

DKTE Society's
TEXTILE & ENGINEERING INSTITUTE
(An Autonomous Institute)

Rajwada, Ichalkaranji 416115

DEPARTMENT: GENERAL ENGINEERING

CURRICULUM

B.Tech. Engineering Program

First Year

With Effect From

2018-19



Promoting Excellence in Teaching
Learning & Research

**First Year UG Program in Mechanical Engineering, Computer Science & Engineering,
Civil Engineering.
Semester-I**

Sr. No.	Course Code	Name of the Course	Group	Teaching Scheme				Credits
				Theory Hrs/ Week	Tutorial Hrs/ Week	Practical Hrs/ Week	Total	
1	GEL121	Engineering Chemistry	A	3	–	–	3	3
2	GEL122	Engineering Mathematics-I	A	3	–	–	3	3
3	GEL123	Fundamentals of Electronics & Computer Programming	B	3	–	–	3	3
4	GEL124	Engineering Mechanics	B	3	–	–	3	3
5	GEL125	Basic Mechanical Engineering	B	3	–	–	3	3
6	GEP126	Engineering Chemistry Lab	A	–	–	2	2	1
7	GEP127	Fundamentals of Electronics & Computer Programming Lab	B	–	–	2	2	1
8	GEP128	Engineering Mechanics Lab	B	–	–	2	2	1
9	GEP129	Basic Mechanical Engineering Lab	B	–	–	2	2	1
10	GEP130	Professional Communication-I	C	1	–	2	3	2
11	GEP131	Workshop Practice	B	–	–	2	2	1
12	GEP132	Social Innovation *	C	–	–	2	2	2
Total				16	0	14	30	24

* Student should study this course on his own with faculty support.

Abbreviations:

CIE: Continuous Internal Evaluation
SEE: Semester End Examination
SE-I: Semester Examination-I
SE-II: Semester Examination-II

Group Details

A: Basic Science
B: Engineering Science
C: Humanities Social Science & Management
D: Professional Courses & Professional Elective
E: Free Elective
F: Seminar/Training/Project

**First Year UG Program in Mechanical Engineering, Computer Science & Engineering,
Civil Engineering.
Semester-II**

Sr. No.	Course Code	Name of the Course	Group	Teaching Scheme				Credits
				Theory Hrs/ Week	Tutorial Hrs/ Week	Practical Hrs/ Week	Total	
1	GEL133	Engineering Physics	A	3	–	–	3	3
2	GEL142	Engineering Mathematics-II	A	4	–	–	4	4
3	GEL134	Basic Electrical Engineering	B	3	–	–	3	3
4	GEL135	Basic Civil Engineering	B	3	–	–	3	3
5	GEL136	Engineering Graphics	B	3	–	–	3	3
6	GEP137	Engineering Physics Lab	A	–	–	2	2	1
7	GEP138	Basic Electrical Engineering Lab	B	–	–	2	2	1
8	GEP139	Basic Civil Engineering Lab	B	–	–	2	2	1
9	GEP140	Engineering Graphics Lab	B	–	–	2	2	1
10	GEP143	Professional Communication-II	C	1	–	2	3	2
11	GEP141	Life Skills, Professional Ethics and Yoga	C	1	–	2	3	2
Total				18	0	12	30	24

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E: Free Elective
F: Seminar/Training/Project

**First Year UG Program in Electronics Engineering,
Electronics & Telecommunication Engineering, Electrical Engineering.
Semester-I**

Sr. No.	Course Code	Name of the Course	Group	Teaching Scheme				Credits
				Theory Hrs/ Week	Tutorial Hrs/ Week	Practical Hrs/ Week	Total	
1	GEL133	Engineering Physics	A	3	–	–	3	3
2	GEL122	Engineering Mathematics-I	A	3	–	–	3	3
3	GEL134	Basic Electrical Engineering	B	3	–	–	3	3
4	GEL135	Basic Civil Engineering	B	3	–	–	3	3
5	GEL136	Engineering Graphics	B	3	–	–	3	3
6	GEP137	Engineering Physics Lab	A	–	–	2	2	1
7	GEP138	Basic Electrical Engineering Lab	B	–	–	2	2	1
8	GEP139	Basic Civil Engineering Lab	B	–	–	2	2	1
9	GEP140	Engineering Graphics Lab	B	–	–	2	2	1
10	GEP130	Professional Communication-I	C	1	–	2	3	2
11	GEP141	Life Skills, Professional Ethics and Yoga	C	1	–	2	3	2
12	GEP132	Social Innovation *	C	–	–	2	2	2
Total				17	0	14	31	25

* Student should study this course on his own with faculty support.

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Group Details

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B: Engineering Science
C: Humanities Social Science & Management
D: Professional Courses & Professional Elective
E: Free Elective
F: Seminar/Training/Project

**First Year UG Program in Electronics Engineering,
Electronics & Telecommunication Engineering, Electrical Engineering.
Semester-II**

Sr. No.	Course Code	Name of the Course	Group	Teaching Scheme				Credits
				Theory Hrs/ Week	Tutorial Hrs/ Week	Practical Hrs/ Week	Total	
1	GEL121	Engineering Chemistry	A	3	–	–	3	3
2	GEL142	Engineering Mathematics-II	A	4	–	–	4	4
3	GEL123	Fundamentals of Electronics & Computer Programming	B	3	–	–	3	3
4	GEL124	Engineering Mechanics	B	3	–	–	3	3
5	GEL125	Basic Mechanical Engineering	B	3	–	–	3	3
6	GEP126	Engineering Chemistry Lab	A	–	–	2	2	1
7	GEP127	Fundamentals of Electronics & Computer Programming Lab	B	–	–	2	2	1
8	GEP128	Engineering Mechanics Lab	B	–	–	2	2	1
9	GEP129	Basic Mechanical Engineering Lab	B	–	–	2	2	1
10	GEP143	Professional Communication-II	C	1	–	2	3	2
11	GEP131	Workshop Practice	B	–	–	2	2	1
Total				17	0	12	29	23

Abbreviations:

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SEE: Semester End Examination
SE-I: Semester Examination-I
SE-II: Semester Examination-II

Group Details

A: Basic Science
B: Engineering Science
C: Humanities Social Science & Management
D: Professional Courses & Professional Elective
E: Free Elective
F: Seminar/Training/Project

First Year B.Tech.
GEL121: ENGINEERING CHEMISTRY

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	100

Course Objectives

1. To explain water quality parameters, Water treatment methods and Green Chemistry.
2. To describe properties and applications of Advanced Materials and Instrumental Methods of Chemical Analysis.
3. To study the properties and characteristics of Fuel and calculate the calorific value of fuel by Bomb and Boy's Calorimeter.
4. To explain Metallic Materials, Corrosion Mechanism and methods of Corrosion Prevention

Course Outcomes

At the end of the course students will be able to

1. Apply the knowledge of water and Green Chemistry to develop water treatment methods and solve environmental problems.
2. Select the proper material for engineering applications and develop rapid and reliable analytical instrumental methods
3. Analyse the quality of fuel and select proper fuel for industrial purpose.
4. Evaluate the quality of metallic material and apply the knowledge of corrosion for prevention of corrosion.

Course Contents

Unit 1.	Water	8 Hrs.
	Introduction, impurities in natural water, water quality parameters like acidity, alkalinity, chlorides, dissolved oxygen, total solids BOD, COD, oil and grease and hardness of water (causes, types, units of hardness). Ill effects of hard water in steam generation in boilers, numericals on hardness, treatment of hard water- zeolite process, ion exchange process and reverse osmosis (R.O.).	
Unit 2.	Instrumental Methods of Chemical Analysis	7 Hrs.
	Introduction, advantages and disadvantages of instrumental methods. A) pH-metry: Introduction, pH measurement using glass electrode, applications of pH-metry. B) Spectrometry: Introduction, Laws of spectrometry (Lamberts and Beer-Lambert's law), Single beam spectrophotometer (schematic, working and applications). C) Chromatography: Introduction, types, gas-liquid chromatography (GLC), basic principle, instrumentation and applications.	

Unit 3.	Advanced Materials A) Polymers: Introduction, plastics, thermosoftening and thermosetting plastic, industrially important plastics like phenol formaldehyde, urea formaldehyde and epoxy resins, conducting polymers (doping, conjugation, conductivity), examples and applications, biodegradable plastics. B) Nanomaterials: Introduction, synthesis and applications. C) Composite materials: Introduction, constituents, types of composites, advantages, composition, properties and uses of fiber reinforced plastics (FRP) and glass fibre reinforced plastic (GRP).	6 Hrs.
Unit 4.	Fuels Introduction, classification, calorific value, definition, units (calorie, kcal, joules, kilojoules), characteristics of good fuels, comparison between solid, liquid and gaseous fuels, types of calorific value (higher and lower), Bomb calorimeter and Boy's calorimeter. Numerical on Bomb and Boy's calorimeter, Petroleum, Cracking, synthetic petrol, reforming, gasoline, knocking, octane and octane number. Fuel cells: Introduction, classification, advantages, limitations and applications.	8 Hrs.
Unit 5.	Metallic materials and Green Chemistry A) Metallic materials: Introduction, Alloys - definition and classification, purposes of making alloys. Ferrous alloys: Plain carbon steel (mild, medium and high), stainless steel. Nonferrous alloys: Copper alloys – Brass & Bronze, Nickel alloy - Nichrome, Aluminium alloys - Duralumin and Alnico, Tin alloy - Solder metal. B) Green Chemistry: Definition, goals of green chemistry, twelve principles of green chemistry and industrial applications.	6 Hrs.
Unit 6.	Corrosion and its Prevention Introduction, causes, electrode potential, electrochemical series, types of corrosion - atmospheric corrosion (oxidation corrosion), electrochemical corrosion - hydrogen evolution and oxygen absorption mechanism, factors affecting the rate of corrosion, Prevention of corrosion by proper selection of material and proper designing, cathodic protection – sacrificial anodic method and external current method, hot dipping-galvanizing and tinning, electroplating, metal spraying and metal cladding.	7 Hrs.

Recommended Books

1. P. C. Jain & Monica Jain, "Engineering Chemistry" (15th Ed.) Dhanpat Rai & Co.
2. Dr. S. S. Dara & Dr. S. S. Umare, "A Textbook of Engineering Chemistry" S. Chand & Company Ltd.
3. Shashi Chawla, "A Text Book of Engineering Chemistry" Dhanpat Rai & Co.

Reference Books

1. M. M. Uppal, "Engineering Chemistry" Khanna Publishers
2. Engineering Chemistry- A Textbook for Engineers, Wiley India
3. A. Pahari & B. S. Chauhan, "Engineering Chemistry" Firewall Media
4. B. K. Sharma, "Industrial Chemistry" Goel Publishing House
5. Gurdeep R. Chatwal & Sham K. Anand, "Instrumental Methods of Chemical Analysis" Himalaya Pub House
6. Galen W. Ewing, "Instrumental Methods of Chemical Analysis" McGraw-Hill
7. Dr. S. S. Dara, "A Textbook of Experiments & Calculations in Engineering Chemistry" S. Chand & Company Ltd.

First Year B.Tech.
GEP126: ENGINEERING CHEMISTRY LAB

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

List of Experiments

Minimum 12 experiments should be performed from the following list out of which two experiments should be demonstrative on instrumental methods.

1. Determination of total hardness of water by EDTA method
2. Determination of alkalinity of water.
3. Determination of chloride content of water by Mohr's method
4. Determination of dissolved oxygen in given water sample
5. Determination of suspended solids, dissolved solids and total solids in given water sample
6. Determination of rate of corrosion of aluminium in acidic and basic medium
7. Determination of percentage of copper in brass
8. Estimation of zinc in brass solution
9. Preparation of urea-formaldehyde resin
10. Preparation of phenol-formaldehyde resin
11. Determination of moisture and ash content in a given coal sample by proximate analysis
12. Separation and identification of cations by paper chromatography
13. Demonstration of pH meter
14. Demonstration of photo-colorimeter / spectrophotometer

Submission

1. Completed Journal

First Year B.Tech.
GEL122: ENGINEERING MATHEMATICS – I

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	100

Course Objectives

1. To teach Mathematical methodologies and models
2. To develop mathematical skills and enhance logical thinking power of students
3. To prepare students in matrix theory to solve simultaneous linear equations & to prepare in numerical techniques to solve engineering problems
4. To produce graduates with mathematical knowledge, computational skills and the ability to deploy these skills effectively in the solution of problems, principally in the area of engineering

Course Outcomes

After successful completion of course students should be familiar with and able to

1. Use matrix algebra to solve physical and engineering problems
2. Use the knowledge of complex number in engineering problems
3. Identify the functions of one or two variables and apply power series solutions as well as the relevant concept of partial differentiation
4. Apply numerical techniques to solve physical and engineering problems and use it to analyse the time based data in engineering field if required.

Course Contents

Unit 1.	Matrix – I Rank of matrix: definition, normal form and rank by normal form, Echelon form and rank by echelon form, Consistency of linear system of equations, Homogeneous System of linear equations, Non-homogeneous System of linear equations	7 Hrs.
Unit 2.	Matrix – II Linear dependence and independence of vectors, Eigen Values & Properties of Eigen values, Eigen vectors & Properties of Eigen vectors, Cayley-Hamilton's theorem & its verification, Inverse of matrix by using Cayley-Hamilton's theorem	7 Hrs.
Unit 3.	Numerical Techniques To Solve Linear Simultaneous Equations Gauss-Jordan method, Jacobi's iteration method, Gauss-Seidel iteration method, Rayleigh's power method to find eigen vector by iteration	6 Hrs.
Unit 4.	Expansion of Functions, Partial Differentiation and Its Applications Maclaurin's theorem expansions of Standard functions, Taylor's theorem, Partial derivatives: Introduction, Partial Differentiation of implicit function, Total derivatives, Euler's theorem on homogeneous function of two variables, Jacobian, Properties of Jacobian, Maxima and Minima of functions	8 Hrs.

- Unit 5. Complex Numbers** **8 Hrs.**
De Moivre's Theorem (Without proof), Roots of complex numbers by using De Moivre's Theorem, Representation of roots of complex numbers on Argand's diagram, Physical interpretation of $r_1 < |z| < r_2$, Definitions of Circular functions as a complex variable & Hyperbolic functions, Relation between Circular & Hyperbolic functions, Inverse Hyperbolic Functions, Separation into real and imaginary part.
- Unit 6. Numerical Differentiation** **6 Hrs.**
Numerical derivatives of first and second order by Newton's forward and backward difference formulae, Newton's divided difference formulae, Sterling's central difference formulae.

Recommended Books

1. P. N. Wartikar & J. N. Wartikar, "A text book of Applied Mathematics," Vol.I & II Pune Vidyarthi Griha Prakashan, Pune
2. Dr. B. S. Grewal, "Higher Engineering Mathematics" 42nd edition, Khanna Publishers, Delhi. June 2012

Reference Books

1. B. V. Ramana, "Higher Engineering Mathematics" Tata McGrawhill Pub Co. Ltd 1st Edition, 2007
2. Dr. U B Jungam, K P Patil & N Kumtekar, "Applied Mathematics-I" Nandu Publication
3. Erwin Kreyszig, "Advanced Engineering Mathematics" Wiley India Pvt. Ltd
4. H. K. Dass, "Advanced Engineering Mathematics" S. Chand, New Delhi
5. Peter V. O'Neil and Santosh K. Sengar, "A text book of Engineering Mathematics" Cengage Learning Volume I
6. Kanti B. Datta, "Mathematical methods of Science and Engineering" Cengage Learning
7. Dr. B. S. Grewal, "Numerical methods" Khanna Publishers, Delhi
8. N. P. Bali, Iyengar, "A text book of Engineering Mathematics" Laxmi Publications (P) Ltd., New Delhi

First Year B.Tech.
GEL123: FUNDAMENTALS OF ELECTRONICS AND COMPUTER PROGRAMMING

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	100

Course Objectives

1. To understand the construction & specification of passive components.
2. To introduce the application of PN junction diode and transistor
3. To understand the basic logic and design of circuits
4. To understand the fundamentals of C' programming.
5. To learn to write 'C' program.

Course Outcomes

At the end of the course students will be able to

1. Measure and test the different types of Passive components and Explain the application of diode and transistor
2. Illustrate the Boolean laws for Boolean algebra and design of combinational circuits.
3. Understand fundamental concepts, control statements, array and functions in c programming language
4. Implement, test, debug, and document programs in C

Course Contents

- Unit 1. Introduction to Passive Components** - Resistors - Fixed and Variable, Construction, Color coding, Specifications. Capacitors - Various Types, Construction, Color coding. Specifications Inductors - Types with Specification. **6 Hrs.**
- Unit 2. Semiconductor devices & Circuits:-** PN Junction diode, diode as rectifier, Specification of rectifier diodes, half wave, full wave (center tapped, bridge) rectifier, Zener diode characteristics, Specifications, Zener voltage regulator. Characteristics & Specification of BJT. CE, CB, CC configurations. Operation of BJT in cut off, saturation and active regions. BJT as switch. **7 Hrs.**
- Unit 3. Digital logic & Circuits** Binary and Hexadecimal number system, BCD and weighted code, Binary Arithmetic (addition, subtraction, multiplication, division) Signed Numbers. Logic-positive and negative logic, basic and universal logic gates. Boolean algebra and postulates, reduction of Boolean expression. Combinational circuits (Half and full adder, subtractor, Mux, De-Mux, decoder and encoder). **8 Hrs.**
- Unit 4. Introduction to 'C'** Constants, variables, variable declaration, keywords, operators. Data types- int, char, float, double. C program structure **6 Hrs.**

Unit 5.	Control Statements if, else, case, Looping Statements – for, while, do while, continue, break.	7 Hrs.
Unit 6.	Arrays & Functions Introduction, declaration, array of integers, array of characters, 2 dimensional array. Functions – basics, declaration, definition, function call, call by value, call by reference.	8 Hrs

NOTE: For this course SEE Examination will be divided in two parts.

- (i). Part-A: 50% marks for theory paper based on descriptive, analytical and problem solving questions.
- (ii). Part-B: 50% marks for computer based online exam

Recommended Books

1. Jacob Millman & Christos C. Halkias, “Electronic Devices & Circuits” McGraw-Hill
2. Allen Mottershead “Electronic Devices and Circuit” PHI Publication.

Reference Books

1. Robert L. Boylestad, Louis Nashelsky, “Electronic Devices and Circuit” Prentice Hall, 1999
2. Donald P leach, Albert Paul Malvino, Goutam saha “Digital Principles & Applications” Tata Mcgraw Hill Publishing Co Ltd, 2014
3. Sergio Franco, “Design with operational amplifier and analog circuits design”
4. David A Bell, “Electronic Measurement and Instrumentation”
5. Brian W. Kernighan, Dennis Ritchie, “The C Programming Language” Prentice Hall Software Series
6. Herbert Schildt, “C The Complete Reference” Tata McGraw-Hill

First Year B.Tech.
GEP127: FUNDAMENTALS OF ELECTRONICS AND
COMPUTER PROGRAMMING LAB

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

List of Experiments

1. Testing of electronic component using Multi-meter and to measure frequency & amplitude on CRO.
2. Study of Half and Full wave rectifier
3. Study of Transistor as Amplifier
4. Verify the TTL gates
5. Design of combinational circuit such as half adder.
6. Design of some digital circuits.
7. Program to understand variables, constants, keywords and data types.
8. Program to display formatted data.
9. Program to understand looping, control statements.
10. Program to understand concept of array.
11. Program to understand concept of functions.
12. Program on 'C'

Submission

1. Completed Journal

First Year B.Tech.
GEL124: ENGINEERING MECHANICS

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	100

Course Objectives

1. To explain statics along with fundamentals theorems and laws governing it.
2. To illustrate equilibrium and its application to find unknown forces and reactions acting on body by using Lami's theorem, method of virtual work.
3. To elaborate different methods of analysis of truss to find forces in members of truss
4. To locate the centroid and calculate moment of Inertia of plane composite figures
5. To study kinetics of linear and circular motion by using Newton's laws of motion
6. To discuss Impact its types, coefficient of restitution and collision of bodies

Course Outcomes

At the end of the course students will be able to

1. Use the theory of resolution and composition of forces for concurrent and nonconcurrent force system and find unknown force acting on body and draw free body diagram and analyse the body in static equilibrium
2. Analyse the trusses by method of joints and method of sections to determine forces in member of truss
3. Locate the position of Centroid of plane figures and calculate Moment of Inertia of different standard and composite figures
4. Analyse the bodies in Dynamic equilibrium and Solve the kinetics problems and explain and evaluate the phenomenon of Impact and behaviour after impact

Course Contents

Unit 1.	Fundamentals of Statics Basic Concepts and Fundamental Laws, Force, Moment and Couple, System of Forces, Resultant, Resolution and Composition of Forces, Varignon's Theorem, Law of Moments.	8 Hrs.
Unit 2.	Equilibrium Lamis' Theorem, Free Body Diagram, Equilibrium of Forces, Equilibrium conditions, Surface friction for bodies on horizontal and inclined planes. Beams: Types of Loads, Types of supports, Analysis of Simple beams, Virtual work method for support reactions	7 Hrs.
Unit 3.	Analysis of Truss Types of Trusses, Assumptions, Methods of Analysis:- Method of Joints, Method of Section, Analysis of Simple truss with maximum seven members	8 Hrs.

Unit 4.	Centroid and Moment of Inertia Centroid and Center of Gravity, Moment of Inertia of Standard shapes from first principle, Parallel and perpendicular axis theorem, Moment of Inertia of plain and composite figures, Radius of Gyration.	7 Hrs.
Unit 5.	Kinetics of Linear and Circular Motion Introduction to Kinematics of Linear and Circular motion (no numerical on kinematics), Kinetics of linear motion, Newton's Laws, D'Alembert's Principle, Work- Energy Principle, Impulse Momentum Principal, Kinetics of Circular Motion	8 Hrs.
Unit 6.	Impact and Collision Impact, Types of Impact, Law of conservation of Momentum, Coefficient of Restitution, Numerical on Direct central Impact.	4 Hrs.

Recommended Books

1. S. S. Bhavikattis, "Engineering Mechanics" New Age International Pvt. Ltd
2. S. B. Junnerkar, "Engineering Mechanics"

Reference Books

1. Dayal M.D. "Engineering Mechanics" Paperback Publication 2012
2. R. K. Bansal and Sanjay Bansal, "Engineering Mechanics" Laxmi Publications
3. Tayal A.K., Umesh, "Mechanics for Engineering, Statics and Dynamics" Publication, N. Delhi, 2008
4. F. P. Beer and E. R. Johnston, "Vector Mechanics for Engineers" Tata Mc-Graw Hill Publication Vol.I and II
5. Manoj K Harbola, "Engineering Mechanics" Cengage Learning
6. K. I. Kumar, "Engineering Mechanics" Tata Mc-Graw Hill Publication
7. Irving H. Shames, "Engineering Mechanics" Prentice Hall of India, New Delhi
8. S. N. Saluja, "Applied Mechanics" Satya Prakashan, New Delhi
9. Ferdinand Singer, Harper and Row, "Engineering Mechanics by Statics and Dynamics"
10. R. S. Khurmi, "Engineering Mechanics" S. Chand Publications
11. S. Rajasekaran, G. Sankarasubramanian, "Fundamentals of Engineering Mechanics" Vikas Publishing House

First Year B.Tech.
GEP128: ENGINEERING MECHANICS LAB

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

List of Experiments

1. To verify the equilibrium using universal force table
2. Law of polygon of forces
3. To verify Lami's theorem by using Jib crane
4. To find internal forces using jib crane
5. Bell crank lever
6. Support reaction of beam
7. Fletchers trolley
8. Centrifugal force
9. A drawing sheet on: - To find resultant of non-concurrent force system (2 problems)
10. A drawing sheet on: - To find support reaction of beam (2 problems)
11. A drawing sheet on: - To find forces in all members of perfect frame (2 problems)
12. A drawing sheet on: - To find displacement using v-t diagram (2 problems)

Submission

1. Completed Journal
2. Drawing sheet on Graphics Statics.

First Year B.Tech.
GEL125: BASIC MECHANICAL ENGINEERING

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	100

Course Objectives

1. Acquire basic knowledge of mechanical engineering
2. Impart knowledge of basic concepts of thermodynamics applied to industrial application
3. Understand principle of energy conversion system and power plants
4. Understand and identify power transmission devices with their functions
5. Learn and understand metal joining processes
6. Describe the scope of mechanical engineering in multidisciplinary industries.

Course Outcomes

At the end of the course students will be able to

1. Understand Fundamental concepts of mechanical engineering and its applications.
2. Identify and describe different energy sources and conversion of one form of energy to another.
3. Solve problems related to heat, energy and power transmission.
4. Identify and categorize different processes and systems in mechanical engineering.

Course Contents

Unit 1.	Energy Sources and Power Plants Renewable and nonrenewable energy, Solar-flat plate collector, concentric collector-Parabolic and cylindrical, Photovoltaic cell, Wind, Geothermal, Tidal, Hydropower plant, Steam Power plant, Bio-gas, Bio-Diesel (Descriptive Treatment only).	7 Hrs.
Unit 2.	Thermodynamics Thermodynamic State, Process, Cycle, Thermodynamic System, Heat, work, Internal Energy, First Law of Thermodynamics, Application of First Law to steady Flow and Non-Flow processes, Limitations of First Law (Numerical Treatment) Statements of Second Law of Thermodynamics.	7 Hrs.
Unit 3.	Basic Concepts of Design Basic steps in design, Ergonomic considerations - Relation between man, machine and environmental factors. Aesthetic design principles. Concept of Stress and Strain, Hooke's Law, Stress-strain diagram for ductile and brittle material.	7 Hrs.
Unit 4.	Mechanical Power Transmission Types of Belt and belt drives, chain drive, Types of gears and gear Trains, (Numerical Treatment on belt drive and Gear Drive)	7 Hrs.

- Unit 5. Introduction to production and Productivity** **7 Hrs.**
Definition of production, types of production such as job order, batch type, mass production etc., Concept of productivity, different techniques to increase productivity, productivity models.
- Unit 6. Manufacturing Processes** **7 Hrs.**
Introduction to manufacturing processes - Steps involved in casting processes, Metal Joining Processes – welding, soldering and brazing and their applications.

Recommended Books

1. G.D. Rai, “Non-Conventional Sources of Energy” Khanna Publication
2. R.K. Rajput, “Thermal Engineering” Laxmi Publication, Delhi
3. Ratan S.S, “Theory of Machines” Tata McGraw Hill New Delhi, 2nd Edition
4. P. N. Rao, “Manufacturing Technology” Tata Mc-Graw Hill Publication Volume I and II

Reference Books

1. Dr. S.P. Sukathame, “Solar Energy” Tata Mc-Graw Hill Publication
2. Hajara Choudhari, “Elements of Workshop Technology” Media Promoters Vol.I and II
3. Achultan, “Engineering Thermodynamics” Prentice Hall of India
4. V.B.Bhandari, “Design of machine element” Tata Mc- Graw Hill Publication
5. R. K. Bansal, “Strength of Materials” Laxmi Publication, 4th Edition
6. David Sumanth, “Productivity Engineering and Management” Tata McGraw Hill, New Delhi.
7. Martand Telsang, “Industrial Engineering & Production Management” S Chand & Company New Delhi (2009)

First Year B.Tech.
GEP129: BASIC MECHANICAL ENGINEERING LAB

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

List of Experiments

1. Assignment on Steady Flow Energy Equation.
2. Demonstration of solar water heating system.
3. Demonstration of Hydroelectric power plant.
4. Diesel power plant
5. Assignment of Stress and Strain.
6. Assignment on aesthetics and ergonomics
7. Demonstration of types of Gears and gear trains.
8. Assignment on Belts and belt drive.
9. Assignment on Gears and gear drive.
10. Types of productivity and productivity concept
11. Demonstration of metal joining processes.
12. Assignment on casting process

Submission

1. Completed Journal

First Year B.Tech.
GEL130: PROFESSIONAL COMMUNICATION – I

Teaching Scheme	
Lectures	1 Hr. /Week
Total Credits	1

Course Objectives

1. To explain the concept of communication
2. To develop grammatical ability
3. To explain the importance of business correspondence
4. To develop oratorical skills like debate, elocution, meetings, extempore

Course Outcomes

At the end of the course students will be able to

1. Apply the importance of communication during their professional life.
2. Apply the knowledge of basic grammar while oral and written communication.
3. Design and compose different types of business letters.
4. Prepare themselves for debate, elocution, extempore and meeting.

Course Contents

Unit 1.	Understanding Communication Etymological perspective and definition of communication Nature and Importance of Communication, Process of communication – idea or source, sender, encoding process, message, medium or channel, noise, receiver, decoding process, feedback Barriers to Communication, Physical barriers, mechanical barriers, sociocultural, psychological barriers, linguistic and semantics barriers.	2 Hrs.
Unit 2.	Organizational communication Objectives of communication, Forms of Communication, Formal and informal communication, methods of communication oral and written communication, networks of communication in the organization upward, downward, horizontal, grapevine communication.	2 Hrs
Unit 3.	Development of grammatical ability Parts of speech, articles , kinds of sentences, punctuation marks	2 Hrs.
Unit 4.	Professional Correspondence Importance, language and style, formats (British & American), Letter Writing, Simple application letter (seeking permission regarding absence etc.), Inquiry and its reply, placing an order, complaint and its adjustment and email etc	3 Hrs.
Unit 5.	Techniques of Communication Techniques of communication, Verbal Communication Non Verbal Communication, appearance, gestures, facial expressions, postures, kinesics, eye contact, silence, haptic, proxemics, paralinguistic, colours	3 Hrs.
Unit 6.	Developing Oral Skills Importance and techniques to improve oral communication: Techniques of formal speech, meetings, Elocution, Extempore, Debate etc	2 Hrs.

Recommended Books

1. Sunita Mishra, C. Muralikrishna “Communication skills for Engineers” Pearson Education
2. Jain Alok, “Professional Communication skills” S. Chand Publication
3. K.R. Laxminarayan, “English for Technical Communication” Vol-I & II, Scitech Publication

Reference Books

1. David A. McMurrey, Joanne Buckley, “Handbook for Technical Writing” Cengage.
2. Jane Summers, Brette Smith, “Communication Skills Handbook: How to succeed in written and oral communication” Wiley India Pvt.Ltd.
3. S.V. Pathak, “Communication skills” Nirali Prakashan.
4. Dr. Abha Singh, “Behavioural Science” Wiley India Pvt.Ltd.
5. Bikram K. Das, Kalyani Samantray, “An Introduction to Professional English and Soft Skills” Cambridge University Press New Delhi.
6. Wren & Martin, ‘Highschool English Grammar & Composition” S. Chand Publication
7. Allen Pease, “Body Language”.
8. Lavis Norman, “Word Power made Easy” S. Chand Publication
9. Syed Abdur Raheem, “Write Right”

First Year B.Tech.
GEP130: PROFESSIONAL COMMUNICATION – I LAB

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

List of Experiments

1. Understanding Self
2. Grammar activities
3. Simple application letter (seeking permission regarding absence)
4. Letter of enquiry and order
5. Letter of complaint and E mail writing
6. Meetings
7. Extempore
8. Vocabulary building activities
9. Teamwork- story making
10. Elocution
11. Debate
12. Effective reading (newspaper articles)

Submission

1. Completed Tutorial and assignment books

First Year B.Tech.
GEP131: WORKSHOP PRACTICE LAB

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

List of Experiments

1. Demonstration of use of instruments such as steel rule, vernier calliper, dial gauge, micrometer and its least count.
2. Demonstration of one job in smithy involving upsetting, drawing, bending such as hook, peg, square headed bolt.
3. Demonstration of one job on Arc Welding Lap/butt joints.
4. Demonstration of one job on gas welding.
5. Fitting one job male, fitting operation such as marking, cutting and filling
6. Fitting one job female, fitting operation such as marking, cutting and filling
7. Fitting one job male, fitting operation such as drilling, tapping, filling
8. Fitting one job female, fitting operation such as drilling, tapping, filling
9. Fitting of job Male and female parts and ensuring the required tolerance
10. Sheet metal Work demonstration on job
11. Sheet metal Work One job on commercial item such as Dust bin or funnel or tray for students work operation such as marking and cutting
12. Sheet metal Work One job on commercial item such as Dust bin or funnel or tray for students work operation such as folding

Submission

1. Completed Journal / Field Book

First Year B.Tech.
GEP132: SOCIAL INNOVATION

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	2

Evaluation Scheme	
CIE	50
Total	50

Note: Student should study this course on his own with faculty support.

The course 'Social Innovation' shall be floated as project based and credits allotted shall be 2.

The objectives of the course are as follows:

- To build students' capacity to use problem solving skills to address social issues through innovative solutions
- To transform students' perspective on the world around them by enabling them to identify areas ripe for innovation

A group of first year engineering students (not less than four) shall be allotted to a faculty member to monitor and guide them. Institute / faculty may take help of local associations / NGOs / social clubs for addressing local issues. A project may include survey, innovative solution to address social problems in and around local areas.

This will help students to connect with social issues at the initial stage of study of program.

First Year B.Tech.
GEL133: ENGINEERING PHYSICS

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	100

Course Objectives

1. To understand basic concepts of Physics such as Diffraction, Polarization, Interference etc.
2. To Know crystallography and its role in Science and technology. Explain seven crystal systems and concept of Miller indices Derive Bragg's law and explain construction and working of Bragg's X-ray
3. To understand basic terms of Nuclear Physics like fission, fusion. Solve problems on fission. Draw diagrams & explain working of fission and fusion reactors.
4. To get acquainted with Laser and Fiber optics and their applications in Engineering
5. To Know concepts of Nano physics, Nano materials & their applications.
6. To understand the importance of acoustics and ultrasonics in engineering and technology

Course Outcomes

At the end of the course students will be able to

1. Use the knowledge of basic concepts like Diffraction, Polarization Double refraction etc. in Engineering.
2. Determine the crystal structure by understanding crystallography and X-ray diffraction technique.
3. Apply the concepts like Nanotechnology, acoustics, ultrasonics and LASER in engineering applications
4. Calculate angle of acceptance Numerical aperture and amount of energy liberated and power generated from nuclear reactor

Course Contents

- Unit 1. Diffraction and Polarization** **7 Hrs.**
Diffraction: Introduction **Fraunhofer diffraction:** Diffraction grating construction and theory, resolving power of diffraction grating.
Polarization: Double refraction, quarter wave plate and Half wave plate. Production and detection of plane, circularly, elliptically polarized light, Optical activity, specific rotation, Laurent's half shade Polarimeter, photo elasticity.
- Unit 2. Crystallography** **6 Hrs.**
Unit cell, Bravais lattices, properties of unit cell (number of atoms per unit cell, coordination number, atomic radius, packing fraction), relation between density and lattice constant, symmetry elements in cube, Miller indices - procedure, features and sketches for different planes. X-ray diffraction, Bragg's law, Bragg's x-ray spectrometer.
- Unit 3. Nuclear Energy** **6 Hrs.**
Introduction, energy released by 1 Kg. of U-235, explosive chain reaction and critical size, nuclear reactor and their classification, essentials of nuclear reactor. Nuclear fusion (p-p chain, c-n cycle), conditions for fusion reaction and fusion reactor.

Unit 4. Fiber Optics and Laser	8 Hrs.
Absorption, spontaneous emission, stimulated emission, pumping energy, population inversion, characteristics of laser, Ruby laser, applications of laser (industrial & medical), Holography (construction, reconstruction, and applications). Principle, structure of optical fibre, propagation of light, acceptance angle and acceptance cone (no derivation), numerical aperture (no derivation), types of optical fibre, applications (medical, military, entertainment, communication, optical fibre sensors), advantages of optical fibres.	
Unit 5. Nanophysics	7 Hrs.
Introduction, Nanoscale, Properties of nanoparticles, production techniques of nanomaterial and applications. Principles of Atomic force Microscope and Scanning tunneling microscope Carbon Nanotubes, Applications of nanotechnology.	
Unit 6. Acoustics and Ultrasonic	8 Hrs.
Acoustics: Introduction, Acoustics of buildings, Sabine's formula for reverberation, sound absorbing materials, factors affecting acoustics of building and their remedies, noise control in machine, Ultrasonic: Introduction, Generation of ultrasonic waves by Magnetostriction and Piezoelectric method, Detection of ultrasonic waves, Properties of ultrasonic waves, Acoustical grating, Applications: drilling, welding, soldering, SONAR.	

Recommended Books

1. R. K. Gaur & Gupta S. L, "Engineering Physics" Dhanapat Rai Publication
2. B. K. Pandey and S. Chaturvedi, "Engineering Physics" Cengage Learning

Reference Books

1. Hitendra K. Malik & A. K. Singh, "Engineering Physics" McGraw Hill Education
2. V. Rajendran, "Engineering Physics" Tata McGraw-Hill Education Pvt. Ltd., 2010
3. G. Vijayakumari, "Engineering Physics" Vikas Publishing, Noida
4. P. K. Palanisamy, "Solid State Physics" Scitech Publication (India) Pvt. Ltd.
5. Callister W.C. Jr. "Material Science and Engineering: An Introduction" John Wiley & Sons, 6th Edn
6. R. Serway, C. Moses and C. Moyer, "Modern Physics" 3rd edition, Thomson Learning.
7. M. N. Avadhanulu & P. G. Kshirsagar, "A Text Book of Engineering Physics" S. Chand
8. B. L. Theraja, "Modern Physics" S. Chand & Company Ltd., Delhi
9. Subramanyam & Brij Lal, "A Text Book of Optics" S. Chand & Company (P.) Ltd
10. S. O. Pillai, "Solid State Physics: Structure & Electron Related Properties" Eastern Ltd, New Age International Ltd.
11. Charles Kittel, "Introduction to Solid State Physics" Wiley India Pvt. Ltd. (8th Edition).

First Year B.Tech.
GEP137: ENGINEERING PHYSICS LAB

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

List of Experiments (Any 12)

1. Biprism experiment
2. Cylindrical obstacle
3. Calculation of divergence of LASER beam.
4. Determination of wavelength of LASER using diffraction grating.
5. Diffraction grating using mercury vapor lamp.
6. Polarimeter.
7. Verification of inverse square law of intensity of light.
8. Resolving power of plane transmission grating
9. Measurement of band gap energy.
10. Study of crystal structure
11. Study of symmetry elements of cube
12. Study of Planes with the help of models related Miller Indices
13. Determination of e/m of an electron

Submission

1. Completed Journal

First Year B.Tech.
GEL134: BASIC ELECTRICAL ENGINEERING

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	100

Course Objectives

- 1 To understand basic concepts involved in electrical & magnetic circuits.
- 2 To understand concepts of elements & parameters in single phase and three phase AC circuits
- 3 To understand working and importance of Electrical Machines
- 4 To study different types of electrical accessories, electric earthing & Lamps

Course Outcomes

At the end of the course students will be able to

1. Apply the fundamental laws and principles to solve the electrical & magnetic circuits.
2. Analyse the behaviour of any element with respect to AC supply
3. Analyse the characteristics behaviour of various Electrical Machines.
4. Apply the knowledge of switchgear and lamps in Electrical installation

Course Contents

Unit 1.	Fundamentals of Electrical circuits	8 Hrs.
	A) D.C. Circuits: Basic electrical quantities, Ohm's Law, Kirchhoff's laws, mesh and node analysis, Energy conversions between electrical, mechanical, thermal quantities.	
	B) Magnetic Circuits: Flux, flux density, Reluctance, field intensity, leakage and fringing, B-H curve, series magnetic circuits.	
Unit 2.	Single Phase A.C. Circuits	8 Hrs.
	Faraday's Laws, Generation of sinusoidal voltage, concept of alternator, R.M.S. & Average value, form factor, peak factor, phasor representation of A.C. quantities, impedance, R-L, R-C, R-L-C series circuits, powers, power factor and its improvement by capacitor method.	
Unit 3.	Three Phase A.C. Circuits	5 Hrs.
	Introduction to three phase supply and its advantages, Generation of three phase A.C. voltage, balanced system, relation between line and phase quantities in star and delta.	
Unit 4.	Single Phase Transformer	7 Hrs.
	Construction, operating principle, Types, EMF equation, Concept of Ideal Transformer, Transformation Ratio, operation on no load and with load, losses, efficiency, voltage regulation, Testing, applications.	

- Unit 5. Electrical Drives** **10 Hrs.**
- A) **D.C. Motor:** Construction, operating principle, Types, characteristics, speed control methods and applications of D.C. Motor
- B) **A.C. Motor:** Construction, operating principle, characteristics and applications of A.C. motor.
- C) **Special purpose Motor:** Construction, operating principle, characteristics and applications of Servomotor, stepper motor.
-
- Unit 6. Electrical Switchgear and Lamps** **4 Hrs.**
- Earthing, Fuse, MCB, Fluorescent tube, CFL, mercury vapour lamp, LED lamp, single line diagram of power system.

Recommended Books

1. U.A. Bakshi, "Basic Electrical Engineering" Technical Publications, Pune
2. U.A. Bakshi, "Electrical Technology" Technical Publications, Pune

Reference Books

1. V.K.Mehta, "Principles of Electrical Engineering" S.Chand & Co. Ltd, India
2. Vincent Del Toro, "Electrical Engineering" Prentice Hall, Inc. Englewood Cliffs, New Jersey
3. A.E.Fitzgerald and Arvin Grabel, "Basic Electrical engineering" MC-Graw-Hill
4. Bharati Dwivedi and Anurag Tripathi, "Fundamentals of Electrical Engineering" Wiley PRECISE Text Book
5. P.V. Prasad and S. Shivanaraju, "Electrical Engineering Concepts and Applications" CENGAGE Learning
6. P.Huelsman, Prentice Hall, "Basic Electrical Engineering" Lawrence Inc. Englewood Cliffs. New Jersey
7. Nagrath I.J. and D. P. Kothari, "Basic Electrical Engineering" Tata McGraw Hill
8. Ashfaq Husain, "Fundamentals of Electrical Engineering" Dhanpat Rai & Co.
9. B.L Theraja, "Electrical Technology" Vol II, S. Chand & Co. Ltd, India

First Year B.Tech.
GEP138: BASIC ELECTRICAL ENGINEERING LAB

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

List of Experiments

1. General Introduction to Electrical Engineering laboratory
2. Verification of Kirchhoff's Laws
3. Determination of Power factor in ac circuit
4. Determination of Resistance & Inductance of a coil
5. Study of Phasor Relationship in R-L-C series circuit
6. Determination of Efficiency and Regulation of Single Phase Transformer
7. Speed control of D.C. Motor
8. Speed control of A.C. Motor
9. Study of special purpose motor
10. Study of different types of Earthing
11. Study of different types of Protective devices
12. Study of different types of lamps

Submission

1. Completed Journal

First Year B.Tech.
GEL135: BASIC CIVIL ENGINEERING

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	100

Course Objectives

1. To state the Relevance of Civil Engineering and Concept of Building Planning
2. To Describe typical Components of Building with its location, function and material used in it
3. To Explain the different Building Materials and basics of building Design
4. To Elaborate process of Linear and Angular Measurements in surveying
5. To find position of point in vertical plane by using Leveling

Course Outcomes

At the end of the course students will be able to

1. Apply the concepts of Civil Engineering and its relation to other branches of Engineering for basic building planning.
2. Apply the different types of linear, angular, area measurement by using chain, compass, dumpy level, planimeter etc.
3. Identify the different building Elements, their location, function and different material used for building construction and different kinds of loads considered in design of building.
4. Understand the role of Transportation, Environmental and Irrigation Engg. in development of country

Course Contents

- Unit 1. Relevance of Civil Engineering and Building Planning** **7 Hrs.**
Introduction, branches of civil engineering, application of civil engineering in other allied fields. Principles of planning, introduction to Bye-Laws regarding building line, height of building, open space requirements, F.S.I., setbacks, ventilation, sanitation as per municipal corporation area requirement.
- Unit 2. Linear and Angular Measurements** **8 Hrs.**
Principles of surveying, Classification of surveys, Chain Surveying, Introduction to metric chain and tapes, error in chaining, nominal scale and R.F., ranging, chaining and offsetting, index plan, location sketch and recording of field book, Chain and compass survey, Meridian, bearing and its types, system of bearing, Types of compass: prismatic and surveyor's compass. Calculation of included angles, correction for local attraction.

Unit 3.	Leveling Terms used in leveling, use of Dumpy level and Auto Level, temporary adjustments, methods of reduction of levels, types of leveling, Contours, characteristics of contours, use of contour maps. Introduction and use of EDM's with special reference to Total Station. Measurement of area by planimeter – mechanical and digital.	7 Hrs.
Unit 4.	Components of Building A) Sub-Structure: Types of soil and rocks as foundation strata, concept of bearing capacity, types of foundations i.e. shallow and deep and their suitability. Shallow foundation such as wall foundation, isolated foundation, deep foundation such as pile foundation. B) Super-Structure: Elements of super-structures and their functions	7 Hrs.
Unit 5.	Building Materials and Design Use and properties of the following materials, Concrete – ingredients and grades, plain and reinforced cement concrete and ready mix concrete, bricks, steel, aluminum, plastic, timber, roofing materials etc. Introduction to types of loads, load bearing and framed structures	7 Hrs.
Unit 6.	Introduction to Transportation, Environmental and Irrigation Engineering Components of rigid and flexible pavement, components of railway track (Broad Gauge) Components of water supply scheme (flow diagram), Types of Dams (Earthen and Gravity Dam)	6 Hrs.

Recommended Books

1. G. K. Hiraskar, "Basic Civil Engineering" Dhanpat Rai Publication
2. B.C. Punmia, "Surveying" Vol.I, Laxmi Publication

Reference Books

1. Anurag A. Kandya, "Elements of Civil Engineering" Charotar Publishing House Pvt.Ltd. – 2nd Edition,2011
2. S. S. Bhavikatti, "Basic Civil Engineering" New Age International Publications
3. Civil Engineering Materials - Technical Teacher's Training Institute, Chandigarh
4. Bindra and Arora, "Building Design"
5. Ramamrutham, "Basic Civil Engineering" Dhanpat Rai Publication
6. N. Basak, "Surveying" Tata Mc-Graw Hill Publication
7. B. C. Punmia, "Irrigation Engineering" Dhanpat Rai Publications

First Year B.Tech.
GEP139: BASIC CIVIL ENGINEERING LAB

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

List of Experiments

1. Introduction to Measurement of distances
2. Plotting the outline of building by chaining ranging & offsetting
3. Study of prismatic compass for angular measurements
4. Plotting of closed traverse by prismatic compass.
5. Reduction of levels by rise and fall method.
6. Reduction of levels by collimation plane method.
7. Fly levelling
8. Measurement of area by Mechanical/Digital planimeter
9. Study of measurement of distances by using EDM
10. Drawing sheet showing various building elements.
11. Drawing sheet showing conventional survey symbols
12. Drawing sheet showing functional building plan of residential building

Submission

1. Completed Field book
2. Drawing sheet showing building component

First Year B.Tech.
GEL136: ENGINEERING GRAPHICS

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	100

Course Objectives

1. Student should understand and read the drawing.
2. Student should visualize the object and interpret the drawing.
3. Student should draw the drawings of all forms.

Course Outcomes

At the end of the course students will be able to

1. Implement knowledge of fundamentals of engineering graphics
2. Improve imagination power and skills
3. Draw the graphics problems on paper by using proper instruments
4. Create and present new ideas and objects by using various engineering graphical techniques

Course Contents

- Unit 1. Fundamentals of Engineering Graphics & Engineering Curves** **6 Hrs.**
- A) Fundamentals of Engineering Graphics:** Introduction to Drawing instruments and their uses. Layout of drawing sheets, Different types of lines used in drawing practice, Dimensioning system as per BIS (Theoretical treatment only)
- B) Engineering Curves:** Construction of regular polygons (up to hexagon). Construction of Ellipse, Parabola, Hyperbola (Directrix-Focus Method only), Involutives, Archimedian spiral, Cycloid and Helix.
- Unit 2. Projections of Lines & Planes** **10 Hrs.**
- A) Projections of Lines:** Introduction to First angle and third angle methods of projection. Projections of points on regular reference planes. Projections of horizontal, frontal and Profile lines on regular and auxiliary reference planes. Projection of oblique lines, its true length and angle with reference planes by rotation and auxiliary plane method. Concept of grade and bearing of line, Point View of a line, Projections of intersecting lines, Parallel lines, perpendicular lines and skew line. (Use co-ordinate system only)
- B) Projections of Planes:** Projections on regular and auxiliary reference planes. Types of planes (horizontal, frontal, oblique and Profile planes). Edge view and True shape of a Plane. Angles made by the plane with Principle reference planes. (Use coordinate system)
- Unit 3. Projections of Solids** **6 Hrs.**
- Projections of Prisms, Pyramids, Cylinder and Cones inclined to both reference planes (Excluding frustum and sphere).
-

Unit 4.	Orthographic Projections Orthographic views: Lines used, Selection of views, spacing of views, dimensioning and sections. Required views from given pictorial views (Conversion of pictorial view into orthographic view) including sectional orthographic view.	7 Hrs.
Unit 5.	Isometric Projections Introduction to isometric, Isometric scale, Isometric projections and Isometric views / drawings. Circles in isometric view. Isometric views of simple solids and objects.	6 Hrs.
Unit 6.	Sections of solids and Development of surfaces A) Sections of Solids: Prisms, Pyramids, Cylinders and Cones (Simple positions and inclined to one plane and parallel to other) B) Development of plane and curved surfaces: Prisms, Pyramids, Cylinders and Cones along with cutting planes.	7 Hrs.

Note: The above syllabus is to be covered according to the first angle method of projection.

Self-Study: Geometrical constructions and free hand sketches, Missing Views

Recommended Books

1. N. D. Bhatt, "Engineering Drawing" Charotar Publication House, Bombay
2. W. J. Luzadder, "Fundamentals of Engineering Drawing" Prentice Hall of India

Reference Books

1. N. H. Dubey, "Engineering Drawing" Vol I & II, Nandu Publishers & Printers
2. Jon M. Duff, William A. Ross, "Engineering Design and Visualization" CENGAGE Learning
3. N. D. Bhatt, "Machine Drawing" Charotar Publication House, Bombay
4. French and Vierck, "Graphic Science" Mc-Graw Hill International
5. K. Venugopal, "Engineering Drawing and Graphics" New Age Publication
6. R. K. Dhawan, "A text book of Engineering Drawing" S. Chand and Co
7. K. L. Narayana, "Machine Drawing" New Age Publication
8. N. B. Shaha and B. C. Rana, "Engineering Drawing" Pearson Education
9. T. Jeyapooan, "Engineering Drawing and Graphics Using AutoCAD" Vikas Publication

First Year B.Tech.
GEP140: ENGINEERING GRAPHICS LAB

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

List of Experiments

1. Engineering curves I - Ellipse , Parabola, and Hyperbola
2. Engineering curves II -Involute, Cycloid, Spiral and Helix
3. Projections of lines.
4. Projections of planes.
5. Projections of solids.
6. Sections of solids.
7. Orthographic projections.
8. Orthographic sectional view.
9. Isometric view.
10. Isometric projection.
11. Development of cones and cylinders.
12. Development of prisms and pyramids.

Submission

1. Completed Drawing Sheets

First Year B.Tech.
GEL141: LIFE SKILLS, PROFESSIONAL ETHICS AND YOGA

Teaching Scheme	
Lectures	1 Hr. /Week
Total Credits	1

Course Objectives

1. To understand and appreciate importance of life skills
2. To create an awareness about interpersonal skills
3. To develop presentation skill to understand social responsibility of an Engineer
4. To create an awareness on Professional Ethics
5. To Promote positive health, prevention of stress related health problems through Yoga and meditation
6. To create opportunities to develop ideals, social skills and strengths

Course Outcomes

At the end of the course students will be able to

1. Understand and apply the theories of life skills throughout their life
2. Design Presentations and develop interpersonal skills
3. Understand and apply Professional Ethics
4. Understand the importance of Yoga for health and realize the importance of stress management, self-meditation in life

Course Contents

Unit 1. Self-Development	2 Hrs.
Goal setting, Importance of goal setting, Characters of goal setting, SMART formula of goal setting, Time management, Importance of time management, Time savers and time wasters.	
Unit 2. Developing Life skills and Interpersonal Skills	2 Hrs.
Building-Nurturing relationships- Professional relationship, Time managing skills, Social protocols, Networking professionally, Basic office courtesies, socializing professionally	
Unit 3. Presentation Techniques	2 Hrs.
Importance of presentation, Components of effective presentation – Body language, Communication skills, Preparing for presentation, Use of audio video Aids	
Unit 4. Professional Ethics	2 Hrs.
Meaning of ethics, Purposes of engineering ethics, Types of ethics, Professional code of conduct, Professional roles to be played by an engineer, Environmental ethics, Computer ethics, Engineers as managers – consulting engineer, Engineers as expert witnesses and advisors	
Unit 5. Yoga and Health management	4 Hrs.
Yoga Therapy: Benefits of yoga asana practice, Importance of correct posture, Role of yoga in maintaining muscular health and for improvement of respiration, Types of Asanas, Yoga related activities.	

Unit 6. Meditation and Stress management:

3 Hrs.

Stress management, Definition, Types of stress, Causes of stress, Values in everyday life, Values, Virtues, Powers of the self, Meditation, Positive thinking & Emotional Maturity, Research studies on Meditation-Benefits, Meditation practice.

Recommended Books

1. A.Alavudeen, R.KalilRehman, M.Jaykumaran, "Professional Ethics and Human Values by University Science Press" Laxmi Publications Pvt.Ltd. Delhi
2. Jeff Butterfield, "SoftSkills for Everyone" Cenange Learning Private Limited Delhi,India

Reference Books

1. Andrew Bradbury "Successful Presentation Skills" The Sunday Times – Kogan
2. Ros Jay and Antony Jay, "Effective Presentation" Pearson – Prentice Hall
3. The Science of Yoga - Taimini - Theosophical Publishing House, Adyar, Madras.
4. Yogasutras of Patanjali - Hariharananda Aranya, University of Calcutta Press, Calcutta.
5. Rajayoga - Swami Vivekananda - Ramakrishna Ashrama Publications
6. The Power of Meditation :A guide for beginners Sister Jayanti
7. B.K.Chandra Shekhar, "Science of Mind Simplified", Diamond Pocket Books(p) Ltd, New Delhi
8. B.K. Jayanti, "Practical Meditation", Brahma kumaris World Spiritual University, London NW 10 2HH,2003

First Year B.Tech.
GEP141: LIFE SKILLS, PROFESSIONAL ETHICS AND YOGA LAB

Teaching Scheme	
Practical	2 Hr. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

List of Experiments

1. Presentation on Time management
2. Presentation on Goal setting
3. Presentation on stress management
4. Preparation of PPT on assigned topics
5. PPT presentation on assigned topic
6. Case studies on ethical issues
7. Discussion on ethical issues (Groupwise)
 Environmental ethics, Computer ethics
8. Presentation on code of ethics
9. Discussion on roles of Engineer (GroupWise)
10. Applying Transition effect, timing and sound to the slides
11. Use of projectors and other audio video aids
12. Yoga related activity for health and stress management.
 Aim is to create motivation for regular Yoga practice

Submission

1. Completed Tutorial and assignment books

First Year B.Tech.
GEL142: ENGINEERING MATHEMATICS – II

Teaching Scheme	
Lectures	4 Hrs. /Week
Total Credits	4

Evaluation Scheme	
SE-I	25
SE-II	25
SEE	50
Total	100

Course Objectives

1. To teach Mathematical methodologies and models
2. To develop mathematical skills and enhance logical thinking power of students
3. To provide students with skills in integral calculus, differential equations & numerical techniques which would enable them to devise engineering solutions for given situations they may encounter in their profession
4. To produce graduates with mathematical knowledge, computational skills and the ability to deploy these skills effectively in the solution of problems, principally in the area of engineering

Course Outcomes

After successful completion of course students should be familiar with and able to

1. Apply first order differential equation methods to solve problems related to electrical circuits, Newton's law of cooling, Rate of decay and growth
2. Apply numerical techniques to solve differential equations as well as to evaluate any type of definite integral if required.
3. Identify the special functions and apply to evaluate multiple integrals
4. Apply rules of curve tracing to trace all types of curves and to find their lengths by rectification method

Course Contents

- | | | |
|----------------|--|----------------|
| Unit 1. | Differential Equations of First Order and First Degree with its applications | 12 Hrs. |
| | Linear differential equations, Reducible to Linear differential equations, Exact differential equations, Reducible to Exact differential equations, Applications to Orthogonal Trajectories, Simple Electrical Circuits, Newton's law of cooling, Rate of decay and growth | |
| Unit 2. | Numerical Solution of Ordinary Differential Equations of First Order and First Degree | 10 Hrs. |
| | Taylor's series method, Euler's method, Modified Euler's method, Runge-Kutta method of fourth order, Solution of Simultaneous first order differential equations by Runge-Kutta method | |
| Unit 3. | Curve Tracing | 8 Hrs. |
| | Tracing of curves in Cartesian form : | |
| | Semi cubical parabola, Cissoid of Diocles, Strophoid, Astroid, Witch of Agnesi, Common Catenary, Folium of Descartes | |
| | Tracing of curves in polar form : | |
| | Cardioid, Pascal's Limacon, Lemniscate of Bernoulli, Parabola, Hyperbola, Rose curves | |

Unit 4.	Special Functions & Rectification Gamma function and its properties, Beta function and its properties, Error function and its properties, Rectification of plane curves (Cartesian and Polar form)	8 Hrs.
Unit 5.	Multiple Integration and Its Applications Double Integrals, triple integrals and evaluation, Change of order of integration, Double Integrals in Polar Coordinates, Change into Polar, Area enclosed by plane curves, mass of lamina, moment of inertia	12 Hrs.
Unit 6.	Numerical Integration Trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rule, Weddle's rule.	6 Hrs.

Recommended Books

1. P. N. Wartikar & J. N. Wartikar, "A text book of Applied Mathematics" Vol.- I & II Pune Vidyarthi Griha Prakashan, Pune
2. Dr. B. S. Grewal, "Higher Engineering Mathematics" Khanna Publishers, Delhi

Reference Books

1. Dennis G Zill, Michael R Cullen, "Advanced Engineering Mathematics" Narosa Publication, 3rd Edition.
2. Michael Greenberg, "Advanced Engineering Mathematics" Pearson Publication, 2nd Edition.
3. B.V.Ramana, "Higher Engineering Mathematics" Tata McGraw-Hill Publications, New Delhi
4. Erwin Kreyszig, "Advanced Engineering Mathematics" Wiley India Pvt. Ltd
5. H. K. Dass "Advanced Engineering Mathematics"
6. Kanti B. Datta, "Mathematical methods of Science and Engineering" Cengage Learning
7. Peter V. O'Neil and Santosh K. Sengar, "A textbook of Engineering Mathematics" Volume I, Cengage Learning
8. N. P. Bali, Iyengar, "A textbook of Engineering Mathematics" Laxmi Publications (P) Ltd., New Delhi

First Year B.Tech.
GEL143: PROFESSIONAL COMMUNICATION – II

Teaching Scheme	
Lectures	1 Hr. /Week
Total Credits	1

Course Objectives

1. To improve thought process, Vocabulary and construction of sentences
2. To develop behavioural skills
3. To explain the importance of LSRW skills
4. To develop career skills

Course Outcomes

At the end of the course students will be able to

1. Recognize the importance of thought process and apply the knowledge regarding vocabulary and construction of sentences while communicating
2. Apply the learnt knowledge about LSRW skills throughout their professional life
3. Use the knowledge regarding behavioural skills
4. Apply the importance of career skills

Course Contents

Unit 1.	Basic Strategies of Language Forms of Tenses, Developing Vocabulary- Synonyms, Antonyms, Hyponyms, Idioms, Phrases, Acronyms, Pairs of confused words- Homonyms, Homophones	2 Hrs.
Unit 2.	Writing for Language Development Expansion of passage, Dialogue writing, Autobiographies, Paragraph writing -Types of paragraph writing -Descriptive , narrative, expository, and persuasive.	2 Hrs.
Unit 3.	Professional Writing Skills Report Writing, Methods of data collection and its utilization, Types of Report Writing-Survey report, Inspection report, Investigation report	2 Hrs.
Unit 4.	Behavioural Skills Understanding Self, Developing Positive attitude, Decision Making Skills, Leadership Skills, Emotional Intelligence, Problem Solving Skills, Team Work, Healthy living.	4 Hrs.
Unit 5.	Career skills Job Application and Resume, Interview - Types of Interview, Techniques and Skills, Group Discussion- Importance and objectives of GD, Procedure of GD, Types of GD Topics, Evaluation criteria of GD.	2 Hrs.
Unit 6.	LSRW Skills Types of listening- Active & Passive listening, Techniques to improve listening skills, Techniques of effective reading -Skimming and scanning, Email writing.	2 Hrs.

Recommended Books

1. Dr. T. Kalyana Chakravarthi, Dr. T. LathaChakravarthi, Biztantra. "Soft Skills for Managers"
2. Jeff Butterfield, "Soft Skills for every one" Cengage.
3. Lavis Norman, "Word Power made Easy" S. Chand Publication

Reference Books

1. David A. McMurrey, Joanne Buckley, "Handbook for Technical Writing" Cengage.
2. Personal Development for Life and Work by Masters, Wallace, Cengage.
3. E.H.Mcgrath, "Basic Managerial skills" Prentice-Hall Of India Pvt. Limited Publication
4. Wren & Martin, 'High school English Grammar & Composition" S. Chand Publication
5. Dr. Abha Singh, "Behavioural Science" Wiley India Pvt.Ltd.
6. Bikram K. Das, Kalyani Samantray, "An Introduction to Professional English and Soft Skills" Cambridge University Press New Delhi.
7. ColmDownes, "Cambridge English for Job Hunting" Cambridge University Press New Delhi.
8. Allen Pease, "Body Language".
9. Gopalswami Ramesh, Mahadevan Ramesh, "The Ace of Soft Skills" Pearson Publication, Delhi.
10. Khanka S.S. "Decision Making Skills"

First Year B.Tech.
GEP143: PROFESSIONAL COMMUNICATION – II LAB

Teaching Scheme	
Practical	2 Hrs. /Week
Total Credits	1

Evaluation Scheme	
CIE	50
Total	50

List of Experiments

1. Group Discussion (lab session/class room activity)
2. Mock Interview
3. Report Writing
4. Paragraph writing on current technical writing
5. Presentation on current affairs
6. Exercise of Application writing and Resume writing
7. Dialogue Writing
8. Expansion of passage and Essay Writing
9. Autobiographies
10. Exercise on grammar and vocabulary
11. Situational conversation
12. Creative writing

Submission

1. Completed Tutorial and assignment books