exam : 20 Marks End Sem. Exam : 35 Marks
PR: 04Hours/Week	PR:02	Laboratory : In Sem. Evaluation : 40 Marks Mid Sem. Exam : 20 Marks End Sem. Exam : 40 Marks

Course Prerequisites : Basic mathematics and Science.

Course Objective: Introduction to the concepts of computer basics and programming with particular attention to Engineering examples. Emphasis on fundamental parts of programming language, so that the students will have a basic understanding of other programming languages.

Course Outcome:
After successful completion of the course, students will able to:
CO1: Explain different programming paradigms, different data types and operators used in 'C' language.
CO2: Use decision structures and loops to solve the given problem in 'C' language.
CO3: Apply the concept of functions in 'C' language to solve the given problem.
CO4: Apply the concept of arrays and strings in 'C' language.
CO5: Use pointers & structures in 'C' language.
CO6: Utilize sequential file system concept in 'C' language.

Course Contents

UNIT-I	Data Types and Operators	04 Hours

Levels of programming language, programming paradigms, Algorithm, Flowchart, C Program Structure, Identifier naming rules, variable declaration, Data Type , Constants, Declarations, Operators and Expressions: Arithmetic Operators, Relational Operators, Logical Operators, Increment Decrement Operators, Bitwise, Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, Type Conversion.

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UNIT-II	Control Statements and Loop Statements	05 Hours
Decision making statements: if statement, if-else statement, if-else-if ladder, and nested if statement, switch case statement, Loop Statements: while, do while and for loops, break and continue statements, structured and un-structured programming.		
UNIT-III	**Functions**	**05 Hours**
Function purpose, function declaration, definition and calling, parameter passing and returning type, Storage Classes: External, Auto, Local, Static, Register, Variables: Local and Global variables, introduction to call by value and call by reference, Recursion, Preprocessor.		
UNIT-IV	**Array & String**	**05 Hours**
Basics of Array: Array Declaration, initialization of array, Accessing array. Types of Arrays: 1D Array, 2D Array, Representation of Array in memory Basics of Strings: String Declaration, String Initialization, reading and printing strings using gets (), puts (), scanf() and printf() function, string manipulation. Array and function.		
UNIT-V	**Pointers**	**05 Hours**
Pointer basic concept, pointer variable – declaration and initialization, Types of Pointers, Pointer operations - incrementing pointer, decrementing pointer, adding and subtracting integer value and pointer, subtracting two pointer variables, comparing two pointer variables, Pointers and Arrays, Pointers and Function Command line arguments		
UNIT-VI	**Structures and File System**	**04 Hours**
Structures: Basic Structures, Array of structures, typedef, Unions,File Handling: Input and Output: Standard I/O, Formatted Output – printf, Formated Input – scanf, Error Handling including exit, perror and error. h		

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Lab Contents

Guidelines for Assessment

1) Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) perdivision.
2) Continuous assessment of laboratory work is done based on overall performance and lab assignments performanceof student
3) Each lab assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each lab assignment assessment include- timely completion,performance, innovation, efficient codes, punctuality and neatness.

List of Assignments

1	Demonstrate the use of Operators.
2	Write a C program to display a given pattern using loops.
3	Write a C program to generate Fibonacci series.
4	Write a C program to demonstrate the use of function (simple and recursive function).
5	Write a C program to count the lines, words and characters in a given text.
6	Write a C program to demonstrate the use of 2D array (matrix manipulation).
7	Write a C program for string manipulation.
8	Write a C program to demonstrate the use of pointers using call by reference.

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F. Y. B. Tech (Computer Engineering/Information Technology)

CS1204: Object Oriented Programming

Teaching Scheme:	Credit	Examination Scheme:	
TH: - 2 Hours/Week	TH: 2	In Sem. Evaluation	: 15 Marks
PR: - 4 Hours/Week	PR: 2	Mid Sem. Exam	: 20 Marks
		End Sem. Exam	: 35 Marks
		Laboratory :	
		In Sem. Evaluation	: 40 Marks
		Mid Sem. Exam	: 20 Marks
		End Sem. Exam	: 40 Marks

Course Prerequisites : CS1203: Fundamentals of Computer Programming

Course Objective:

To explore the principles of Object-Oriented Programming (OOP).
To understand object-oriented concepts such as data abstraction, encapsulation, inheritance, dynamic binding, and polymorphism.
To use the object-oriented paradigm in program design.
To lay a foundation for advanced programming.
Provide programming insight using OOP constructs

Course Outcome:

After successful completion of the course, students will able to:

CO1: Explain the basic concepts of object oriented programming.
CO2: Describe programming insights in OOP.
CO3: Apply the basic concepts of Inheritance to solve the given problem.
CO4: Demonstrates the use of Polymorphism concepts in OOP.
CO5: Use the concept of exception handling in OOP.
CO6: Describe Files and Streams handling with their solutions.

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Course Contents

UNIT-I	Principles of Object-Oriented Program ing	4 Hours
Programming Paradigms, A Overview of C, Necessity for OOP, difference between C and C++, Data Hiding, Data Abstraction, ncapsulation, Class and Object. Single line comments, Local variable declaration within function scope, function declaration, parameters passing – value Vs reference, Operator new and delete, the typecasting operator		
UNIT-II	**Class & Object**	**5 Hours**
Scope of Class and Scope Resolution Operator, Member Function of a Class, private, protected and public Access Specifier, this Keyword, Inline Functions in contrast to macro, default arguments, Constructors and Destructors, friend function and friend class.		
UNIT-III	**Inheritance**	**5 Hours**
Introduction to Inheritance, Types of inheritance: Single inheritance, Multiple inheritance, Multilevel inheritance, Hierarchy inheritance, Hybrid Inheritance, Virtual Class, Abstract Class, Constructor in Derived Classes, Pointers to Objects, Pointer to Derived Classes Virtu l Functions, Pure Virtual Functions		
UNIT-IV	**Polymorphism**	**5 Hours**
Introduction to Polymorphism, Operator Overloading - Concept of overloading, operator overloading, Overloading Unary Operators, Overloading Binary Operators, Data Conversion, Type casting (implicit and explicit), Pitfalls of Operator Overloading and Conversion, M table keyword, Function overloading, Explicit keyword, Polymorphism through dynamic binding		
UNIT-V	**Templates and Exception Handling**	**5 Hours**
Template: Concept, Class Template, Function Template, Member Fu ction Template, template specialization. Exception Handling: Basics of Exception Handling, Exception Handling Mechanism, Throwing Mechanism, Caching Mechanism, Re-Throwing Mechanism, tandard Template Library (STL). System exceptions.		
UNIT-VI	**File Handling**	**4 Hours**

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Data hierarchy, Stream and files, Stream Classes, Stream Errors, Disk File I/O with Streams, File Pointers, Error Handling in File I/O, Library functions and formatted output, File I/O with Member Functions, Overloading the xtraction and Insertion Operators, memory as Stream Object Command- Line Arguments.

Lab Contents

	ist of Laboratory Assignments/Experiments
1	Write a C++ program to create a calculator for an arithmetic oper tor.
2	Write a C++ programs for illustrating the Looping, Expressions & Functions.
3	Develop an object-oriented program in C++ to create a database for any information system usiconstructor, default constructor, copy constructor, destructor, static member functions, friend cl this pointer, inline code and dynamic memory allocation operator -new and delete.
4	Write a C++ program to perform different arithmetic operations on complex number using operator overloading.
5	Write a C++ program to implement the concept of multiple inheri ance.
6	Write a C++ program to Manage bank account using inheritance concepts using C++(Multiple/multilevel/Hierarchical/Hybrid)
7	Create User defin d exception to check the given conditions and throw the exception if the criterion does not meet.
8	Write a C++ menu driven program that will create a data file Implement the following and a. operations on data: b. Search the specific item c. Display the item Update the item
9	Mini Project
	Text Books: T1. E Balgurusamy , "Object Oriented Programming with C++" , McGraw-Hill T2. BjarneStroustrup , "Programming – Principles and Practice Using C++", Addison-WesleyEducational Publi hers Inc; 4th edition.
	Reference Books: R1. YashavantKa etkar, "Let Us C++", BPB Publications. R2. Herbert Schildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill

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F. Y. B. Tech (Group 1,2&3)
[EC1201]: Basic Electronics Engineering

Teaching Scheme: **TH: - 2** **Hours/Week PR:- 2** **Hours/Week**	**Credit TH: 2** **PR:1**	**Examination Scheme:** **In Sem. Evaluation: 15 Marks** **Mid Sem. Exam : 20 Marks** **End Sem. Exam : 35 Marks** **Lab Evaluation : 50 Marks**

Course Prerequisites:

Semiconductor materials, P-N junction diode, V-I characteristics of Diode,Concept of Communication systems, Bandwidth, Basic number system, concept of transducer and sensors.

Course Objective:

This course emphasizes on effective knowledge of semiconductor devices-diodes, Transistors, Op-Amp and an astablemultivibrator in the field of Electronics .It also gives insights on applications such as amplifiers, transducers based circuits.

Course Outcome: After successful completion the students will be able to,

CO1: Explain the basic concepts and working principles of diodes.

CO2: Demonstrate the application of BJT as a switch and amplifier.

CO3: Design applications using Op-Amp.

CO4: Apply the concept of logic gates

CO5: Build Instrumentation system using different Sensors for various applications.

CO6: Elaborate the need and types of modulation Techniques.

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F. Y. B. Tech (Group 1,2&3)
[EC1201]: Basic Electronics Engineering

Course Contents		
UNIT-I	**Semiconductor Physics**	**6 Hours**
Semiconductor Physics: P type, N type semiconductor .Current in semiconductors (Diffusion and Drift Current). **P-N junction Diode**: Construction, V-I characteristics, Application as a Rectifier-Half Wave, Full Wave and Bridge Rectifiers. **Filte**r-Half wave, Full wave and Bridge rectifiers with Capacitor filter. **Special purpose Diodes**: Zener Diode –V-I characteristics, Applications as voltage regulator, LEDs and Photodiode –construction, working and applications		
UNIT-II	**Bipolar Junction Transistor**	**4 Hours**
BJT: Construction, types, Configuration, Biasing. DC load line, Application as a switch and amplifier.		
UNIT-III	**Integrated Circuits**	**6 Hours**
Op-Amp: Block diagram, symbol, modes of operation, parameters-Ideal and practical (IC 741). Need of Feedback. Application of Op-amp in open loop configuration-Comparators, Applications of amp as Inverting and non inverting amplifier, Summing and difference amplifier, Integrators and differentiators-Ideal and practical.**IC555:**: Block diagram, applications as AstableMultivibrator		
UNIT-IV	**Digital Systems**	**5 Hours**
Number system - Binary, octal, hexadecimal, Arithmetic operations and their conversions. Logic gates, Boolean algebra, Combinational circuits such as Adder, MUX, DEMUX .Sequential circuits such as Flip Flops (SR-flip flop, D Flip-Flop).		

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[EC1201]: Basic Electronics Engineering

UNIT-V	Sensor Technologies	6 Hours
Basic Instrumentation system, Transducers: selection criteria, Classification, Types -Linear variable Differential Transducer, Load cell, Ultrasonic, Optical, Temperature sensors such as Thermocouple, Thermistor, RTD and LM35.**Sensors:** soil moisture, finger print.		
UNIT-VI	**Electronic Communication Systems**	**4 Hours**
Block diagram, IEEE Frequency spectrum, Wired and Wireless media, Modulation techniques: AM and FM, Mobile communication system, 2G, 3G, 4G &5G Technologies, GSM and GPS.		
Lab Contents		
Guidelines for Assessment		
1) Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division. 2) Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.		
List of Laboratory Experiments		
1	I. Familiarization of electronics components such as Resistors, Inductors, capacitors, diodes, Transistors, switches, connectors, wires, cables. II. Familiarization of breadboard, Datasheet of Diode	
2	Generate different types of waveforms for given specification using function generator and CRO - a) Sine wave-1KHz,3V	

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	b) Square wave-5KHz,5V c)Triangular wave-1MHz,2.5V
3	Implement full wave Bridge rectifiers with capacitor filter and observe the effect of capacitor filter on rectifier output. Calculate V_{LDC},I_{LDC}
4	Design zener diode as regulator for given specification and calculate load Regulation
5	Calculate voltage gain of single stage RC coupled CE amplifier and observe phase shift between input and output
6	Design Inverting and Non inverting amplifier using Op-amp IC-741.
7	Implement Adder using Op-Amp IC 741.
8	Design astablemultivibrator using IC 555
9	Simulate integrator using Op. Amp IC 741.
10	Verify truth Tables of Logic Gates and implement Multiplexer using IC
11	Implement Temperature measurement system using LM35
12	Simulate AM generation technique, observe waveform and calculate modulation Index.
13	Design a Case study of any one electronics applications based on the curriculum and simulate/implement it

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[EC1201]: Basic Electronics Engineering

Text Books

T1."Electronics Devices" by Thomas.L.Floyd 9th Edition, Pearson.
T2.R.P.Jain, Modern Digital Electronic, 3rd edition, 12th reprint TMH publication, 2007.
T3. H. S. Kalasi, "Electronic Instrumentation", TMH publication.
T4. Louis E. Frenzel (2006), Communication Electronics, Principles and Applications, Third Edition, TMH publication.

Reference Books:

R1. "Sensors and Transducers" by D. Patrnabis, 2nd Edition, PHI
R2. Vijay Garg, Wireless Communications & Networking. 2nd Edition, Elsevier, 28-Jul-2010.
R3. "Sensors Handbook", by S. Soloman, 2nd Edition.
R4.Electronic Devices-K.N.Bhat

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F. Y. B. Tech (Group 2&3)
Academic Year – 2023-2024 Semester -I
[EE1201]: Basic Electrical Engineering

Teaching Scheme: **TH: 2Hours/Week** **PR: 02Hours/Week**	**Credit TH:02 PR:01**	**Examination Scheme:** **In Sem. Evaluation:15 Marks Mid Sem. Exam :20 Marks End Sem.Exam : 35 Marks** **Lab Evaluation : 50 Marks**

Course Prerequisites: Elementary concept, Modern Electron Theory, E.M.F., Electric Potential, Potential difference and current, Electrical circuit elements (R, L and C).

Course Objective: Objective of this course is to memorize the basic knowledge of electrical quantities & electrical wiring, installation systems. Provide solutions for the network by applying various laws & theorems. Apply the knowledge of magnetic circuits to electrical machines. Extract the knowledge of electrostatics. Understand fundamentals of AC circuits. Relate different sensors & transducers in electrical systems

Course Outcome:

After successful completion of the course, students will able to: CO1: Recall the elementary concept of Electrical Engineering.

CO2: Simplify various laws and theorems to complex electrical networks**.**

CO3: Recognized the basics of electromagnetism and single-phase transformers.

CO4: Interpret the basics of electrostatics.

CO5: Illustrate different terms applicable to AC fundamentals.

CO6: Summarize measurement devices & transducers.

Course Contents

UNIT-I	**Basic Concepts & Wiring Systems**	**04 Hours**

Concept of Potential difference, voltage, current, Fundamental linear passive and active elements to their functional current-voltage relation, Concept of work, power, energy and conversion of energy. Basic layout of distribution

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Academic Year – 2023-2024 Semester -I

system, Types of Wiring System & Wiring Accessories, Necessity of earthing, Typesof earthing, Safety devices and system.		
UNIT-IV	**Electrostatics**	**05 Hours**
Electrostatic field, electric field strength, concept of permittivity in dielectrics, capacitor composite, dielectric capacitors, capacitors in series & parallel, energy stored in capacitors, charging and discharging of capacitors, Principle of batteries, types, construction and application**.**		
UNIT-V	**AC Fundamentals**	**05 Hours**
AC waveform definitions, form factor, peak factor, study of R-L, R-C, RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor, 3 phase Balanced AC Circuits (Star & Delta).		
UNIT-VI	**Measurements and Sensors**	**05 Hours**
ratio, current ratio, KVA rating, efficiency and regulation, Electromechanical energy conversion		

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Academic Year – 2023-2024 Semester -I

Introduction to measuring devices/sensors and transducers (Piezoelectric & Thermo-couple) related to electrical signals, Basic concept of indicating and integrating instruments, Elementary methods for the measurement of electrical quantities in DC and AC systems (Current & Single-Phase power).
Lab Contents
Guidelines for Assessment
1) Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division. 2) Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding**.**
List of Laboratory Experiment

1	Basic safety precautions. Introduction and use of measuring, instruments–voltmeter, ammeter, multi-meter, oscilloscope.Real-life resistors, capacitors and inductors.
2	Verification of Kirchhoff's Laws and Superposition theorem.
3	Verification of Thevenin's and Norton's theorem.
4	Verification of magnetization characteristics of magnetic materials.
5	Direct loading test on single phase transformers.
6	Constructional study of DC machine /Study project based on Capacitor.
7	To measure amplitude, time period and frequency of time varying signals.
8	Study the electrical characteristics of an R-L-C series circuit.
9	Verification of voltage and current relations in polyphase AC circuits.

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F. Y. B. Tech (Group 2&3)
Academic Year – 2023-2024 Semester -I

10	Demonstration of measurement of electrical quantities in DC & AC systems.

Text Books:

T1. A.E. Fitzgerald, KingselyJr Charles, D. Unmans Stephen, "Electric Machinery",(Sixth Edition), Tata McGraw Hill"
T2.B.L.Theraja,"A Textbook of ElectricalTechnology",(vol.I),ChandandCompanyLtd.NewDelhi"
T3. V. K. Mehta, "Basic Electrical Engineering", S. Chand and Company Ltd., New Delhi.
T4. J. Nagrath and Kothari, "Theory and problems of Basic Electrical Engineering", (Second Edition), Prentice Hall of India Pvt. Ltd.

Reference Books:

R1.T. K. Nagsarkar and M. S. Sukhija, "Basic of Electrical Engineering", Oxford University Press 2011"
R2. D. J. Griffiths, "Introduction to Electrodynamics", (Fourth Edition), Cambridge University Press.

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F. Y. B. Tech (CSBS)
Academic Year – 2023-24 Semester -I [EE1202]
Principles of Electrical Engineering

Teaching Scheme:	Credit	Examination Scheme: Theory	Examination Scheme: Lab
TH: 02 Hours/Week	TH:02	In Sem. Evaluation:15 Marks	In Sem. Evaluation:20 Marks
PR: 02 Hours/Week	PR:01	Mid Sem. Exam: 20 Marks	Mid Sem. Exam: 10 Marks
		End Sem. Exam: 35 Marks	End Sem. Exam: 20 Marks

Course Prerequisites: Elementary concept, Modern Electron Theory, E.M.F., Electric Potential, Potential difference and current, Electrical circuit elements (R, L and C).

Course Objective: Objective of this course is to memorize the basic knowledge of electrical quantities & electrical wiring, installation systems. Provide solutions for the network by applying various laws & theorems. Apply the knowledge of magnetic circuits to electrical machines. Extract the knowledge of electrostatics. Understand fundamentals of AC circuits. Relate different sensors & transducers in electrical systems

Course Outcome:
After successful completion of the course, students will able to:
CO1: Recall the elementary concept of Electrical Engineering.
CO2: Simplify various laws and theorems to complex electrical networks**.**
CO3: Recognized the basics of electromagnetism and single-phase transformers.
CO4: Interpret the basics of electrostatics.
CO5: Illustrate different terms applicable to AC fundamentals.
CO6: Summarize measurement devices & transducers.

Course Contents

UNIT-I	Basic Concepts & Wiring Systems	04 Hours

Concept of Potential difference, voltage, current, Fundamental linear passive and active elements to their functional current-voltage relation, Concept of work, power, energy and conversion of energy. Basic layout of distribution system, Types of Wiring System & Wiring Accessories, Necessity of earthing, Types of earthing, Safety devices and system.

UNIT-II	DC Circuits	06 Hours

Terminology and symbols in order to describe electric networks, voltage source and current sources, ideal and practical sources, Concept of dependent and independent sources. Kirchhoff's laws and applications to network solutions using mesh analysis and Nodal analysis, Simplifications of networks using series-parallel, Star/Delta transformation. Current-voltage of electric network by mathematical equations to analyze the network (Superposition theorem, Thevenin's theorem, Norton's Theorem Maximum Power Transfer theorem).

UNIT-III	Principle of Electromechanics	05 Hours

Electricity and Magnetism, magnetic field and Faraday's law, self and mutual inductance, Ampere's law, Magnetic circuit, Magnetic material and B-H Curve, Single phase transformer, principle of operation, EMF equation, voltage ratio, current ratio, KVA rating, efficiency and regulation, Electromechanical energy conversion

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UNIT-IV	Electrostatics	05 Hours
Electrostatic field, electric field strength, concept of permittivity in dielectrics, capacitor composite, dielectric capacitors, capacitors in series & parallel, energy stored in capacitors, charging and discharging of capacitors, Principle of batteries, types, construction and application.		
UNIT-V	**AC Fundamentals**	**05 Hours**
AC waveform definitions, form factor, peak factor, study of R-L, R-C, RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor, 3 phase Balanced AC Circuits (Star & Delta).		
UNIT-VI	**Measurements and Sensors**	**05 Hours**
Introduction to measuring devices/sensors and transducers (Piezoelectric & Thermo-couple) related to electrical signals, Basic concept of indicating and integrating instruments, Elementary methods for the measurement of electrical quantities in DC and AC systems (Current & Single-Phase power).		

Lab Contents

Guidelines for Assessment

1) Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.
2) Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Laboratory Experiment

1	Basic safety precautions. Introduction and use of measuring instruments–voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
2	Verification of Kirchhoff's Laws and Superposition theorem.
3	Verification of Thevenin's and Norton's theorem.
4	Direct loading test on single phase transformers.
5	To measure amplitude, time period and frequency of time varying signals.
6	Study the electrical characteristics of an R-L-C series circuit.
7	Verification of voltage and current relations in polyphase AC circuits.
8	Constructional study of DC machine

Text Books:

T1. A.E. Fitzgerald, Kingsely Jr Charles, D. Unmans Stephen, "Electric Machinery",(Sixth Edition), Tata McGraw Hill"
T2. B. L. Theraja, "A Textbook of Electrical Technology", (vol. I), Chand and Company Ltd. New Delhi"
T3. V. K. Mehta, "Basic Electrical Engineering", S. Chand and Company Ltd., New Delhi.
T4. J. Nagrath and Kothari, "Theory and problems of Basic Electrical Engineering", (Second Edition), Prentice Hall of India Pvt. Ltd.

Reference Books:

R1.T. K. Nagsarkar and M. S. Sukhija, "Basic of Electrical Engineering",Oxford University Press 2011"

R2. D. J. Griffiths, "Introduction to Electrodynamics", (Fourth Edition), Cambridge University Press**.**

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F. Y. B. Tech (Group 1)
[ME1201]: Workshop Practice

Workshop Practice **Teaching Scheme:** **PR:- 4 Hours/Week**	**Credits** **PR: 2**	**Examination Scheme (Lab.):** **In Sem. Evaluation: 40 Marks** **Mid Sem. Exam : 20 Marks** **End Sem. Exam : 40 Marks**

Course Prerequisites: Knowledge about basic measuring instruments, dimensions of products and drawings.

Course Objective: To provide students a hands-on experience of various manufacturing techniques used for fabricating metallic and non-metallic components. Students will begin by learning the basics of safety practices in an industrial facility, followed by the basics of metrology. For each manufacturing process that is studied the design aspects as well as the economic, safety and environmental aspects will be highlighted.

Course Outcome:
After successful completion of the course, students will be able to:

CO1: Explain basic safety issues in manufacturing facilities and measuring instruments required for metrology.
CO2: Demonstrate common manufacturing processes such as fitting and casting.
CO3: Demonstrate operations using lathe machine and should be able to explain working of power hack saw, milling, and grinding machine.
CO4: Prepare components using various metal forming processes.
CO5: Demonstrate the process of arc welding using appropriate safety precautions.
CO6: Explain the recent emerging areas in primary manufacturing processes such as CNC and EDM machines.

Course Contents

UNIT-I	**Introduction to Safety & Metrology**	**4 Hours**
Introduction, Safety in Workshop, Workshop tour, Measuring Instruments- Vernier Caliper, Micrometer.		
UNIT-II	**Fitting and Foundry**	**12 Hours**

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Introduction to fitting, marking, cutting and finishing tool Introduction to casting process		
UNIT-III	**Machining**	**16 Hours**
Introduction to machining, basics working principle of power hack machine. Introduction to lathe machine, its construction working and operation on lathe machine Introduction to milling machine, its construction working and operation on milling machine		
UNIT-IV	**Forming**	**8 Hours**
Introduction to metal forming processes, hot working, cold working processes.		
UNIT-V	**Welding**	**4 Hours**
Introduction to welding process, welding types, types of welding joints, principle and working of electric arc welding, safety precautions while performing welding operation.		
UNIT-VI	**CNC and EDM**	**4 Hours**
Introduction to CNC and VMC machines, G codes, M codes, Programing Basic working principle of EDM machine		

Lab Contents

Guidelines for Assessment

1) Practical for the subject shall be engaged in minimum three batches (batchsizeof22students maximum) per division.
2) Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Laboratory Experiment

1	Introduction to safety, metrology
2	Introduction to fitting
3	Introduction to sand casting and study of open die casting
4	Introduction to power hack saw cutting, Lathe machine and its operation
5	Detailed parts of Milling and Grinding Machine and its Operations,
6	To understand metal forming process, hot working & cold working process.
7	To study of Electric Arc Welding
8	Introduction to CNC, VMC machine and understand the process of Electrical Discharge Machining.

Text Books:

T1: B. S. Raghuwanshi, A Course in Workshop Technology, Dhanpat Rai and Co., 2014.

Reference Books:

R1: W. A. J. Chapman, Workshop Technology, CBS, New Delhi, 5th Ed., 1995.
R2: M. P. Groover, Principles of Modern Manufacturing: Materials, Processes and Systems, Wiley India Pvt. Ltd, 2018.

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F. Y. B. Tech (Group 1)
Academic Year – 2023-2024 Semester -II
[ME1202]: Engineering Drawing

Teaching Scheme:	Credit	Examination Scheme:
TH: - 2 Hours/ Week PR: - 2 Hours/Week	TH: 2 PR:1	In Sem. Evaluation: 15 Marks Mid Sem. Exam: 20 Marks End Sem. Exam: 35 Marks Lab Evaluation: 50 Marks

Course Prerequisites: Basic geometrical measurements (linear and angular), Construction and deviation of line, circle and polygon, Coordinate geometry, computer literacy.

Course Objective: To provide students a basic understanding of the fundamentals of engineering drawing, with emphasis on visualization, standards and conventions, tools and usage in engineering applications.

Course Outcome:

After successful completion of the course, students will able to

CO1: Apply the concept of Introduction, Lettering, Dimensioning, Engineering curves.

CO2: Apply the concept of Orthographic projection of an object to draw several 2D views and its sectional views for visualizing the physical state of the object.

CO3: Draw and understand Projections of solids and Sections of standard solids.

CO4: Draw Isometric views of a given pictorial orthographic view.

CO5: Draw and develop Lateral surfaces of solids.

CO6: Draw and understand Perspective Projections.

Course Content

UNIT-I	**Introduction and Engineering Curves**	**4 Hours**
Introduction, Lettering, Dimensioning, Engineering curves.		
UNIT-II	**Orthographic Projections**	**6 Hours**
Theories of projection, multi-view projection: VP, HP, Front view, Top view, Projection on profile planes. Projections of objects placed in various quadrants: First and third angle projections.		
UNIT-III	**Projections of Solids and Section of Solids**	**5 Hours**
Projections of solids in simple positions: Solids inclined to one or more planes. Sections of standard solids and true shape sections of standard machine elements.		
UNIT-IV	**Isometric Projections**	**6 Hours**
Projections of simple solids, simple and complex positions construction.		

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UNIT-V	Development of lateral surfaces (DLS) of solids	5 Hours
Applications of DLS, method of development, Development and anti-development of lateral surface of cut and uncut solids.		
UNIT-VI	**Perspective Projections**	**4 Hours**
Terminology and principles, Axonometric projection: Dimetric, trimetric and axonometric projection, terminology, isometric scale, Box method, Coordinate or offset method.		

Lab Content & Guidelines for Assessment

1) Practical for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.

2) Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

	List of Laboratory Assignments
1	Introduction & Engineering Curves [Minimum 2 Problems]
2	Orthographic Projection [Min. 2 Problems]
3	Projection of Solids and Sections of solids [Min. 2 Problems]
4	Isometric Projections [Min. 2 Problems]
5	Development of lateral surfaces (DLS) of solids [Min. 2 Problems]
6	Perspective Projections [Min. 2 Problems]
7	Introduction to CAD [Min. 2 Problems]

Text Books:

T1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House.

T2. Textbook of Engineering Drawing by Reddy. K. Venkata, B. S. Publications.

T3. Textbook of Engineering Drawing by Dr. R. K. Dhawan, S. Chand Publications.

T4. A Textbook of Engineering Drawing by Prof. P. J. Shah, S. Chand Publications.

T5. A Textbook of Engineering Drawing [Along with an introduction to AutoCAD 2015] by Rana Ramakant, Lal Roop.

Reference Books:

R1. V. Laxminarayan and M. L. Mathur, A Textbook of Machine Drawing, Jain Brothers.

R2. N. D. Bhatt, Machine Drawing, Charotar Publishing House.

R3. Basant Agrawal and C. M. Agrawal, Engineering Drawing, Tata McGraw- Hill Publishing Co. Ltd.

R4. Dhananjay A. Jolhe, Engineering Drawing with an Introduction to AutoCAD, Tata McGraw-Hill \ Publishing Co. Ltd.

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F. Y. B. Tech (Group 2 and Group 3)
[ME1203]: Product Visualization

Product Visualisation **Teaching Scheme:** **PR:- 2 Hours/Week**	**Credits** **PR: 1**	**Examination Scheme (Lab.):** **In Sem. Evaluation: 20 Marks** **Mid Sem. Exam : 10 Marks** **End Sem. Exam : 20 Marks**

Course Prerequisites: Basic geometrical measurements (linear and angular), Construction and deviation of line, circle and polygon, Co-ordinate geometry, computer literacy.

Course Objective: This course will help students to develop imagination of physical objects to be represented on paper for engineering communication, manual drawing skills and drawing interpretation skills. Also this course imparts physical realization of the dimensions of the objects and inculcate drawing and design soft tools.

Course Outcome:
After successful completion of the course, students will be able to:

CO1: Apply the concept of Introduction; Lettering, dimensioning, Engineering curves
CO2: Apply the concept of Orthographic projection of an object to draw several 2D views and its sectional views for visualizing the physical state of the object
CO3: Draw and understand Projections of solids and Sections of standard solids
CO4: Draw Isometric views of given pictorial orthographic view.
CO5: Draw and understand CAD

Course Contents

UNIT-I	**Introduction, Engineering Curves**	**4 Hours**
Introduction; Lettering, dimensioning, **Engineering curves**		
UNIT-II	**Orthographic Projection**	**4 Hours**
Theories of projection; Multi-view projection; VP; HP; Front view; Top view; Projection on profile planes; Projections of objects placed in various quadrants; First and third angle projections		

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F. Y. B. Tech (Group 2 and Group 3)
[ME1203]: Product Visualisation

UNIT-III	Projection of Solids	8 Hours
Projections of solids in simple positions; Solids inclined to one or more planes		
UNIT-IV	**Isometric Projections**	**4 Hours**
Projections of simple solids, simple and complex positions, construction		
UNIT-V	**Introduction to CAD**	**10 Hours**
Use of a CAD tool/software to make a solid model of a part, generate views and sections, dimensions, output in different formats		

Lab Contents

Guidelines for Assessment

1) Practical for the subject shall be engaged in minimum three batches (batchsizeof22students maximum) per division.
2) Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Laboratory Experiment

1	Introduction, Engineering Curves	[Min. 2 Problems]
2	Orthographic Projection	[Min. 2 Problems]
3	Projection of Solids	[Min. 2 Problems]
4	Isometric Projections	[Min. 2 Problems]
5	Introduction to CAD	[Min. 2 Problems]

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Text Books:

T1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 53rd Ed., 2019.

T2. Textbook of Engineering Drawing by Reddy, K.Venkata , BS Publications

T3. Textbook of Engineering Drawing by Dr. R.K Dhawan, S. Chand Publications

T4. A Textbook of Engineering Drawing by Prof. P.J Shah, D.Chand Publications.

T5. A Textbook of Engineering Drawing [Along with an introduction to AutoCAD 2015] by Rana

Reference Books:

R1. V. Laxminarayan and M. L. Mathur, A Textbook Of Machine Drawing, Jain Brothers.

R2. N. D. Bhatt, Machine Drawing, Charotar Publishing House, 2016.

R3. Basant Agrawal and C. M. Agrawal, Engineering Drawing, Tata McGraw- Hill Publishing Co. Ltd.

R4. Dhananjay A. Jolhe, Engineering Drawing with an Introduction to Auto CAD, Tata McGraw-Hill Publishing Co. Ltd.

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F.Y. B. Tech (Group 1, 2 & 3)
[HS1206]: Science of learning

Teaching Scheme: PR: 2Hours/Week	Credit PR: 01	Examination Scheme(Lab) In Sem.Evaluation: 20 Marks Mid em. Exam: 10 Marks End em. Exam: 20 Marks

Course Objective:
Provide easy access to the invaluable learning techniques used by experts in art, sci nce, math, engineering, music, literature, sports, and many other disciplines.

Course Outcome:
After successful completion of the course, students will able to:
CO1:Help non-native English speakers improve their listening and note-taking skills for the purpose of listening to academic lectures.
CO2: Understand the functioning of brain functioning to be successful problem solver.
CO3: Apply the technique in his/her real-life situation to improve learning process.

Course Contents

UNIT-I	Introduction	02
What is learning? What is Academic Listening and Why is It Important?Cornell Note taking methods.		
UNIT-II	How we learn?	03
Focused mode, Diffuse mode, shifting of modes, Getting stuck, Procrastination, problem with procrastination, procrastination and pain, the pomodore techniques.		
UNIT-III	How we learn?	03
Understanding neurons, brain links, the metaphor technique. Importance of sleep, synaptic sweep, how to build brick wall of learning. Working memory and long-term memory, memory tips, focusing, why brain links are importance.		
UNIT-IV	Learning with clubs and groups and finding your mission	02

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Case study of Terry Sejnowski, Importance of clubs, need of multidisciplinary, case study of JulienYego. Hippocampus, BDNF		
UNIT-V	Making brain links	02
Deliberate practice (versus lazy learning), interleaving, making sets of brain links, special advice for math, science, arts and other abstract subjects.		
UNIT-VI	Testing yourself	01
Asking yourself important questions, studying different places, importance of sleep, set a quitting time		
UNIT-VII	How to do well on test?	01
The hard start technique, what to do and what not to do in your learning		

Guidelines for Assessment

Assessment is a continuous assessment based on submission of the assignments, timely completion, attendance and understanding.

List of Assignments

1	Use Coronell Note Taking Method to take notes during lecture .
2	Take notes using Mind Map ping Technique .
3	Write an essay on pros and Cons of Ready made Notes
4	Make a power point present ation on procrastination and the usefulness of techniques to overcome this challenge
5	Write an article on how your l earning improved by studying different techniques

Textbook:

T1. Barbara Oakley, Terrence J. Sejnowski, Alistair McConville, 'Learning How to L arn', Tarcherperigee, 2018
Other learning material
L1. Dunkel, Patricia A.. "Academic Listening and Lecture Notetaking for L1/L2 Students: The Need to Investigate the Utility of the Axioms of Good Notetaking." TESL Canada Journal 6 (1988): 11-26.

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F. Y. B. Tech emester-I (Group 1,2,3&4)
[HS1207]: Indian Knowledge system

Teaching Scheme: TH: 1 Hours/Week	Credit TH: 01	Examination Scheme: In Sem.Evaluation:30 Marks

This course provides an in-depth exploration of the rich tapestry of Indian knowledge systems, including philosophy, spirituality, literature, science, and arts. Students will engage with ancient and contemporary texts, practices, and ideas that have shaped Indian culture and its impact on the global stage.

Course objective: Understand the foundational concepts and key tenets of Indian knowledge systems.
Understand various philosophical and spiritual traditions within the Indian context.
Examine the historical evolution of Indian literature, art, and science.

Course Outcome: After successful completion of the course, students will be able
CO1: Explain the foundational concepts and key tenets of Indian knowledge systems.
CO2: Bridging gap between Ancient Indian knowledge and integration to modern innovation for betterment of Society.
CO3: Apply interdisciplinary perspectives to explore the Health and Psychological parametersthrough Indian knowledge systems.

Course Contents

UNIT-I	Introduction to Indian Knowledge Systems and Vedic Corpus	3

. Overview of Indian Knowledge system with Ancient Indian Knowledge in Action. Shrutis with synopsis of Vedas. Message in Vedas. Application of concept in Vedas. Glimpses of Upanishads.

UNIT-II	Wisdom through Smrutis	3

Wisdom through Ages, Classification of Indian philosophy with Unique features. Science based knowledgefrom Darshanas. Logic and Argumentations

UNIT-III	Wisdom Through Ages Health Wellness and Psychology through Ancient Scholars	3

Introduction wellness through Indian medical system, Glimpses of Yoga Shastra, Mind body consciousness complex. Ancient Indian approach to psychology, Contributions of Yoga to the world.

Guidelines for Assessment

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List of Assignments	
1	Participation in class discussions and activities
2	Weekly quizzes to assess understanding of concepts
3	Theme based poste presentation exploring a specific aspect of Indian knowledge systems
4	Case Studies from ancient Indian knowledge and Foundational aspects of Ashtanga yoga

Text Books:

1. An Introduction to Indian Knowledge Systems: Concepts and Applications, B Mahadevan, VR Bhat, and Nagendra Pavana R N; 2022 (Prentice Hall of India).
Indian Knowledge Systems: Vol I and II, Kapil Kapoor and A K Singh; 2005 (D.K. PrintWorld Ltd).

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F. Y. B. Tech (Group 2&3)
Academic Year – 2023-2024 Semester -II
[HS1208]: Principals of Economics

Teaching Scheme: TH: 2 Hours/Week	Credit 02	Examination Scheme: InSem.Evaluation:15 Marks Mid Sem. Exam : 20Marks End Sem. Exam : 35 Marks

Course Prerequisites: Fundamentals of Economics, Understanding the fundamental concepts of Economics and find out the overall utilization of scarce resources.

Course Objective:

1. To equip the students with time tested tools and techniques of managerial economics to enable them to appreciate its relevance in decision making.
2. To explore the economics of information and network industries and to equip students with understanding of how economics affects the business strategy of companies in these industries.
3. To develop economic way of thinking in dealing with practical business problems and challenges. 4.To understand the market structure and price determination
4. To describe the Break Even Analysis and its practical usage
5. To understand the concept of money market and capitamarket

Course Outcome:

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

CO 1: Comprehend the Basic Concepts of Micro Economics in Business decision making.
CO 2: Identify the theory of demand and its application in consumer market.
CO 3: Evaluating the Producer's Behavior in context of supply Analysis.
CO 4: Comprehend the concept of Break Even Point under Graphic Method.
CO 5: Examine the inter relationships between various facets of micro-economics from perspective of consumer, firms, industry and various Markets.
CO 6: Evaluating the role played by Reserve Bank of India.

Course Contents

UNIT-I	Basic Concept of Economics	06 Hours

Introduction to Economics, Basic Economic Problem, Circular Flow of Economics (Two, Three and Four Sector Model),Nature of the Firm- Rationale, Micro and Macro Economics and their interdependence on each other, Difference between Micro and Macro Economics

UNIT-II	Theory of Demand	06 Hours

Concept of Demand, Determinants of Demand, Demand function, Law of Demand, Demand Schedule and curve, Movement along and shift of Demand Curve, Exceptions to the law of demand.

UNIT-III	Theory of Supply Analysis	06 Hours

Meaning and concept of supply, Law of supply, Supply Schedule, Supply Curve and Shift of Supply Curve. Exception to Law of Supply

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UNIT-IV	**Cost Analysis**	**06 Hours**
Concepts of Cost:- fixed cost, variable cost, total cost, average cost, marginal cost, opportunity cost. Break even analysis, Graphic Method and Algebraic method (Numerical from BEP)		
UNIT-V	**Forms of Market and Price Determination**	**06 Hours**
Forms of Market – Perfect Competition, Monopoly and Monopolistic Competition, Market Equilibrium – Price Determination under Perfect Competition, Monopoly and Monopolistic Markets		
UNIT-VI	**Money Market and Capital Market**	**06 Hours**
Meaning and concept of money market, Instruments of money market, Capital Market and its instruments, Role and Functions of Reserve Bank of India		
Text Books: **T1.** Economic Analysis of Business Decision – Dr Meenakshi Duggal **T2.** Introductory *Microeconomics and Macroeconomics* , T.R. Jain and Dr V.K. Ohri **T3.**3. *Managerial Economics* – D.N. Dwivedi		
Reference Books: **R1.** *Intermediate Microeconomics: A Modern Approach*, Hal R, Varian. **R2.** *Principles of Macroeconomics*, N. Gregory Mankiw.		

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F. Y. B. Tech (Computer Science & Business System Engineering)
Academic Year – 2023-2024 Semester -I

HS 1209: Business Communication & Value Science- I

Teaching Scheme: PR: 2 Hours / Week	Credit PR: 1	Examination Scheme: Term Work: 50 Marks

Course Pre-requisites: Basic knowledge of high school English.

Course Objective:

- Understand what life skills are and their importance in leading a happy and well-adjusted life
- Motivate students to look within and create a better version of self
- Introduce them to key concepts of values, life skills and business communication

Course Outcome:

After successful completion of the course, students will able to:

CO 1: Recognize the need for life skills and values.
CO 2: Recognize own strengths and opportunities.
CO 3: Apply the life skills to different situations.
CO 4: Describe the basic tenets of communication.
CO 5: Apply the basic communication practices in different types of communication.

Course Contents

UNIT-I	Self-Introduction	03 Hours

Class activity–presentation on favorite rick et captain in IPL and the skills and values they demonstrate Self-work with immersion – interview a maid, watchman, sweeper, cab driver, beggar and narrate what you think are the values that drive them Activity: Write a newspaper report on an IPL match Activity:
Record a conversation between a celebrity and an interviewer Quiz Time, Self-awareness – Questionnaire.

UNIT-II	Essential Grammar	03 Hours

Refresher on Parts of Speech –Applications of tenses in Functional Grammar,
Sentence formation (general & Technical), Common errors, Voices. Show sequence from film where a character uses wrong sentence structure.

UNIT-III	Communication Skills & Speed reading and Skit	08 Hours

Barriers of communication, Effective communication. Types of communication-verbal and non–verbal. Listening Skills: Law of nature- Importance of listening skills, Difference between listening and hearing, Types of listening Activity: Skit based on communication skills Evaluations on Listening skills- listen to recording and answer questions based on them.

UNIT-IV	E-mails and Verbal Communication & Written Communication & C.V.	03 Hours

Email writing: Formal and informal emails, activity **Verbal communication**: Pronunciation, clarity of speech, **Vocabulary Enrichment**: Exposure to words phrases, idioms, significant abbreviations formal business vocabulary – Group discussion using words learnt. **Written Communication**: Summary writing, story writing. **Build your CV** – start writing your

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comprehensive CV including every achievement in your life, no format, no page limit. **Life skill**: Stress management, working with rhythm and balance, colors, and teamwork.

UNIT-V	Leadership and Term Work.	03 Hours

Theory to find out from the participants their views, observations and experiences of working in a team. Intro of Dr. Meredith Belbin and his research on team work and how individuals contribute.

Belbin's 8 Team Roles and Lindgren's Big 5 personality traits. Belbin's 8 team player styles.

Team falcon exercise.

UNIT-VI	Introduction To Life Skills	03Hours

Critical life skills, Multiple Intelligences, embracing diversity – Activity on appreciation of diversity (A short film on diversity. Play the video (link to be attached in the FG) Session on : Diversity & Inclusion- Different forms of Diversity in our society).

Life skill: Community services - work with an NGO and make a presentation

Life skill: Join a trek – Values to be learned: Leadership, teamwork, dealing with ambiguity managing stress, motivating people, creativity, result orientation.

Guidelines for Assessment

1)Practical for the subject shall be engaged in minimum three batch.
(Batch size of 22 students maximum) per division.

2) Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.

List of Assignments

1	Email writing.
	Grammar and vocabulary test 1
	Grammar and vocabulary test 2
	Group discussion
	Framing questions for interview
	Writing Micro blog on given subject.
	Exercise on life skills and personality types.
	Speed reading exercise.
	Debate on the topic of diversity with an angle of ethics, morality, and respect for individual (In the presence of an external moderator). Groups will be graded by the professor
	Summary writing exercise

Text Books:

T1. Business Communication – Dr. Saroj Hiremath

T2. English vocabulary in use – Alan McCarthy and O'Dell.

Reference Books:

R1. APAART: Speak Well 1 (English language and communication)

R2. APAART: Speak Well 2 (Soft Skills)

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F.Y.B.Tech (Group 1) Academic Year 2023-24
Semester IHS1210] Universal Human Values

Teaching Scheme: **TH: - 3**	**Credit TH:3**	**Examination Scheme:** **In Sem. Evaluation: 20 Marks Mid Sem. Exam:30 marks End Sem.Exam:50 marks**

Course Objectives: To help the students appreciate the essential complementarily between and SKILLS to ensure sustained happiness and prosperity which are the core aspirations of allhuman beings.
Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence. Such a holistic perspective forms the basis ofUniversal Human Values and movement towards value-based living in a natural way.

Course Outcome:
After successful completion of the course, students will able to CO1: Distinguish between skills and values through value education.
CO2: Distinguish between self and body with program to nurture body with self-regulation.
CO3: Recognize the value of harmonious relationship based on naturally accepting valuesin human - human relationship.
CO4: Describe harmony in nature and existence.
CO5: Explain ethical conduct, mutually fulfilling human behavior, enriching interactionwith nature.

Course Contents

UNIT-I	**Introduction to value education**	**6 Hours**

Understanding value education, Self-exploration as the process for value education, Happiness and Prosperity, Right Understanding, Relationship and Physical Facility, Happiness and Prosperity – CurrentScenario, Method to fulfil the basic human aspiration**.**

UNIT-II	**Harmony in Human being**	**6 Hours**

Understanding human being as a coexistence of the self and body, Understanding the needs of Self and Body, The Body as an Instrument of the Self, Understanding activities of Self,Understanding Harmony inthe Self, Understanding the Harmony in self with body, Programs to fulfil the self-regulation and health

UNIT-III	**Harmony in Family and society**	**6 Hours**

Harmony in family-a basic unit of human interaction, Human--human relationship, Values inrelationships, understanding harmony in the society, vision for universal human order
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UNIT-IV	Harmony in Nature and existence	6 Hours
Understanding the harmony in nature, understanding the four orders of nature, realizing existence as co-existence at all levels, holistic perception of harmony in existence,		
UNIT-V	**Implications of the Holistic Understanding of Harmony**	**6 Hours**
Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Universal Human Order, Competence in professional ethics, Holistic technologies, production systems and management models: Typical case studies		
Guidelines for ISE		
1) Term work shall be based on continuous assessment of six assignments.		
Text Books: **T1.1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010** **2. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.**		
Reference Books: **R1. Manav Vyavhar Darshan, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 2001**		

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F. Y. B. Tech (Computer Science Business Systems)
Academic Year – 2023-2024 Semester -II
[CB1201]: DESIGN THINKING

Teaching Scheme:	Credit	Examination Scheme (Pr)
PR: - 2 Hours/Week	PR:1	In Sem. Evaluation :20 Marks Mid Sem. Exam : 10 Marks End Sem. Exam : 20 Marks

Course Prerequisites : Business Communication & Value Science

Course Objective: The course titled Innovation, Business Models and Entrepreneurship is designed to give an in-depth Understanding on Various aspects of Innovation, Creativity, evolving business models, incubation and entrepreneurship. Come up with exposure to design thinking for designing innovative products. The course is a blend of theory and practice therefore this course does not require any prerequisite and will be useful to understand innovation and its applications in different spheres of development and growth

Course Outcome:
After successful completion of the course, students will able to:
CO 1: Analyze the needs of a customer or company for their specific problem.
CO 2: Apply the critical thinking and design thinking approach to solve real world problems.
CO 3: Develop and test ideas through a rapid iteration cycle

Course Contents

UNIT-I	Introduction to Design Thinking	4 Hours
Why Design? - Four Questions, Ten Tools - Principles of Design Thinking - The process of Design Thinking - How to plan a Design Thinking project.		
UNIT-II	**Understand, Observe And Define The Problem**	**4 Hours**
Search field determination, Problem clarification, Understanding of the problem, Problem analysis, Reformulation of the problem, Design thinking process (empathize, analyze, idea & prototype), Observation Phase, Empathetic design, Tips for observing, Methods for Empathetic Design, Point-of-View Phase, Characterization of the target group, Description of customer needs. mplementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brain storming, product development.		
UNIT-III	**Ideation And Prototyping**	**4 Hours**
Ideate Phase - The creative process and creative principles - Creativity techniques - Evaluation of ideas - Prototype Phase - Lean Startup Method for Prototype Development - Visualization and presentation techniques.		

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UNIT-IV	Testing And Implementation	4 Hours
Test Phase - Tips for interviews - Tips for surveys - Kano Model - Desirability Testing - How to conduct workshops - Requirements for the space - Material requirements - Agility for Design Thinking.		
UNIT-V	**Future**	**4 Hours**
Design Thinking meets the corporation – The New Social Contract – Design Activism – Designing tomorrow.		

The Teaching Pedagogy

Design Thinking Gallery Walk: Students will create visual representations of their design thinking projects, such as posters or digital presentations. Organize a gallery walk where students can showcase their work to their peers and provide feedback. This assignment promotes communication skills, presentation abilities, and collaboration within the class.

Design Thinking Reflection Journal: Throughout the design thinking lab sessions, require students to maintain a reflection journal. In their journals, they should document their experiences, challenges faced, insights gained, and lessons learned during each stage of the design thinking process. This assignment encourages students to reflect on their design thinking journey and develop a deeper understanding of their own growth and development.

Lab Contents

Guidelines for Assessment

1) Continuous assessment based on experiments performed, submission of results of program in the form of report/journal, timely completion, attendance, understanding, efficient codes, punctuality and neatness.
2) Lab assessment of 25 marks shall be based on continuous assessment and performance in Practical/Oral examination.

List of Tutorial Assignments

1	**Design Thinking Case Study Analysis:** Provide students with real-world case studies of organizations or products that have successfully implemented design thinking principles. Ask students to analyze the case studies, identify the design thinking methods used, and evaluate the outcomes. This assignment helps students understand the practical application and benefits of design thinking in different contexts.
2	**Empathy Interviews and User Persona Development: S**tudents should conduct empathy interviews with specific target audience who are affected by a particular problem or challenge. The goal is to develop a deep understanding of their needs, desires, and pain points. Students can then analyze the interview data and create personas or empathy maps to gain insights into user perspectives. Create detailed user personas of user. They should research and gather information about the users' demographics, needs, motivations, and behaviors. This assignment helps students understand the importance of user-centered design and how to empathize with the target audience.

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3	**Ideation and Brainstorming:** Assign students to participate in a group brainstorming session to generate a large number of ideas for solving a specific problem. Encourage them
	to use techniques like mind mapping, SCAMPER (Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, Reverse), or random word association to stimulate creative thinking. Students can then select the most promising ideas for further development.
4	**Crazy 8s Ideation:** Instruct students to individually generate as many ideas as possible within a set time limit, such as eight minutes. The goal is to encourage rapid idea generation and push students to think beyond their initial assumptions. After the ideation session, students can select their most promising ideas for further development.
5	**Rapid Prototyping: The Wallet Project Via Stanford D-School Concept**: A fast-paced project through a full design cycle project. Students pair up, show and tell each other about their wallets, ideate, and make a new solution that is "useful and meaningful" to their partner.
6	**INVENT A SPORT (WITH JUST THESE ITEMS)**: With limited time and resources, group will create and invent a new sport, and a set of directions for people to actually play the game.
7	**Design Challenge:** Provide students with a specific problem or challenge and ask them to apply the design thinking process to come up with a solution. For example, they could be tasked with redesigning a household item to make it more user-friendly or creating a mobile app that addresses a specific user need. Encourage students to conduct research, ideate, prototype, and test their solutions.
8	**Design Challenge:** Present students with a design challenge that requires them to solve a specific problem within a given context. For example, they could be asked to design a more efficient public transportation system for a city or create a sustainable packaging solution for a product. Encourage them to follow the entire design thinking process, from research and ideation to prototyping and testing.

Text Books:

T1. Change by design, Tim Brown, Harper Bollins (2009)

T2. Design Thinking in the Class Room by David Lee, Ulysses press

Reference Books:

R1. Design the Future , by Shrrutin N Shetty , Norton Press

R2. Universal principles of design- William lidwell, kritina holden, Jill butter.

R3. The era of open innovation – chesbrough.H

R4. Product Design and Manufacturing by A.K. Chitale and R.C. Gupta, Prentice Hall

Web References:

https://www.coursera.org/learn/uva-darden-design-thinking-innovation?action=enroll&aid=true&authMode=login

https://drive.google.com/file/d/1cplqb1eOWnoNMhFWNP8TyYLF2qHdGY_K/view

https://nptel.ac.in/courses/110/106/110106124/#

https://www.interaction-design.org/literature/article/personas-why-and-how-you-should-use-them

https://www.coursera.org/lecture/patient-safety-project-planning/prototyping-phase-jVuQn

https://www.ibm.com/design/thinking/page/framework

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F. Y. B. Tech Semester-I (Group 1,2,3&4)
[HS1201]: Induction Training

Training Duration: 3 Weeks	**Non-Credit Audit Course**

Course Objective: To familiarize the students with new environment and inculcate in them the ethos of the institution with a sense of larger purpose. The aim of induction training is to make the students feel comfortable in the new environment, create bonding in the batch as well as between the faculty and students, people around them, society at large and nature, useful in character building as responsible engineer, a citizen and a human being.

Course Outcome:

After successful completion of the course, students will able to:

- **CO 1:** Incorporate importance of health, fitness, outdoor activities and develop a sense of aesthetics and enhance creativity.
- **CO 2:** Explore one self, experience the joy of learning, take decisions with courage, built relationships between teachers and students and be sensitive to others.
- **CO 3:** Interact with the people who are eminent in industry, social service or in public life.
- **CO 4:** Get familiarize with the institution, department and local area and role of an engineer in society through technology.

Course Contents

I	**Physical Activity**
Physical activity with games / sports/ yoga. Gardening or other suitably designed activity.	
II	**Creative Arts**
Skills related to Visual or Performing arts e.g painting, music, dance, pottery, sculpture etc.	
III	**Mentoring and Universal Human Values**
Universal Human Values through group discussion and real life activities in small group with faculty asmentor for each group.	
IV	**Familiarization to Department/Branch and Innovations**

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F. Y. B. Tech Semester-I (Group 1,2,3&4)
[HS1201]: Induction Training

Guidelines related to rules and regulation of Choice Based Credit System (CBCS) and Examination Scheme. A College tour to explore common facilities like library, canteen, workshop etc. Visit to their Department and laboratories to understand role, achievements and innovations.	
V	**Proficiency Modules:**
Modules in the form of crash courses to overcome some lacunas that students may have e.g English, skills, computer Familiarity, stress management etc.	
VI	**Literary Activity:**
Reading a book, writing a summary, debating, enacting a play etc	
VII	**Lectures & Workshops by Eminent People:**
Motivational lectures about life, meditation, lectures by eminent personalities from industry, social service or public life, lectures by Training Placement Officer and Alumni	
VIII	**Visits in Local Area**
Visits to the local landmarks including historical monuments, visits to a hospital, orphanage or a village, visits to an industry in local area.	
Guidelines for Assessment	
1) Induction Training is mandatory non-credit audit course. 2) Internal continuous assessment and evaluation has to be carried out based on participation in activities (like creative arts, proficiency, literary, universal human values etc.) for award of grade at college level. Grade awarded for audit course shall not be calculated for grade point &SGPA. **3)** Based on experience each group of students shall prepare report on their program feedback**.**	

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F. Y. B. Tech (Group1, 2,3&4)

Professional English Communication [HS1202]

Teaching Scheme:	Credit	Examination Scheme:
TH: 2 Hours/Week PR: 2 Hours/Week	TH: 02 PR: 01	Theory : In Sem.Evaluation:15 Marks Mid Sem. Exam: 20 Marks End Sem. Exam: 35 Marks Practical: In Sem.Evaluation:20 Marks Mid Sem. Exam: 10 Marks (Orals) End Sem. Exam: 20 Marks

Course Prerequisites :Basic knowledge of high school English.

Course Objective:

- Prepare students to communicate effectively in a global professional environment using English.

Course Outcome:

After successful completion of the course, students will able to:

CO1: Adapt and use vocabulary for sentence formation.
CO2: Read , listen and comprehend professionally.
CO3: Write and analyze various forms of communication (emails and reports).
CO4: Effectively communicate at different levels of hierarchy.

Course Contents

UNIT-I	Reading	14 Hours
Introduction to the course, emphasizing its usefulness to students' careers; Basic grammar –2, Reading comprehension / Skimming		
UNIT-II	**Listening and Speaking**	**14 Hours**
Group discussion, Interview techniques, Vocabulary; Process of communication, Verbal and non-verbalcommunication		
UNIT-III	**Writing**	**14 Hours**
Writing: principles and practice, Summary / Essay / Report writing		
UNIT-IV	**Other forms of communication**	**14 Hours**
Phonetics; Presentation, Presentation – 2, Email; Communication via social media, Common errors; Americanvs. British English		

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Guidelines for Assessment

List of Assignments	
1	Email writing.
2	Multiple choice questions online assessment after completion of every unit to evaluate the understanding of the grammar.
3	Grammar and vocabulary test 2
4	Group discussion
5	Framing questions for interview
6	Writing Micro blog on given subject.
7	Exercise on life skills and personality types.
8	Spoken exercises to evaluate the learning in the conversational aspect of the language exercise.
9	Report Writing.
10	Presentation (Individual & Group)

Text Books:

1. M Ashraf Rizvi, Effective Technical Communication, McGraw Hill Education India, 2nd Ed., 2017.
2. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, Oxford University Press India, 3rd Ed., 2015.

Reference Books:

1. Paul V Anderson, Technical Communication, Cengage Learning, 9th Ed., 2017.
2. 2. Susan Thurman, Only Grammar Book You Will Ever Need, Adams, 2003.

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F. Y. B. Tech (Group1, 2,3&4)
English Language skill[HS1203]

Teaching Scheme: TH: 2 Hours/Week PR: 2 Hours/Week	Credit TH: 02 PR: 01	Examination Scheme: Theory : In Sem.Evaluation:15 Marks Mid Sem. Exam: 20 Marks End Sem. Exam: 35 Marks Practical: In Sem.Evaluation:20 Marks Mid Sem. Exam: 10 Marks (Orals) End Sem. Exam: 20 Marks

Course Prerequisites :Basic knowledge of high school English.

Course Objective:

- Understand what life skills are and their importance in leading a happy and well-adjusted life
- Motivate students to look within and create a better version of self
- Introduce them to key concepts of values, life skills and business communication

Course Outcome:

After successful completion of the course, students will able to:

CO1: Read and understand the basic components of a sentence at the level required to follow UG curriculum.
CO2: Listen and comprehend basic conversations.
CO3: Write comprehensions, emails and reports.
CO4: Prepare & present PPTs and use social media professionally.

Course Contents

UNIT-I	Grammar, vocabulary and reading	03 Hours
Introduction to the course, emphasizing its usefulness to students' careers; Basic grammar and vocabulary. Basic grammar and vocabulary, Reading comprehension, Phonetics.		
UNIT-II	**Listening and Speaking**	**03 Hours**
Listening comprehension, Group discussion; Public speaking		
UNIT-III	**Writing**	**08 Hours**
Writing: principles and practice, Summary / Essay / Report writing		
UNIT-IV	**Other forms of communication**	**03 Hours**
Presentation, Email; Communication via social media,		
UNIT-V	**Advanced level of Units 1-4**	**03 Hours**

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Reading comprehension – Advanced, Listening and speaking – Advanced, Writing – Advanced; Presentation – Advanced	
Guidelines for Assessment	
1) Practical for the subject shall be engaged in minimum three batches (batch size of 22students maximum) per division. 2) Lab Evaluation is a continuous assessment based on experiments performed, submission of results of experiment in the form of report/journal, timely completion, attendance and understanding.	
List of Assignments	
1	Email writing.
2	Grammar and vocabulary test 1
3	Grammar and vocabulary test 2
4	Group discussion
5	Framing questions for interview
6	Writing Micro blog on given subject.
7	Exercise on life skills and personality types.
8	Speed reading exercise.
9	Writing story.
10	Summary writing exercise.
Text Books: **T1 :** Wren and Martin, Revised by N. D. V. Prasada Rao, High School English Grammar and Composition, S.Chand and Company Ltd, Regular Ed., 2016. **T2.** Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, Oxford University Press India, 3rd Ed., 2015.	
Reference Books: **R1.** M Ashraf Rizvi, Effective Technical Communication, McGraw Hill Education India, 2nd Ed., 2017.	

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F. Y. B. Tech Semester-I (Group 1,2,3&4)
[HS1204]: German

Teaching Scheme:	Credit	Examination Scheme:
TH: 2 Hours/Week PR: 2 Hours/Week	TH: 02 PR: 01	Theory : In Sem.Evaluation:15 Marks Mid Sem. Exam: 20 Marks End Sem. Exam: 35 Marks Practical: InSem.Evaluation:20Marks Mid Sem. Exam: 10 Marks End Sem. Exam: 20 Marks

Course Prerequisites: Desire to get acquainted with the German language.

Course Objective: Introduction of Germany, Greetings, phrases, vocabulary, Understanding of numbers, Grammar- Introductory Sentence Formation, Articles, Pronouns, Tense, Prepositions

Course Outcome:
After successful completion of the course, students will able to:
CO1: Understand the basic information of Germany
CO2: Recognize and identify German letters and numbers
CO3: Describe and introduce themselves
CO4: Formulate basic questions

Course Contents

UNIT-I	**Start auf Deutsch: (Begin in German) /** Guten Tag! (Good day)	12 Hours

To learn to spell in German; introducing and giving information about oneself and others; to talk about oneself and others. **Grammar** - W-questions; simple statements; basic verbs and personal pronouns. **Vocabulary** - Alphabets; numbers 1 -20; greetings; countries and their languages.

UNIT-II	**Freunde, Kollegen und Ich (Friends, Colleagues and Me)**	11 Hours

To talk about hobbies, to make appointments; to talk about work, profession, work timings; to talk about seasons of the year; to create one's profile. **Grammar**-Gender articles *der,die,das,die and the singular plural form sa noun*; personal pronouns II; yes- no questions; verbs *haben* and *sein.* **Vocabulary-**
Hobbies; days of the week; months and seasons of the year; numbers 21-100; Professions

UNIT-III	**Städte, Länder, Sprachen: (Cities, Countries, Languages)**	11 Hours

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To name places and buildings; to ask questions about a place; to match texts with images; to enquire about things;to name modes of transport;toaskfororderscriberoutes;tounderstandinternationalwords
Grammar - Definite articles *der, die, das*; indefinite articles *ein, eine, ein*; negative articles *kein,keine, kein*; exclamatory sentences with *Sie* **Vocabulary** - Places and buildings; modes of transport;directions

UNIT-IV	**Guten Appetit ! (Food, Food preferences, etc.)**	**11 Hours**

Food, beverages, Speaking about different meals, Nominativ and Akkusativ cases, Understanding the prices and quantities, and the communication in the market/supermarket, Speaking about likes and dislikes with the verb mögen.
Grammar - Definite articles in Akkusativ : *den, die, das*; indefinite articles *einen, eine, ein*;
Modal Verben : wollen, dürfen, können

UNIT-V	**Alltag und Familie ! (Routine, Family, etc.)**	**11 Hours**

Talking about daily routine and holiday routine, Understanding the clock timings, Understanding the time table, Speaking about family, Possessive articles, Modal auxiliaries, Learning how to fix an appointment through a conversation.
Modal Verben : müssen, möchten, sollen

Guidelines for Assessment

Assessment is a continuous assessment based on submission of the assignments, timely completion, attendance and understanding

List of Assignments

1	Assignment on Parts of speeches and tenses.
2	Assignment on Definite & Indefinite Articles (Nominative & Accusative Cases).
3	Assignment on Negative Articles (Nominative & Accusative Cases).
4	Assignment on Personal Pronouns (Nominative Case)
5	Assignment on Personal Pronouns (Accusative Case)

Text Books:

T1. Netzwerk Neu A1 (Kursbuch) 2011. Goyal Publishers & Distributors Pvt. Ltd. Delhi, India

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F.Y. B. Tech (Group 1, 2, 3&4)
[HS1205]: Japanese Semester I/II

Teaching Scheme: TH: 2 Hours/Week PR: 2 Hours/Week	Credit TH: 02 PR: 01	Examination Scheme: Theory : In Sem.Evaluation:15 Marks Mid Sem. Exam: 20 Marks End Sem. Exam: 35 Marks Practical: In Sem.Evaluation:20 Marks Mid Sem. Exam: 10 Marks (Orals) End Sem. Exam: 20 Marks

Course Prerequisites: Desire to get acquainted with the Japanese language.

Course Objective: To meet the needs of ever growing industry with respect to language support, to get introduced to Japanese society and culture through language.

Course Outcome:
After successful completion of the course, students will be ableto:

CO1: Read & write Hiragana script at the level required to follow UG curriculum and JLPT Level N5.1.

CO2: Read & write Katakana script at the level required to follow UG curriculum and JLPT Level N5.1.

CO3: Write & speak basic sentences and questions related to self, family and friends.

CO4: Listen and comprehend and speak about time, hobbies, likes, dislikes and food preferences.
CO5: Write basic Kanjis.

Course Contents

UNIT-I	Introduction to Japanese Language - Hiragana	12 Hours

Introduction of Hiragana script, Listening: Short video skit on self introduction, Speaking: Song of script, Writing: Japanese Script, General Vocabulary: Months, Days of week, Basic greetings

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UNIT-II	Introduction -Katakana Script	11 Hours
Listening: English Words, Writing: Japanese Script, General vocabulary: days of month, Basic numeral		
UNIT-III	**Basic Sentence and Question Formation**	**11 Hours**
Basic sentence structure [Affirmative and negative] and framing questions [yes or no type], Writing: self introduction, General vocabulary: about family		
UNIT-IV	**Timing and Verbs**	**11 Hours**
Speaking: Talking about daily routine, Listening: Conversation based, Writing: writing daily routine using verbs and timing, Reading : A clock		
UNIT-V	**Basic kanji and Basic conversation**	**11 Hours**
Kanjis related to nature and numbers, Writing: writing kanjis, Speaking: related to traveling		

Guidelines for Assessment

Assessment is a continuous assessment based on submission of the assignments, timely completion, attendance and understanding

List of Assignments

1	Written Assignments on Hiragana Script
2	Written Assignments on Katakana Script
3	Written & Reading Assignments on Affirmative and Negative Sentences
4	Written & Spoken Assignments based on Daily Routine
5	Written Assignments based on Kanji

Reference Books:

R1 . Minna No Nihongo, "Japanese for Everyone", Elementary Main Textbook 1 (Indian Edition),Goyal Publishers & Distributors Pvt. Ltd.

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