SEMESTER-1
CIVIL ENGINEERING

COURSE TITLE : ENGLISH FOR COMMUNICATION I
COURSE CODE : 1001
COURSE CATEGORY : F
PERIODS/WEEK : 4
PERIODS/SEMESTER : 60
CREDITS : 3

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Nurturing Nature – Environmental issues	15
2	Towards Tomorrow – Science & Technology	15
3	Sport 'S' miles – Sports & adventure	15
4	Media Matters - Media	15
TOTAL		**60**

COURSE OUTCOME:

To develop the four basic skills in English and use them effectively in day-to-day life.

SPECIFIC OUTCOME:

After completing the course the student will be able to:

- Read articles, essays, and technical writings of various kinds and develop comprehension about the message, images, thoughts and ideas contained in these articles.
- Read short stories, poems, conversations and develop aesthetic sense and humanitarian ethos.
- Read various prose passages and develop skills in skimming and scanning.
- Understand the meaning of words used in passages by guessing meaning from the context.
- Develop curiosity about the different topics of current interest and express points of view.
- Familiarise themselves with different techniques of writing and use them effectively in business correspondences.
- Group and sequence ideas and exploit the potentials of cohesion and coherence.
- Acquire proficiency in correct usage of English words.
- Internalise correct pronunciation and use them in daily conversation.
- Develop communication skills by taking part in group discussions and present their views in a logical and convincing way.
- Learn different language functions like agreeing, permitting, apologizing, negating and the like and use them effectively in daily communication.
- Identify the different study skills and use them to improve their academic performance.

CONTENT DETAILS

MODULE - I

1.1 Reading Passage - Environmental Issues.
1.2 Vocabulary – Guessing meaning from the given clues and context
1.3 Grammar – Nouns, Pronouns, Adjectives, Articles & Determiners
1.4 Writing – Basic tips of writing
1.5 Language functions – Making requests, Agreeing/disagreeing
1.6 Speaking – Introducing oneself

MODULE - II

2.1 Reading Passage - Advancement in Science & Technology.
2.2 Vocabulary – Antonyms & Synonyms
2.3 Grammar – Verb Patterns, Concord,
2.4 Language functions – Asking/giving permission, Giving instructions
2.5 Writing – Introducing cohesive devices, writing a paragraph
2.6 Speaking – Presentation using PPT

MODULE - III

3.1 Reading passage - Sports and Adventure.
3.2 Vocabulary – Spelling, collocation
3.3 Grammar – Telling about what is happening, happened and will happen
3.4 Language functions – Accepting/negating, Apologizing
3.5 Writing – Job Application/Resume
3.6 Speaking – Telephone Conversation

MODULE - IV

4.1 Reading passage based on media.
4.2 Vocabulary – Technical Vocabulary – Related to computer, industry, business and Administration.
4.3 Grammar – Establishing cause & effect, telling about positions.
4.4 Language functions – Congratulating others, Expressing one's opinion, Giving directions.
4.5 Writing –An introduction to Technical Writing and Memos.
4.6 Speaking – Group Discussion.

REFERENCE BOOKS:-

1. Course Book – Words to Deeds (A Coursebook in English for Polytechnic College Students – Semester I)

COURSE TITLE : ENGINEERING MATHEMATICS – I
COURSE CODE : 1002
COURSE CATEGORY : F
PERIODS/WEEK : 6
PERIODS/SEMESTER : 90
CREDITS : 6

TIME SCHEDULE

MODULE NO.	CHAPTER NO	CHAPTER TITLE	PERIODS.
I	**TRIGONOMETRY-I**		
	1	ANGLES	**2**
	2	TRIGONOMETRIC RATIOS	**5**
	3	TRIGONOMETRIC RATIOS OF RELATED ANGLES	**5**
	4	HEIGHTS AND DISTANCES	**4**
	5	COMPOUND ANGLES	**6**
II	**TRIGONOMETRY-II**		
	6	MULTIPLE AND SUB MULTIPLE ANGLES	**4**
	7	SUM OR DIFFERENCE FORMULAE AND CONVERSE	**4**
	8	PROPERTIES AND SOLUTIONS OF TRIANGLES	**10**
III	**DIFFERENTIAL CALCULUS**		
	9	FUNCTIONS AND LIMITS	**4**
	10	DIFFERENTIATION-I	**10**
	11	DIFFERENTIATION-II	**10**
IV	**APPLICATIONS OF DIFFERENTIATION**		
	12	EQUATIONS OF TANGENTS AND NORMALS	**4**
	13	RATES AND MOTION	**8**
	14	MAXIMA AND MINIMA	**4**
	15	TUTORIALS, TESTS, ASSIGNMENTS	**10**
TOTAL PERIODS			**90**

COURSE OUTCOME:

Students will be able to:-

- Describe the concept of an angle, its units and measurement.
- Define trigonometric ratios
  comprehend trigonometric ratios of standard angles
- Understand related angles of the type (n 90±θ) and solve simple problems on related angles
- Estimate heights and distances using trigonometry
- Define compound angles, multiple and sub multiple angles and state compound angles, multiple and sub multiple angles, sum or difference & converse formulae apply these formulae in solving problems
- State sine rule, cosine rule, tangent rule & projection formula and apply these rules to solve a given triangle
- Distinguish variables, constants and functions
- Evaluate the limit of a given function
- Define derivative of a function
- State standard results and rules of differentiation
- Apply the results and rules to solve problems
- Perform different methods of differentiation
- Solve problems on successive differentiation up to second order
- Illustrate derivative as a rate measurer
- Formulate and compute velocity and acceleration of a moving body
- Identify derivative as the slope of the tangent
- Estimate rate of change in related rate problems
- Evaluate maximum and minimum values of a function
- Solve simple problems on maxima and minima

SPECIFIC OUTCOME

MODULE-I TRIGONOMETRY-I

1.1 ANGLE

1.1.1 Definition of an angle.
1.1.2 Concept of an angle in trigonometry ,
1.1.3 Different systems of measuring an angle.
1.1.4 Definition of degree and radian.
1.1.5 Express a right angle in different systems,
1.1.6 Relation between degree & radian .

1.2 TRIGONOMETRIC RATIOS.

1.2.1 Definition of Trigonometric ratios

1.2.2 Trigonometric identities.(statements only)

1.2.3 Problems based on trigonometric identities,

1.2.4 Trigonometric ratios of standard angles like 0^0, 30^0, 45^0, 60^0 and 90^0.

1.2.5 Problems.

1.3 TRIGONOMETRIC RATIOS OF RELATED ANGLES

1.3.1 Angle of any magnitude and sign

1.3.2 Give examples to differentiate positive and negative angles

1.3.3 Trigonometric ratios in different quadrants and signs ASTC-Rule

1.3.4 Finding all other t-functions, when a t-function in a particular quadrant is given.

1.3.5Complementary angles and relation between trigonometric ratios of complementary angles.

1.3.6 Formulae of 90± □, 180± □, 270± □, 360± □ and (-□)

1.3.7 Evaluation of sin 120, cos 330, tan 315

1.3.8 Problems on related angles.

1.4 HEIGHTS AND DISTANCES

1.4.1 Angle of elevation and angle of depression.

1.4.2 Simple problems on height and distance.

1.5 COMPOUND ANGLES.

1.5.1 Compound angles

1.5.2 Examples for compound angles.

1.5.3 Formulae of sin(A+B),and cos (A+B),

1.5.4 tan(A+B) in terms of tan A and tan B

1.5.5 Formula for sin(A-B),cos (A-B) and tan(A-B).

1.5.6 Simple problems on compound angles.

MODULE-II TRIGONOMETRY-II

2.1 MULTIPLE AND SUBMULTIPLE ANGLES.

2.1.1 Multiple and sub multiple angles with examples.

2.1.2 Formulae for sin2A,cos2A and tan 2A (statements only)

2.1.3 Formulae for sin 3A, cos 3A (statements only)

2.1.4 Simple problems on multiple angles (problems involving half angle formulae are excluded)

2.2 SUM OR DIFFERENCE FORMULAE AND CONVERSE

2.2.1 Expressions for sinC ± sinD and cosC ± cosD in terms of Product of trigonometric ratios.

2.2.2 Expressions for sinAcosB, cosAsinB, cosAcosB and sinAsinB in terms of the sum and difference of trigonometric ratios.

2.2.3 Simple problems.

2.3 PROPERTIES AND SOLUTION OF TRIANGLES.

2.3.1 The relation between sides of a triangle and Sines, Cosines and Tangents of any angle

2.3.2 Sine rule, Cosine rule and Tangent rule-(statements only.) ,

2.3.3 Projection formulae in any triangle.(no proof)

2.3.4 Simple problems on above rules.

2.3.5 Solution of a triangle in the following cases when

(i) All the three sides are given

(ii) Two sides and included angle are given

(iii) Two angles and one side is given

2.3.6 Area of a triangle (Formulae and simple problems, no proof) when,

(i) All the three sides a, b and c are given

(ii) Two sides and one included angle are given

MODULE-III DIFFERENTIAL CALCULUS

3.1 FUNCTIONS AND LIMITS.

3.1.1 Variables and Constants.

3.1.2 Dependent and independent variables.

3.1.3 Definition of a function

3.1.4 Explicit and implicit functions

3.1.5 Concept of limit of a function (intuitive idea only).

3.1.6 Need for this concept in finding instantaneous rate of change like velocity and slope.

3.1.7 Explanation of $\lim_{x\to 0} \frac{1}{x} = \infty$ and $\lim_{x\to\infty} \frac{1}{x} = 0$,

3.1.8 Simple problems on evaluation of limits of functions

(i) When x tends to 'a'

(ii) By factorization,

(iii) When x tends to '∞'

3.1.9 Algebraic and trigonometrical limits:-

$$1)\ \lim_{x\to a}\frac{x^n - a^n}{x-a} = na^{n-1} \text{ for any rational number.}$$

$$2)\ \lim_{\theta\to 0}\frac{\sin\theta}{\theta} = 1 \quad \text{where } \theta \text{ is in radians}$$

3.1.10 Simple problems on evaluation of limits based on direct application of the above standard limits.

3.2 DIFFERENTIATION-I

3.2.1 Increment and incremental ratio.

3.2.2 Differential coefficient or derivative of a function.

3.2.3 Derivatives of functions of x^n, sinx,and cosx with respect to 'x' from method of first principles

3.2.4 List of standard derivatives.

3.2.5 Derivatives of e^x and log x (no proof).
3.2.6 Derivatives of inverse trigonometric functions (no derivation)
3.2.7 Rules of differentiation: Sum, product and quotient of functions.
3.2.8 Simple problems based on these rules.

3.3 DIFFERENTIATION-II

3.3.1 Derivatives of function of a function (Chain rule).
3.3.2 Problems based on chain rule.
3.3.3 Differentiation of Implicit functions and Parametric functions.
3.3.4 Simple problems on differentiation of implicit functions and parametric functions.
3.3.5 Successive differentiation up to second order.
3.3.6 Problems on successive differentiation.

MODULE-IV APPLICATIONS OF DIFFERENTIAL CALCULUS

4.1 EQUATIONS OF TANGENTS AND NORMALS

4.1.1 Geometrical meaning of derivative
4.1.2 Slope of a curve at a point.
4.1.3 Equations of tangent and normal to the curve y = f(x) at a given point.

4.2 RATES AND MOTION

4.2.1 Derivative as a rate measurer
4.2.2 Simple problems of rates occurring in engineering..
4.2.3 Velocity and acceleration
4.2.4 Simple problems to find velocity and acceleration of a moving body 13.5 when displacement 's' is given in terms of 't' and related problems
4.2.5 Problems to determine the rate of change of a variable, when the rate of change of some related variable is given.

4.3 MAXIMA AND MINIMA

4.3.1 Increasing and decreasing functions.
4.3.2 Conditions for maxima and minima.(No proof)
4.3.3 Maxima and minima of a function.
4.3.4 Simple direct problems on maxima and minima.

CONTENTS DETAILS

MODULE - I

1.1 ANGLES

Definition of an angle, Concept of an angle in trigonometry Different systems of measuring an angle, Definition of degree and radian, Express a right angle in different systems,
Relation between degree & radian.

1.2 TRIGONOMETRIC RATIOS.

Definition of Trigonometric ratios, Trigonometric identities. (Statements only), Problems based on trigonometric identities, Trigonometric ratios of standard angles like 0^0, 30^0, 45^0, 60^0 and 90^0.Problems.

1.3 TRIGONOMETRIC RATIOS OF RELATED ANGLES

Angle of any magnitude and sign, positive and negative angles

Trigonometric ratios in different quadrants and signs

ASTC-Rule, Complementary angles and relation between trigonometric ratios of complementary angles.

Signs of trigonometric functions of related angles, Given a trigonometric functions of an angle and its quadrant find others Formulae of 90± □, 180± □, 270± □, 360± □ and (-□), Problems on related angles, Evaluation of sin 120 ,cos 330, tan 315

1.4 HEIGHTS AND DISTANCES

Angle of elevation and angle of depression. Simple problems

1.5 COMPOUND ANGLES.

Compound angles, Examples, Addition and subtraction formulae, Expression of tan(A+B) in terms of tanA and tanB, Simple problems on compound angles.

MODULE - II

2.1 MULTIPLE AND SUBMULTIPLE ANGLES.

Multiple and sub multiple angles with examples, Formulae for sin2A,cos2A,tan2A,Sin3A,Cos3A(without proof), problems on multiple angles (problems involving half angle formulae are excluded)

2.2 SUM OR DIFFERENCE FORMULAE AND CONVERSE

Sum, Difference, product formulae, converse of product formulae (without proof) and simple problems based on it.

2.3 PROPERTIES AND SOLUTION OF TRIANGLES.

Sine rule, Cosine rule and Tangent rule-(statements only.), Projection formulae in any triangle.(no proof),Simple problems on above rules. Solution of a triangle when all the three sides are given ,two sides and included angle are given two angles and one side is given Area of a triangle (Formulae and simple problems, no proof) when all the three sides a, b and c are given & when two sides and one included angle are given

MODULE - III

3.1 FUNCTIONS AND LIMITS.

Variables and Constants. Dependent and independent variables Definition of a function Explicit and implicit functions, Concept of limit of a function, Explanation of $\lim_{x\to 0} \frac{1}{x} = \infty$ and $\lim_{x\to\infty} \frac{1}{x} = 0$, Simple problems on evaluation of limits of functions(i) when x tends to 'a'(ii) by factorization, (iii) when x tends to '∞' Algebraic and trigonometrical limit(without proof) and simple problems based on it

3.2 DIFFERENTIATION-I

Increment and incremental ratio, derivative of a function, Derivatives of functions of x^n, sinx and cosx with respect to 'x' from method of first principles, List of standard derivatives. Derivatives of e^x ,log x & Derivatives of inverse trigonometric functions (no derivation), Rules of differentiation: Sum, product and quotient of functions. Simple problems based on these rules.

3.3 DIFFERENTIATION-II

Derivatives of function of a function (Chain rule).Problems based on chain rule. Differentiation of Implicit functions and Parametric functions.

Simple problems on differentiation of implicit functions and parametric functions,

Successive differentiation up to second order. Problems on successive differentiation.

MODULE - IV

4.1 EQUATIONS OF TANGENTS AND NORMALS

Geometrical meaning of derivative Slope of a curve at a point.

Equations of tangent and normal to the curve y = f(x) at a given point.

4.2 RATES AND MOTION

Derivative as a rate measurer, Simple problems of rates occurring in engineering, Velocity and acceleration, Simple problems to find velocity and acceleration of a moving body when displacement 's' is given in terms of 't' and related problems. Problems to determine the rate of change of a variable, when the rate of change of some related variable is given.

4.3 MAXIMA AND MINIMA

Increasing and decreasing functions. Conditions for maxima and minima.(No proof) Maxima and minima of a function. Simple direct problems on maxima and minima

NB: Emphasis is given in application oriented problems and hence proofs and derivations are not expected.

Text Book:

Engineering Mathematics-I for polytechnic colleges by different authors.

Reference Books:

Anton - Calculus, 7 edn. - WILEY

Dr.M.K.Venkatraman - Engineering Mathematics - National Publishing Co, Chennai

Dr.P.Kandasamy & Others - Engineering Mathematics - S.Chand & Co Ltd, New Delhi

COURSE TITLE : ENGINEERING PHYSICS I
COURSE CODE : 1003
COURSE CATEGORY : F
PERIODS PER WEEK : 3
PERIODS /SEMESTER : 45
CREDITS : 3

TIME SCHEDULE

Module	Name of Module	Course Objective Number	Total periods per Semester		
			Instructional	Test	Total
I	Force and Motion	1.1 - 1.4	10	1	11
II	Vectors and Statics	2.1 - 2.2	12	1	13
III	Properties of Matter	3.1 - 3.4	11	1	12
IV	Periodic Motion and Waves	4.1 - 4.3	8	1	9
	TOTAL		**41**	**4**	**45**

COURSE OUTCOME

After the completion of the course student will be able to

- Differentiate different Physical quantities and its standard units.
- Understand concepts of force, Linear momentum, etc. which helps him to extend these concepts to Engineering mechanics.
- Solve fundamental problems in Mechanics related to force and its effects.
- Understand the fundamental principles of Rocket propulsion.
- Work with various vector algebraic tools which help to understand various concepts of Physics and technology.
- Acquire broad ideas about resultant force, moment of force and moment of a couple.etc. enables to perform vector operations and interpret the results geometrically and understand the applications in various Engineering branches.
- Understand basic ideas of different types of modulii of elasticity with special reference to Young's Modulus.
- Study concepts of technical terms such as stress, strain, elastic limit, elastic fatigue, plastic material etc
- Get an introductory idea of liquid flow with special reference to Bernoulli's theorem leading to its practical applications
- Impart basic ideas of viscosity and its practical applications

- Inculcate qualitative and quantitative knowledge of Simple Harmonic Motion.
- Contemplate basic concepts of wave motion and its characteristics leading to the understanding of various types of applications such as vibrations of air column.
- Recognise the characteristics of Ultrasonic sound and hence to apply the same in various applications in the field of Engineering and technology.

Specific Outcome

MODULE - I FORCE AND MOTION

1.1.0 Understand the concept of units and measurements.
1.1.1. Define Unit of a Physical quantity.
1.1.2. Explain the principle of measurement.
1.1.3. Identify fundamental and derived units.
1.1.4. Apply the dynamics of particles in practical situations.
1.1.5. Identify the vector and scalar quantities.
1.1.6. Derive the expression $S_n = u + a (n-½)$.
1.1.7. Solve problems related to gravity with equations of motion.
1.1.8 State Newton's laws of motion.
1.1.9 Define the terms force, Inertia, Momentum and Impulse.
1.1.10 Derive the relation F = ma.
1.1.11 State law of conservation of momentum and prove it in the case of two bodies making a collision .
1.1.12 Explain the principle behind the recoil of gun.
1.1.13 Solve problems related to laws of motion.

MODULE - II VECTORS AND STATICS

2.1.0 Understand the principles of statics and its applications.
2.1.1 Add vectors using triangle method.
2.1.2 Define Resultant and Equilibrant of vectors.
2.1.3 State Parallelogram law of forces.
2.1.4 Derive expression for resultant using Parallelogram law.
2.1.5 State the law of triangle of forces.
2.1.6 State Lami's theorem.
2.1.7 Explain moment of a force.
2.1.8 State the conditions of equilibrium of a rigid body acted upon by a large number of coplanar parallel forces.
2.1.9 Derive expression for work done by a couple.

MODULE - III PROPERTIES OF MATTER

3.1.0 Comprehend the concept of elasticity.
3.1.1 Define stress, strain, and elastic limit.
3.1.2 State Hooke's law.
3.1.3 Derive expression for Young's modulus, rigidity modulus, and bulk modulus.
3.1.4 Understand the term elastic fatigue.

3.1.5 Solve the problems related to modulus of elasticity.
3.1.6 Understand the principle of fluid flow.
3.1.7 Distinguish between Streamline and Turbulent flow.
3.1.8 Explain Pressure energy, Kinetic energy and Potential energy of a liquid.
3.1.9 Mention equation of continuity.
3.1.10 State Bernouille's theorem.
3.1.11 Explain the working of airfoil and atomizer.
3.1.12 Apply the principle of viscosity in solving problems.
3.1.13 Define coefficient of viscosity.
3.1.14 Give the Poiseusille's formula.
3.1.15 Explain terminal velocity.
3.1.16 Mention Stoke's formula.
3.1.17 Explain the effect of temperature on viscosity.
3.1.18 Solve problems using Poiseuille's formula.

MODULE - IV PERIODIC

4.1.1 Comprehend the concept of wave motion.
4.2.0 Define Simple Harmonic motion.
4.2.1 Derive equation for simple harmonic motion.
4.2.2 Explain period, frequency and amplitude.
4.2.3 Distinguish between transverse and longitudinal waves.
4.2.4 Define wavelength.
4.2.5 Derive the relation $v = f\lambda$
4.2.6 Explain resonance.
4.2.7 Distinguish between closed pipes and open pipes.
4.2.8 Calculate the velocity of sound using resonance column experiment.
4.2.9 Explain ultrasonic waves.
4.2.10 Mention applications of ultrasonic waves.

COURSE CONTENT

MODULE - I FORCE AND MOTION (11Hrs)

Physical Quantities – units - fundamental and derived units - SI System and its advantages- One dimensional motion- Scalar and vector quantities - speed- velocity- acceleration - recapitulation of equations of motion - derivation of the formula $S_n = u + a(n-½)$ - motion under gravity - problems.

Force and motion - linear momentum - Newton's laws of motion - derivation of F = ma law of conservation of momentum - derivation - recoil of gun - expression for recoil velocity rocket propulsion - impulse - problems.

MODULE - II VECTORS AND STATICS (13Hrs)

Vectors and scalars- Triangle method of vector addition- Concurrent forces- Resultant and Equilibrant- parallelogram law –Derivation of resultant in magnitude and direction-Law of triangle of forces- Lami's theorem- Resolution of forces- Parallel forces- like and unlike parallel forces- moment of a force- conditions of equilibrium under the action of a number of coplanar parallel forces- couple-moment of a couple- work done by a couple- numerical problems.

MODULE - III PROPERTIES OF MATTER (12Hrs)

Elasticity – stress – strain - elastic limit. Hook's law - Young's modulus - rigidity modulus - bulk modulus – determination of Young's modulus by stretching - elastic fatigue – plastic – problems.

Fluid flow- streamline and turbulent flow- pressure energy, potential energy and kinetic energy of a liquid- equation of continuity –Bernoulli's theorem – applications- airfoil and atomizer.

Viscous force- coefficient of viscosity- Poiseulle's formula – Stoke's formula and experiments – Variation of viscosity with temperature – numerical problems

MODULE - IV PERIODIC MOTION AND WAVES (9Hrs)

Simple harmonic motion – definition – simple harmonic motion as projection of a uniform circular motion along the diameter of a circle – equation for simple harmonic motion – period, frequency, amplitude and phase –Examples of simple Harmonic Oscillators - problems.

Waves – longitudinal and transverse – relation between velocity, frequency and wavelength – free vibration, forced vibration and resonance – nodes and antinodes - vibration of air column in a tube – closed pipes – open pipes – end correction – resonance column experiment – variation of velocity with temperature – ultrasonic waves – production – applications - problems.

REFERENCE BOOKS

1. Resnick and Halliday - Physics
2. D.S.Mathur - Mechanics
3. Narayana Kurup - Mechanics
4. A.Marikani - Engineering Physics
5. H D Young - University Physics

COURSE TITLE : ENGINEERING CHEMISTRY I
COURSE CODE : 1004
COURSE CATEGORY : F
PERIODS PER WEEK : 3
PERIODS /SEMESTER : 45
CREDITS : 3

TIME SCHEDULE

Module	Name of Module	Course Objective no.	Total periods per semester		
			Instructional	Test	Total
I	Atomic Structure-I, Nanochemistry and Catalysis	1.1 1.2 1.3	Theory : 13	1	14
			Practical		
II	Fundamental of analytical chemistry	2.1 2.2 2.3	Theory : 11	1	12
			Practical		
III	Water and its treatment.	1.1 1.2 1.3	Theory : 8	1	9
			Practical		
IV	Metals and Alloys	1.1 1.2 1.3	Theory : 9	1	10
			Practical		
TOTAL					**45**

Course Outcome

After the completion of the course, student will be able to

- Understand the concept of atom
- Prepare the students to learn the advanced level of Science and Technology like Nanotechnology.
- Relate the knowledge of basic chemistry in industrial applications like Catalysis
- Understand different concepts of acids and bases
- Analyse the physical concepts related to pH and develop the skill of solving problems
- Develop the ability to analyse, interpret and apply the fundamentals of analytical chemistry including the skill of solving problems
- Distinguish different types of water and hardness. Predict the methods of removal of hardness and apply the basic principles of chemistry behind it and apply the learned facts in real life situation.

- Differentiate between metals and alloys
- Apply the concept of metals and alloys in metallurgy.

Specific Outcome

MODULE - I:

1.1.0 ATOMIC STRUCTURES I, NANO CHEMISTRY AND CATALYSIS

1.1.1. Review the fundamental particles of atom

1.1.2. Explain the terms nano materials and nanotechnology.

1.1.3. Explain different methods of synthesis and applications of carbon nanotubes.

1.1.4. Introduce different terms used in catalysis.

MODULE - II :

1.2.0 FUNDAMENTALS OF ANALYTICAL CHEMISTRY

1.2.1. Recollect the ideas of acids and bases.

1.2.2 Narrate the different definitions of acids and bases and compute equivalent weights of acids and bases.

1.2.3 Explain the terms Ionic product of water,' pH, pOH and Buffer Solution and illustrate Calculation of pH and pOH.

1.2.4 Explain the strength of solution using molarity and normality.

1.2.5 Solve problems based on normality and molarity.

1.2.6 Explain different terms used in Volumetric analysis.

1.2.7 Understand the principle of volumetric analysis and Solve problems based on $N_1V_1=N_2V_2$.

MODULE - III:

1.3..0 WATER AND ITS TREATMENT

1.3.1. Understand soft and hard water- definition and causes

1.3.2 Distinguish between soft and hard water

1.3.3 Mention types of hardness

1.3.4 Explain methods of removal of hardness

1.3.5 Explain reverse osmosis and desalination of sea water

MODULE - IV:

1.4.0 METALS AND ALLOYS

1.4.1 Distinguish the different varieties of Iron with their properties

1.4.2 Explain different methods of heat treatments of steel

1.4.3 Introduce alloys and explain composition of alloys like brass, bronze, Duralumin and Solder

1.4.4 Explain Powder Metallurgy with different steps, uses, advantages and limitations

CONTENT DETAILS

MODULE - I: Atomic Structure I, Nano Chemistry and Catalysis (13+1 = 14 hour)

Definition of atom and molecule - Fundamental particles - Electron, Proton and Neutron. Their charge and mass - Atomic number, mass number.

Definitions of nano materials and nano technology – Applications of nano materials – Carbon nano tubes – Types of Carbon nano tubes – SWCNT and MWCNT – Synthesis, Properties and any five applications of Carbon nano tubes.
Catalysis – Definition of Catalyst – Terms – Positive Catalyst, Negative Catalyst, Promotors and poisons with one example each - Types of Catalysis – Homogeneous Catalysis and Heterogeneous Catalysis – Two example each (No mechanism is required).

MODULE - II: Fundamentals of Analytical Chemistry (11+1 = 12 hour)

Definitions of Acids and Bases – Arrhenius, Bronsted & Lowry and Lewis definitions – Conjugate acid – base pair with two examples – Basicity of acid and Acidity of base – Equivalent weights of acids and bases.

Ionic Product of water – pH and pOH scale Definition – relation between pH and pOH – Simple problems based on pH. Applications of pH – Buffer solution – definition – classification of Buffers – Acidic and Basic Buffers – Buffer Capacity (definition only).
Molarity and Normality – Definition and mathematical formulae – Simple problems based on molarity and normality – Volumetric analysis – Titration – end point – indicators – pH range of indicators – choice of indicators in titration – Principle of Volumetric analysis (Normality equation only). Simple problems based on normality equation.

MODULE - III: Water and its Treatment (8+1=9 hour)

Water - Physical properties of water – Soft water and hard water – Reasons of hardness – Types of hardness – temporary hardness and permanent hardness – removal of temporary hardness – Boiling and Clark's Process – Removal of permanent harness – Ion exchange process using Cation and Anion exchangers - Potable water – Characteristics and treatment with block diagram - Desalination of sea water – reverse osmosis.

MODULE - IV: Metals and Alloys (9+1=10 hours)

Physical properties of metals – Properties of Industrial metals like Cast Iron, Pig Iron, Wrought Iron and Steel (Manufacture is not required) – Effect of Impurity in Steel – Heat Treatment of Steel – Tempering, Quenching and Nitriding – Alloys – Definition – Purpose of making alloys – Preparation of alloys by fusion method (figure is required) – Composition of alloys like Brass, Bronze, Duralumin and Solder – Powder Metallurgy (1. Preparation of Metal Alloy by Atomization and Reduction. 2. Chemical Mixing or Blending. 3. Compacting. 4. Pre-Sintering. 5. Sintering.) and its uses, advantages and limitations.

REFERENCE:

Sl. No.	Name of Author	Title of Book	Name of Publisher
1	Jain and Jain	Engineering Chemistry	Dhanpat Rai and Sons
2.	S. S. Dara	Engineering Chemistry	S. Chand Publication
3.	B. K Sharma	Industrial Chemistry	Geol Publication
4.	S. S. Dara	Environmental Chemistry and Pollution Control	S. Chand Publication
5.		Wiley “All in One”	Wiley India Pvt. Ltd 2012 Editon.

COURSE TITLE : COMPUTING FUNDAMENTALS (PRACTICAL)
COURSE CODE : 1008
COURSE CATEGORY : C
PERIODS/WEEK : 5 (2 THEORY+ 3 PRACTICAL)
PERIODS/SEMESTER : 75
CREDITS : 4

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Computer Fundamentals – Hardware and Software	14
2	Office Automation Tools	14
3	Basic Programming Concepts	22
4	Introduction to programming using python	25
	Total	**75**

COURSE OUTCOME:

On completion of the course the student will be able :

- Understand Computer Fundamentals – hardware and Software
- Understand computer networks
- Study Office automation tools
- Email and search engines
- Basic Programming Concepts
- Introduction to programming in Python

SPECIFIC OUTCOME

MODULE - I TO UNDERSTAND THE COMPUTER FUNDAMENTALS – HARDWARE AND SOFTWARE

1.1.1 Identify computer hardware and software (in the lab)
1.1.2 Draw and explain the block diagram of computer system
1.1.3 Demonstrate various peripherals and their applications.
1.1.4 Demonstrate the usage of various storage devices (data copying, CD/DVD burning)
1.1.5 Illustrate the booting procedure (using windows and linux)
1.1.6 Identify various operating system file management commands (create, copy, move, delete and rename folders and files)
1.1.7 Demonstrate installation of application software (in windows and linux)
1.1.8 Identify various computer languages
1.1.9 Differentiate the compiler and interpreters
1.1.10 State computer networks and internet**.**

MODULE - II TO APPLY OFFICE AUTOMATION TOOLS

2.1.1 Demonstrate how a document to be prepared and formatted
2.1.2 Demonstrate how a spread sheet to be prepared and calculations are performed
2.1.3 Demonstrate how presentations are prepared.
2.1.4 Demonstrate how to create email-id and uploading and downloading files.

MODULE - III TO UNDERSTAND BASIC PROGRAMMING CONCEPTS

3.1.1 Identify various problem solving steps
3.1.2 Design algorithm and flowchart for simple sequential problems.
3.1.3 Design algorithm and flowchart for control structures (decision making and iterative)

MODULE - IV TO DEVELOP PROGRAMS USING PYTHON

4.1.1 Demonstrate output functions and input function for a simple application
4.1.2 Modify the applications with inserting control logic (if, else, elif)
4.1.3 Modify the applications with inserting looping control(while, for)
4.1.4 Write programs for a simple total/average mark calculation and calculation of grade based on boundary conditions**.**

CONTENT DETAILS

List of Experiments :

1. Identify the internal and external hardware/peripheral components
2. Familiarisation with operating system along with file management commands like create, copy, move, delete and rename files and folders.
3. Prepare and print Bio-data with a covering letter using word processor.
4. Calculation of Total mark, grade based on boundary conditions for n number of students using Spread sheet.
5. Experiments for burning the contents in to optical disks.
6. Preparation of presentation (with transition and animations , insertion of scanned images and internet contents)
7. Email id creation, sending and receiving of email with attachments.
8. Programs to calculate average of 3 numbers, area of triangle, volume of cylinder, Temperature conversion.
9. Largest of 3 numbers, Check whether even or odd, Roots of quadratic equation, Character name of the day.
10. Print natural numbers, Factorial value, Multiplication table, Sum of digits, Sum of a set of numbers, calculation of grade based on boundary conditions

Text Book(s):

1. Rajaraman V. - Fundamentals of Computers - PHI

References:

1. Mrs. Chetna Shah & Mr. Kalpesh Patel - Open Office

Hardware Requirement : Desk Top Computer

Operating System.

COURSE TITLE : HEALTH & PHYSICAL EDUCATION
COURSE CODE : 1009
COURSE CATEGORY : C
PERIODS/WEEK : 3 (1 Theory +2 Practical)
PERIODS/SEMESTER : 45
CREDITS : 2

***Objective*:** The course intended to provide learning experience to students to realize the importance of physical fitness, health and well being. It will also help to develop life time physical activity behaviour among the students. The course will help,

1. To introduce the fundamentals of health, physical education, fitness and sports.
2. To provide knowledge and understanding regarding the scientific basis of fitness.
3. To enable the students to lead a healthy lifestyle based on concepts of fitness and wellness.
4. To impart knowledge regarding health and nutrition; and to equip the students to provide first aid measures and manages common injuries.

Health and Physical Education (Theory) – 15 Sessions

TIME SCHEDULE		
MODULE	**TOPIC**	**PERIODS**
I	Concept of Health and Physical Education	6
II	Introduction to fitness	18
III	First Aid	9
IV	Food and Nutrition	6
	Test	6
TOTAL		45

MODULE – I CONCEPT OF HEALTH AND PHYSICAL EDUCATION

a) Health – Definition and spectrum of health
b) Various aspects of health-physical health, mental health, social health, spiritual health
c) Factors influencing health-Biological factors, environmental factors, socio-cultural factors, Personal factors.
d) Physical Education - Meaning and definition, aims, objectives and importance of physical education

MODULE - II INTRODUCTION TO FITNESS

a) Meaning and importance of physical fitness.
b) Components of physical fitness-Health related and skill related fitness.

c) Means of fitness development-aerobic and anaerobic activities, sports and games, yoga and recreational activities.
d) Principles of use and disuse. Relationship between duration and severity of exercise – stitch, cramps. Oxygen debt and second wind
e) Posture- Meaning and concepts of posture, classification of posture- Endomorph, Ectomorph and Mesomorph, Dynamic postures- sitting,standing, walking, running, lying,- Postural deformities- Kyphosis, Lordosis, Scoliosis, Knock knee, Bow leg, Flat foot.
f) Health risk behaviours- Effects of Drugs, Alcohol, Smoking, Dietary abuse and Inactivity.

MODULE - III FIRST AID

a) Definition and purpose of first aid Principles and Ethics of First Aid
b) First Aid – General Procedure -first aid kit.
c) Wounds (types and its management)
d) Fractures (types and its management)
e) First aid for –burns, snake bite, drowning, unconsciousness, electric shock, chocking, sun stroke, bleeding.
f) Bandaging techniques
g) Techniques of carrying injured persons.
h) Cardiopulmonary resuscitation (CPR).

MODULE - IV FOOD AND NUTRITION

a) Classification of food
b) Calories and daily requirement of calories.
c) Balanced diet
d) Food pyramid
e) Caloric value of Indian foods

SUGGESTED READINGS

1**) AAPHERD**. ***Health Related Physical Fitness test Mannual***.1980 published by association drive Reston Virginia
2**) ACSM** ***Fitness Book***, Leisure Press Campaign, Illinois,1996, Leisure Press , Canada
3) **ACSM**'s ***"health related physical fitness assessment manual"*** Lippincott Williams and Wilkins USA, 2005
4) **B.C. Rai** ***Health Education and Hygiene,*** published by Prakashan Kendra,Lucknow
5) **Corbin, Charles B.et.al, C.A.,(2004).** ***Concepts of Fitness and Wellness,*** Bosten:McGrawHill
6**) Fashey,TomasD,Insel, Paul M, and Roth, Walton T (2005)** ***Fit and well,*** New York: McGrawHill Inc.

7) **Greenberg, Jerold S and Dintiman George B (1997)** ***welness- Creating a Life of Health and fines*** London: Allyn and Bacon Inc.
8) **Norman Bezzant*****Help First Aid for everyday emergencies,*** JaicoPublishing House Bombay, Delhi
9) **Puri,K, Cahndra.,S,S, (2005).** ***Health and Physical Education***. New Delhi: Surjeet Publication

Health and Physical Education (Practical) – 15 Sessions (2 Hours/session)		
PART- I	**COMPULSORY**	**09 SESSIONS**
1	Warming Up and warming down(Various Stretching and Rotation Exercises)	1
2	Aerobic dance and various flexibility exercises	1
3	Yoga – Pranayama – Surya Namaskar-Padmasana- Pachimothasana- Bhujangasana- Dhanurasana - Sarvangasana -Matsyasana- SalabhasanHalasana- Chakrasana- Vrikshasana- Padahastasana - Savasana	3
4	Weight Training – Biceps curls- Triceps curls- Lateral rise- Good morning- Wrist curl- Front press- Press behind the neck- Bench press- Upright rows- Leg presses- Half Squat- Full squat- Dumbbell exercises	2
5	Physical Fitness Test yard dash -- Speed anding Broad Jump-Leg Power -Ups (60 sec) -Abdominal strength uttle Run(10mts x 4)-Agility ll –ups(M)Flexed arm hang(W) –Shoulder strength 0 yard/walk-Endurance	2
PART- II	**OPTIONAL**	**06 SESSIONS**
1	Students can opt any one activity from two disciplines suggested by the faculty subject to the availability of facilities at the college	3
2	1. Football, 2. Basketball, 3. Volleyball, 4. Shuttle Badminton, 5. Ball Badminton, 6. Kabaddi, 7. Cricket, 8. Table Tennis, 9. Track and Field	3

Assessment of Students

Health and Physical Education			
	Internal	**External**	**Total**
Theory	40	00	40
Practical	10	50	60

a) Internal Assessment for Theory Course

The weightage of internal continuous assessment marks for theory courses shall be as follows:-

SL.NO.	Criteria Component	Weightage (%)
1	Test papers	50
2	Assignment (Minimum 2)	25
3	Attendance	25

b) Internal Assessment for Practical Course

The weightage of internal continuous assessment marks for practical courses shall be as follows:-

SL. No.	Criteria Component	Weightage (%)
1	Physical Fitness Test	50
2	Sports and games performance	50

c) Assessment at End of Semester Examination (Practical Course)

1) The course teacher and an examiner appointed by the Principal shall conduct the practical examination at the end of the semester.

2) Award of marks for the semester practical examinations as follows:-

SL. No.	Criteria Component	Weightage (%)
1	Fair Record	40
2	Viva Voce	20
3	Performance in Yoga	20
4	Demonstration of Weight Training Exercises	10
5	Demonstration of Aerobics, Stretching, Rotation and Flexibility exercises	10

COURSE TITLE : ENGINEERING GRAPHICS
COURSE CODE : 2005
COURSE CATEGORY : F
PERIODS/ WEEK : 5
PERIODS/ SEMESTER : 75
CREDIT : 0

TIME SCHEDULE

MODULE	TOPIC	PERIODS
1	Introduction of engineering graphics Lettering, numbering and dimensioning	19
2	Geometric construction & Scales	21
3	Projections of points and lines	18
4	Projections of planes	17
TOTAL		**75**

COURSE OUTCOME:

After the completion of the course, student will be able to

- Understand the importance of engineering graphics
- Recognise the use of drawing instruments, standards, symbols etc.
- Appreciate the lettering, numbering , dimensioning
- Recognise geometric construction & Scales
- Understand the projections of points ,lines etc.
- Understand the projections of planes

SPECIFIC OUTCOME:

MODULE - I

1.1.0 Understand the importance of engineering graphics

1.1.1 Understand the importance of engineering graphics
1.1.2 Explain the importance of engineering communication medium
1.1.3 Describe the development of engineering graphics and computer aided drafting CAD
1.1.4 Indicate the link between engineering graphics and other subjects of study in diploma courses

1.2.0 Recognise the use of drawing instruments

1.2.1 Use engineering drawing instruments
1.2.2 Select the proper instrument to draw horizontal, vertical and inclined lines
1.2.3 Select the proper instrument to draw large and small circles and arcs to its specifications
1.2.4 Select the proper pencil to draw different types of line according to its specifications
1.2.5 Identify the steps to keep the drawing clean and tidy

1.3.0 Recognise the use of drawing standards, symbols etc

1.3.1 Appreciate the standards of engineering drawing
1.3.2 Select the drawing sheet
1.3.3 Draw different types of lines
1.3.4 Prepare title block as per BIS
1.3.5 Fold drawing sheets as per standards

1.4.0 Appreciate the lettering & numbering

1.4.1 Apply lettering and numbering
1.4.2 Write drawing title using sloping and vertical lettering including numerals as per BIS
1.4.3 Select suitable size of letters of different layout and applications
1.4.4 Write engineering drawings notes using lettering

1.5.0 Appreciate the dimensioning

1.5.1 Apply dimensioning as per standards
1.5.2 State the need of dimensioning as per BIS specification
1.5.3 Identify the notations used in a drawing as per BIS
1.5.4 Identify the system of placement of the dimensions as per BIS
1.5.5 Dimension of a given drawing according to BIS including features
1.5.6 Apply the rules for dimensioning of standard features, given a drawing comprising of standard features
1.5.7 Identify the principles of dimensioning, given a dimensioned drawing
1.5.8 Identity the correctness of an engineering drawing dimensioned and dimension the same as per BIS

MODULE - II

2.1.0 Recognise Geometric construction

2.1.1 Apply principles of geometrical construction
2.1.2 Construct polygon, given the length of the side
2.1.3 Insert a regular polygon in a circle.
2.1.4 Define Ellipse, involutes, helix, Parabola, Hyperbola and Cycloid,
2.1.5 Construct Ellipse by concentric circle, eccentricity, rectangular and parallelogram methods

2.1.6 Construct an involute, helix, parabola from given data
2.1.7 Identify the application of these constructions in engineering practice.

2.2.0 Recognise Scales

2.2.1 Know about the importance of scale in Engineering Drawing
2.2.2 Identify different types of Scales

MODULE - III

3.1.0 Understand the projections of points & lines

3.1.1 Understand the projection of points, lines and planes
3.1.2 Project points in different quadrants
3.1.3 Project lines parallel to both planes
3.1.4 Project lines perpendicular to HP and || to VP
3.1.5 Project lines perpendicular to VP and || to HP
3.1.6 Project lines inclined to HP and || to VP
3.1.7 Project lines inclined to VP and || to HP
3.1.8 Project lines inclined to both planes - simple direct questions and answers
3.1.9 Find true length of lines

MODULE - IV

4.1.0 Understand the projections of planes

4.1.1 Project planes parallel to VP and perpendicular to HP
4.1.2 Project planes parallel to HP and perpendicular to VP
4.1.3 Project planes inclined to one plane and parallel to other

CONTENT DETAILS

MODULE - I

1.1 The Importance of Engineering Graphics

Explanation of the scope and objective of this subject – its importance as a graphic communication- Computer Aided Drafting (CAD) need for preparing drawing as per BIS standards.

1.2 Drawing Instruments.

Basic drawing instruments – T square – Set square – compass - dividers – drawing boards – Pencils – Drawing papers – Mini drafter – French curves – Stencils – Selection and mode of using them.

1.3 Drawing Standards

Size of drawing sheets – Layouts of drawing sheet – Title Blocks – Types of lines – Folding of drawing sheets

1.4 Free hand Lettering and Numbering

Need for legible lettering and numbering on drawings – selection of suitable size of lettering for different drawing writing of Engineering drawing titles and notes using both vertical and sloping styles.

1.5 Dimensioning

Function of dimensioning - need for dimensioning engineering drawing according to BIS – notation used in dimensions – dimension line – extension line – arrow heads and leader – system of dimensioning (method I and method II)

MODULE - II

2.1 Geometric construction

Construction of regular polygon given the length of its side - methods of inserting a regular Polygon in a given circle – construction of ellipse by different methods – eccentricity - concentric circle- rectangular and parallelogram. Definition of involute - helix - parabola & hyperbola – construction of cycloid- helix- involute and parabola.

2.2 Scales

Meaning of drawing to scale – reduced scale – enlarged scale – full size scale – types of scale – plain scales & diagonal scales – dividing a line into number of equal parts

MODULE - III

3.1 Projection of points- lines and planes

Projection of points in different quadrants-

Projection of straight lines(in first quadrant only) - parallel to one or both planes - parallel to one plane and perpendicular to other – inclined to one plane and parallel to other - inclined to both planes. Methods of finding true length and its inclination with the reference planes.

MODULE - IV

4.1 Projection of planes

Projection of planes (in first quadrant only) – perpendicular to both planes - parallel to one plane and perpendicular to other plane - inclined to one plane and perpendicular to the other plane

TEXT BOOKS

1. K. C Jon, - Engineering Graphics - PHI Learning Private Limited
2. P. I. Varghese - Engineering Graphics - VIP Publishers

REFERENCE BOOKS

1. N D Bhatt - Engineering Drawing
2. Sageer& Abu - Engineering Graphics
3 M. B. Shah and B.C.Rana - Engineering Drawing - Pearson Publications
4**.** T.Jayapoovan - Engineering Drawing & Graphics using Autocad – Vikas publications

COURSE TITLE : ENGINEERING SCIENCE LAB (For Semester I & II)
[Engineering Physics & Engineering Chemistry Lab]
COURSE CODE : 2007
COURSE CATEGORY : F
PERIODS PER WEEK : 3
PERIODS /SEMESTER (I & II): 90
CREDITS : 3

ENGINEERING PHYSICS LAB

TIME SCHEDULE

SL.No	Name of module	Course objective	Total period in 1 and 2 semester		
			Instructional	Test	Total
1	Measurement and calculation of different physical quantities	1:1 1:2 1:3	Practical: 42	3	45
Total periods 1 and 2 semester 45					

On completion of the course the student will be able to:

1. To measure volume of a cylinder using vernier calipers.
2. To measure volume of a wire using screw gauge.
3. To determine focal length of a convex lens by displacement method.
4. To determine the velocity of sound in air at room temperature using resonance column.
5. To determine spring constant using Hooke's law..
6. To determine acceleration due to gravity using simple pendulum.
7. To verify law of resistances.
8. To determine specific resistance of material using Meter Bridge.
9. To determine Internal Resistance of a Primary Cell using Potentiometer.
10. To plot characteristics of photoelectric cell (photoelectric current vs intensity of light and voltage applied)
11. To determine the mass of the given body using moment bar.
12. To determine the mass of a body by parallelogram method and by Lami's theorem.
13. To verify Ohm's law and to determine the resistance of the given wire.

14. To determine the coefficient of viscosity of a highly viscous liquid.
15. To determine the relative density using U- tube apparatus.

LIST OF PRACTICAL EXPERIMENTS – PHYSICS

1. Vernier calipers
2. Screw gauge
3. Convex lens
4. Resonance column
5. Hooke's law
6. Simple pendulum
7. Law of resistances
8. Meter bridge
9. Potentiometer
10. Photoelectric cell
11. Moment bar
12. Concurrent forces(mass of the body)
13. Ohm's law
14. Stoke's method for viscosity
15. U tube

ENGINEERING CHEMISTRY LAB

SL.No	Name of module	Course objective	Total period in 1 and 2 semester		
			Instructional	Test	Total
1	Quantitative analysis(Volumetric analysis)	1:1 1:2 1:3	Theory: Practical: 39	- 6	45
Total periods 1 and 2 semester 45					

TIME SCHEDULE

On completion of the course the student will be able to:

Practical Volumetric Analysis

Single Titration

1. Standardisation of HCL
2. Standardisation of NaOH Double Titrations
3. Estimation of NaOH
4. Estimation of KOH
5. Estimation of Na2 CO3
6. Estimation of K2 CO3
7. Estimation of HCl
8. Estimation of HNO3
9. Estimation of H2 SO4
10. Estimation of Oxalic acid
11. Standardisation of KMnO4
12. Estimation of Oxalic acid
13. Estimation of Fe 2+ ion
14. Estimation of Mohr's Salt
15. Determination of PH of Solution
16. Estimation of Zinc using EDTA
17. Estimation of Magnesium Using EDTA

Reference:

Prof. A. O. THOMAS – PRACTICAL CHEMISTRY – Eight Edition 2000

COURSE TITLE : WORKSHOP PRACTICE
COURSE CODE : 2008
COURSE CATEGORY : F
PERIODS/ WEEK : 3
PERIODS/ SEMESTER (I & II): 90
CREDIT : 3

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Carpentry, Foundry & Casting	27
2	Smithy, Forging & Fitting	27
3	Sheet metal	18
4	welding	18
TOTAL		90

Course outcomes:

STUDENT WILL BE ABLE TO:

- Perform various exercises on given drawing and specifications in Carpentry shop, Foundry & Casting shop.
- Perform various exercises on given drawing and specifications in Smithy, Forging & Fitting shop.
- Perform various exercises on given drawing and specifications in Sheet metal shop.
- Perform various exercise on given drawing and specifications in Welding shop.

CONTENT DETAILS

MODULE I

Introduction, objectives, safety in the Carpentry shop, Foundry & Casting shop.
Familiarization of tools
Marking and measuring tools such as straight edge- meter square- try square- bevel square- combination square- marking knife- marking gauge- mortise gauge- cutting gauge- wing compares- trammel- divider- outside and inside calipers- spirit level and plumb bob.
Cutting tools such as Rip saw- Cross cut saw- panel saw- tenon saw- bow saw- compass saw- key hole saw- firmer chisel- bevel edge firmer chisel- parting chisel- mortise chisel- jack plane- wooden and metal- trying plane- smoothening plane- rebate plane- plough plane- router plate- spoke shave.
Boring tools such as Bradawl ratchet brace- wheel brace- shell bit- fostries bit- counter sunk bit.
Striking tools such as mallet etc
Holding devices – Bench vice- bench stop- sash clamp- G-clamp- hard screw.
Miscellaneous tools – Rasp cut file- scraper- glass paper- pincers- ratchet and cabinet type screw drivers.
Carpentry Practice

Marking- sawing- planning- chiseling- grooving- rebating exercises Preparation of carpentry joints.

Familiarization of Foundary tools

Hand tools – shovel- riddle- hammers- trowels- relic- lifters- strike off bar spruce- balloons- swab- gate cutter- mallet- vent rod- draw spike- lifting plate- pouring weight- gaggers- clamps, core & chaplets.

Moulding practice & casting

Preparation of moulding sand- Prepare moulds of different types using different patterns(single, double & three piece patterns)- ferrous & Non- ferrous metal casting using simple patterns.

MODULE II

Familiarization of Smithy tools

Hand tools – anvil- swage block- hammers such as ball peen- straight peen- cross peen and sledge hammers.Tongs such as flat- hallow- cold and hot chisels- swages- fullers- flatters- set hammers- pinch and drift.

Equipment: Open and closed hearth- heating furnaces- hand and power driven blowers- open and stock fire fuels such as charcoal- coal- oil and gas

Smithy & Forging Practice

Building fire in the furnace- Upsetting- bending- drawing- setting down- pinching- cutting and welding exercises

Familiarization of fitting tools

Hand tools & Marking tools – scriber- compass- dividers- outside and inside calliper- jenny calliper- ordinary scribing block- universal scribing block- angle plate- V-block- center punch- prick punch- try square- bevel square- surface plate- straight edge.

Cutting tools – chisels – flat- crosscut- half round- diamond point- side chisel. Files – single cut and double cut files rough- bastard- second cut- smooth Dead smooth files – flat- square- pillar- round triangular- half round- knife- safe edge and needle files.

Scribers – Neck saw – solid and adjustable frames – blades – cutting with point rack saw

Striking tools: Ball peen- straight peen- cross peen and double-faced hammers

Holding devices-vice-bench- leg- pipe- hand- pin and tool makers vice

Marking tools – scriber – ordinary and universal scribing block- center and prick punch.

Angle plate- v-block- Try Square- surface plate

Fitting Practice

Cutting - filing- scribing and simple joints exercises

MODULE III

Familiarization of Sheet metal tools

Understand safety precautions.

Familiarization of sheet metal tools – scribers- dividers- trammel points- set square- punches – prick Punches- centre punches – hand Grover- rivet- set- chisels hammers- riveting hammers- ball peen hammers – mallet- snip- shears- pliers- hand reamers (tongs) files- stakes. Measuring instruments in sheet metal folding rule- common rule- steel circumference rule- vernier calipers- micrometer- calipers- thickness gauges (SWG) sheet metal gauge.

Practice work

Sheet cutting- development- folding- bending and pipe bending- making right angle joints.

MODULE IV

Familiarization of welding tools & safety

Safety precautions- Study of various tools and equipments used in the welding shop for both arc welding and gas welding.

Practice work

1.D.C. arc welding

2.A.C. arc welding

3.Gas welding

4. Edge preparation of welded joint such as V and double V.

5.Horizontal -flat and vertical joints

General Information:

Examination in the Second Semester

TEXT BOOKS

1. **Mechanical Workshop Practice By K. C Jon, PHI Learning Private Limited**
2. **Mechanical Workshop & Laboratory Manual By K. C. John**

REFERENCE BOOKS

1. **S K Hajra Choudhary - Workshop Technology Vol. I**
2. **S K Hajra Choudhary - Workshop Technology Vol. II**