COURSE TITLE   : **ENGLISH FOR COMMUNICATION - II**
COURSE CODE   : **2001**
COURSE CATEGORY   : **F**
PERIODS/WEEK   : **4**
PERIODS/SEMESTER   : **60**
CREDITS   : **3**

MODULE	TOPICS	PERIODS
1	Relationships	15
2	Inspirations	15
3	Mysteries	15
4	Innovations	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:

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

CONTENT DETAILS

MODULE - I

1. Reading passage - Relationships.
2. Vocabulary – Vocabulary acquisition through dictionaries.
3. Grammar – Connectors.
4. Writing – Letter Writing.
5. Language Function – Expressing one's opinion/Expressing likes & dislikes.
6. Speaking – Seminar Presentations.

MODULE - II

1. Reading passage - Inspirations.
2. Vocabulary – Vocabulary acquisition through developing reading skills.
3. Grammar – Using relative clauses.
4. Writing – Notices, Memos, Short Messages.
5. Language Function – Granting leave, Interrupting
6. Speaking – Attending Interviews.

MODULE - III

1. Reading passage - Mysteries.
2. Vocabulary – Learning words by association.
3. Grammar – Passive Voice.
4. Writing – Process Writing.
5. Language Function – Asserting/Making Suggestions.
6. Speaking – Conducting Meetings – Short Speeches.

MODULE - IV

1. Reading passage - Innovations.
2. Vocabulary – Confusing Words, Homophones.
3. Grammar – Reported Speech.
4. Writing – E-mails.
5. Language Function – Saying goodbye, Offering help.
6. Speaking – Describing the working of a machine.

PRACTICAL

Two hours are set apart for practical training in the use of English language. Here, stress is given to skills of listening and speaking. Accuracy and fluency are the two factors which are needed for our students. Practical sessions are intended to equip the learner to meet the everyday demand of the industry. Activities that can be used in the practical sessions are enlisted:

Speaking activities – Speaking with a friend, speaking to an audience, role play, group discussion, Just a Minute (JAM), Sharing of experience and ideas, Impromptu speeches.

REFERENCE: - G (A Coursebook in English for Polytechnic College
Students – Semester II)

COURSE TITLE   : **ENGINEERING MATHEMATICS – II**
COURSE CODE   : **2002**
COURSE CATEGORY   : **F**
PERIODS/WEEK   : **6**
PERIODS/SEMESTER : **90**
CREDITS   : **6**

<u>**TIME SCHEDULE**</u>

MODULE	TOPICS	PERIODS
1	VECTOR ALGEBRA	14
	BINOMIAL SERIES	10
2	DETERMINANTS	8
	MATRICES	14
3	INDEFINITE INTEGRALS	10
	DEFINITE INTEGRALS	8
4	APPLICATIONS OF INTEGRATION - AREA & VOLUME	6
	DIFFERENTIAL EQUATIONS	10
5	TESTS, ASSIGNMENTS AND TUTORIALS (4 Periods per Unit)	10
TOTAL		**90**

<u>**SPECIFIC OUTCOME**</u>

<u>**MODULE - I VECTOR ALGEBRA AND BINOMIAL THEOREM.**</u>

1.1.0   Vector Algebra
       1.1.1   Scalar and vector quantities.
       1.1.2   Definition of a vector.
       1.1.3   Representation of vectors.
       1.1.4   Name a directed line segment as a vector.
       1.1.5   Different types of vectors.
       1.1.6   Addition and subtraction of vectors in terms of the segment.
       1.1.7   Position vector of a point with reference to a point.
       1.1.8   Difference of two vectors with same initial point as position vector of a point.
       1.1.9   Orthogonal Cartesian axes ,the unit vectors i, j and k .
       1.1.10 Types of vector product (a) scalar product (b) vector product
       1.1.11 Scalar (dot) product and vector (cross) product.
       1.1.12 Properties of dot product and cross product (no proof)
       1.1.13 Simple problems to find
             (i) Work done by a force (application of scalar product)
             (ii) Moment of a force (application of vector product)

1.2.0 Binomial Theorem.

 1.2.1 Concept of factorial

 1.2.2 Meaning of nc_r and value of nc_r (No proof and no problems)

 1.2.3 Use of nc_r in the expansion $(x + a)^n$, where n is positive integer.

 1.2.4 State binomial theorem for a positive integer.

 1.2.5 Expansion of $(x + a)^n$,and $(x - a)^n$ where n is positive integer. (Statement only).

 1.2.6 General term of the expansion of $(x + a)^n$,and $(x - a)^n$

 1.2.7 Properties of binomial expansion

 1.2.8 Problems of the following types

   1.2.8.1 Expand using Binomial theorem

   1.2.8.2 Find a particular term in the expansion

   1.2.8.3 Find middle term(s)

   1.2.8.4 Find the coefficient of x^n

   1.2.8.5 Find constant terms in $(x + a)^n$,and $(x - a)^n$

MODULE - II DETERMINANTS AND MATRICES.

2.1.0 DETERMINANTS.

 2.1.1 Definition of determinant by means of algebraic expression

 2.1.2 Order of a determinant

 2.1.3 Evaluation of determinants of 2nd & 3rd order --- problems.

 2.1.4 Solution of a system of simultaneous linear equations in two unknowns

 2.1.5 Solution of a system of simultaneous linear equations in three unknowns

2.2.0 MATRICES.

 2.2.1 Definition of matrices

 2.2.2 Order of matrices

 2.2.3 Different types of matrices

 2.2.4 Algebra of matrices such as

   Equality of matrices

   Addition of matrices

   Subtraction of matrices

   Scalar multiplication and Multiplication

 2.2.5 Problems on algebra of matrices

 2.2.6 Transpose of a matrix

 2.2.7 Symmetric and skew-symmetric matrices

 2.2.8 Determinant associated with a square matrix

 2.2.9 Singular and non singular matrices

 2.2.10 Minors and cofactors

 2.2.11 Cofactor matrix

 2.2.12 Adjoint of a matrix

 2.2.13 Inverse of a matrix

2.2.14 Solution of a system of three linear equations in two unknowns
using the inverse of the coefficient matrix.

MODULE - III INTEGRAL CALCULUS.

3.1.0 INTEGRAL CALCULUS.
3.1.1 Integration as reverse process of differentiation
3.1.2 List standard integrals.
3.1.3 Rules of integration.

$$1. \int kf(x)dx = k \int f(x)dx. \qquad 2. \int \{f(x) \pm g(x)\}dx = \int f(x)dx \pm \int g(x)dx$$

3.1.4 Simple problems using standard results and rules of integration.
3.1.5 Simple problems using algebraic simplification and trigonometric results.
3.1.6 Integration by substitution method.
3.1.7 Solve simple problems on substitution method
3.1.8 Evaluation of integrals of the form
(1) $\int x^{n-1} f(x^n)\, dx$ 2) $\int \emptyset[f(x)]\, f(x)dx$
3) $\int f(x^n)f(x)\, dx$ 4) $\int \frac{f(x)}{f(x)}dx$ 5) $\int f(ax+b)dx$
3.1.9 Integration by parts.
3.1.10 Solutions of problems of the type x sinx, x^2 cos x, (ax + b) e^x, x sin^2x, log x,
e^x sinx, x log x etc.,

3.2.0 DEFINITE INTEGRALS.
3.2.1 Meaning of $_a\int^b$ f(x) dx and definition of definite integral.(Correct notation)
3.2.2 Properties of definite integrals.
3.2.3 Problems of the same type as in indefinite integral using limits of integration.

MODULE – IV APPLICATIONS OF INTEGRATION

4.1.0 AREA AND VOLUME
4.1.1 Formulae for finding area bounded by a curve and volume of a solid of revolution
(no proof)
4.1.2 Estimation of the area bounded by the curve y = f(x), the x- axis and the
ordinates at x=a and x=b
4.1.3 Estimation of the area bounded by the curve y = f(x), and the x- axis
4.1.4 Estimation of the area enclosed between two curves $y_1 = f_1(x)$, and $y_2 = f_2(x)$
4.1.5 Simple problems to find the volume of solid of revolution.

4.2.0 DIFFERENTIAL EQUATIONS.

4.2.1   Definition of differential equation with examples

4.2.2   Order and Degree of D E with examples.

4.2.3   Solution of D E by variable separable method.

4.2.4   Problems on variable separable method.

4.2.5   Solution of a linear D E of the type $\dfrac{dy}{dx} + Py = Q$

4.2.6   Simple problems

4.2.7   Solution of D E of the type $\dfrac{d^2 y}{dx^2} = f(x)$

4.2.8   Simple problems

CONTENT DETAILS

MODULE - I

1.1 Vector Algebra

Scalar and vector quantities, Definition of a vector, Representation of vectors, Name a directed line segment as a vector, Different types of vectors, Addition and subtraction of vectors in terms of the segment, Position vector of a point with reference to a point, Difference of two vectors with same initial point as position vector of a point, Orthogonal Cartesian axes ,the unit vectors i, j and k , Types of vector product (a) scalar product (b) vector product, Scalar (dot) product and vector (cross) product, Properties of dot product and cross product (no proof), Simple problems to find (i) work done by a force (application of scalar product) (ii) moment of a force (application of vector product).

1.2 Binomial Theorem

Concept of factorial , Meaning of nc r and value of ncr (No proof and no problems), Use of ncr in the expansion (x + a)n , where n is positive integer, State binomial theorem for a positive integer, Expansion of (x + a)n ,and (x - a)n where n is positive integer(statement only), General term of the expansion of (x + a)n ,and (x - a)n, Properties of binomial expansion, Problems of the following types (a) expand using Binomial theorem, (b) to find a particular term in the expansion, (c) to find middle term(s), (d) to find the coefficient of x^n , to find constant terms in (x + a)n ,and (x - a)n,

MODULE - II Determinants and Matrices

2.1 Determinants

Definition of determinant by means of algebraic expression , Order of a determinant, Evaluation of determinants of 2nd & 3rd order --- problems, Solution of a system of simultaneous linear equations in two unknowns, Solution of a system of simultaneous linear equations in three unknowns

2.2 Matrices

Definition of matrices, Order of matrices, Different types of matrices, Algebra of matrices such as Equality of matrices, Addition of matrices, Subtraction of matrices, Scalar multiplication and Multiplication, Problems on algebra of matrices, Transpose of a matrix, Symmetric and skew-symmetric matrices, Determinant associated with a square matrix, Singular and non singular matrices, Minors and cofactors, Cofactor matrix, Adjoint of a matrix, Inverse of a matrix, Solution of a system of three linear equations in two unknowns , Using the inverse of the coefficient matrix.

MODULE - III

3.1 Integral Calculus

Integration as reverse process of differentiation, List standard integrals, Rules of integration,

$$1. \int kf(x)dx = k\int f(x)dx. \qquad 2. \int \{f(x) \pm g(x)\}dx = \int f(x)dx \pm \int g(x)dx$$

Simple problems using standard results and rules of integration, Simple problems using algebraic simplification and trigonometric results, Integration by substitution method, Solve simple problems on substitution method, Evaluation of integrals of the form,

(1) $\int x^{n-1} f(x^n)\, dx$ 2) $\int \emptyset[f(x)]\, f'(x)dx$ 3) $\int f(x^n)f'(x)\, dx$ 4) $\int \dfrac{f'(x)}{f(x)}\, dx$

5) $\int f(ax + b)dx$

Integration by parts, Solutions of problems of the type x sinx, x^2 cos x, (ax + b) e^x, x $\sin^2$x, log x, e^x sinx, x log x etc.

3.2 Definite Integrals

Meaning of $_a\int^b$ f(x) dx and definition of definite integral.(Correct notation), Properties of definite integrals, Problems of the same type as in indefinite integral using limits of integration.

MODULE - IV

4.1 Area and Volume

Formulae for finding area bounded by a curve and volume of a solid of revolution (no proof), estimation of the area bounded by the curve y = f(x), the x- axis and the ordinates at x=a and x=b, Estimation of the area bounded by the curve y = f(x), and the x- axis , Estimation of the area enclosed between two curves y_1 = f_1(x), and y_2=f_2(x), Simple problems to find the volume of solid of revolution.

4.2 Differential Equations

Definition of differential equation with examples, Order and Degree of D E with examples,

Solution of D E by variable separable method, Problems on variable separable method,

Solution of a linear D E of the type $\dfrac{dy}{dx} + Py = Q$, Simple problems, Solution of D E of the type

$\dfrac{d^2 y}{dx^2} = f(x)$, Simple problems

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

TEXT BOOK:

Engineering Mathematics-II for polytechnic colleges by different authors.

REFERENCE BOOK:

   1. W.R Neelakanta   -   Applied Mathematics – Sapna Publications.

   2. Dr. D S Prakash   -   Applied Mathematics – S Chand Publications

   3. Calculus : One-Variable calculus Vol-I, 2edn. - Apostol,WILEY

COURSE TITLE   : ENGINEERING PHYSICS II
COURSE CODE   : 2003
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	Circular Motion and Rotational Dynamics.	1.1 - 1.4	12	1	13
II	Gravitation and Satellites.	2.1 - 2.6	8	1	9
III	Electromagnetism	3.1 - 3.3	12	1	13
IV	Modern Physics	4.1 - 4.9	9	1	10
	TOTAL		**41**	**4**	**45**

COURSE OUTCOME

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

- Create a clear cut understanding of various aspects of circular motion which is relevant to Engineering Science.

- Explain the Banking of roads and rails.

- Know the idea of a rigid body and its motion. It will impart the meaning of technical terms such as Moment of Inertia, Radius of gyration, axis of rotation, angular momentum and torque. He can also estimate various energies associated with rotation.

- Apply Equations of Translational and rotational motion in analysing rolling without slipping.
- Gather detailed ideas of Gravitational force and Acceleration due to gravity.
- Conceive introductory knowledge of different types of satellites.

- Derive technical terms such as Orbital velocity, Period, escape velocity of Satellites.
- Study orbital features of geostationary Satellites and its uses in everyday life.
- Study the orbital features of Polar Satellites and the uses of polar satellites.
- Get an overview of other types of satellites.
- Apply basic laws of Electricity and magnetism to solve simple problems concerning the motion and distribution of charges.
- Analyse complicated electrical circuits and find out currents through different branches and resistances in the circuit.
- Design simple electrical instruments using magnetic effect of electric current and understand how those devices can be used as multi range ammeters and voltmeters.
- Get basic ideas of the nature of light with special reference to quantum theory.
- Study quantitatively as well as qualitatively photoelectric effect.
- Derive Einstein's photoelectric electric equation.
- Get an overview of applications of photoelectric effect in various fields
- Understand the working of a Laser with special reference to Ruby laser, He-Ne gas laser and solid state laser with their merits and demerits.
- Introduction to various applications of Laser including communication.
- Create an awareness of nuclear fission and the working of nuclear reactors.
- Gather an introductory knowledge of nuclear fusion with special reference to energy production in stars.
- Impart an idea of alternative forms of energy sources.

SPECIFIC OUTCOME

MODULE - I   2.1 CIRCULAR MOTION AND ROTATIONAL DYNAMICS

2.1.1.   Understand the concept of circular motion.
2.1.2.   Define angular displacement and angular velocity.
2.1.3.   Derive the relation between linear velocity and angular velocity.
2.1.4.   Mention the expression for centripetal acceleration.
2.1.5.   Apply the Principle of centripetal force in the case of   banking of roads and rails.
2.1.6.   Solve the problems related to centripetal force.
2.1.7.   Understand the dynamics of rotating body.
2.1.8.   Define the moment of inertia of a rigid body.
2.1.9.   Define radius of gyration.
2.1.10.   State theorems of parallel and perpendicular axes.
2.1.11.   Define torque.
2.1.12.   Mention the relation between torque and angular momentum.
2.1.13.   Mention the expression for kinetic energy of rotation.

2.1.14. Derive the expression for moment of inertia of a uniform circular disc about an axis passing through its centre and perpendicular to its plane.

2.1.15. Derive expression for kinetic energy of a disc rotating on a horizontal plane.

2.1.16. Solve problems using above expressions.

MODULE – II   2.2 GRAVITATION AND SATELLITES

2.2.1. State Newton's law of gravitation.

2.2.2. Derive expression for orbital velocity, Period of satellite.

2.2.3. Define gravitational potential.

2.2.4. Mention expression for escape velocity.

2.2.5. Understand the idea of satellites.

2.2.6. Explain geostationary satellites and polar satellites.

2.2.7. Mention applications of geostationary and polar satellites.

MODULE - III   2.3 ELECTROMAGNETISM

2.3.1. Understand the terms electric charge and potential difference.

2.3.2. State Ohm's law

2.3.3. Explain the terms resistivity and conductivity.

2.3.4. Understand the law of resistances.

2.3.5. Understand the fundamentals of electricity and its magnetic effect .

2.3.6. State Kirchoff's laws.

2.3.7. Derive expression for balancing condition of wheatstone's Bridge.

2.3.8. State Biots and Savart's law.

2.3.9. Mention the expression for magnetic field due to current through a circular coil.

2.3.10. State Fleming's left hand rule.

2.3.11. Describe the principle and construction of a moving coil galvanometer.

2.3.12. Explain the conversion of galvanometer into ammeter and voltmeter

2.3.13. Solves problems based on the above laws.

MODULE - IV   2.4 MODERN PHYSICS

2.4.1. Understand laser action and its applications.
Explain population inversion, spontaneous emission, stimulated mission and optical pumping.

2.4.2. Write down the characteristics of Laser.

2.4.3. Describe various applications of Laser.

2.4.4. Explain the working of Ruby Laser, He –Ne laser.

2.4.5. Understand the advantage of gas laser over solid state laser.

2.4.6. Comprehend the theories of photoelectric effect

2.4.7. Describe Max plank's quantum theory.

2.4.8. Explain Photoelectric effect and application(photoelectric cell)

2.4.9.	State Laws of Photoelectric emission.
2.4.10.	Derive Einstein's photoelectric equation.
2.4.11.	Solve problems using the above equation.
2.4.12.	Understand nuclear fission and explain the working of nuclear reactors.
2.4.13.	Understand nuclear fusion and explain the energy production in stars.

CONTENT DETAILS

MODULE – I CIRCULAR MOTION AND ROTATIONAL DYNAMICS (13Hrs)

Angular displacement – angular velocity – angular acceleration – relation between linear velocity and angular velocity in circular motion – centripetal acceleration – centripetal force – banking of roads and rails – problems.

Rigid body – centre of mass - moment of inertia – radius of gyration – statement of parallel and perpendicular axes theorems – derivation of moment of inertia of a disc about an axis passing through the centre and perpendicular to its plane – angular momentum and torque – relation between torque and angular momentum (only expression) – rotational kinetic energy – kinetic energy of a disc rolling on a horizontal surface – problems.

MODULE- II GRAVITATION AND SATELLITES (9Hrs)

Newton's law of gravitation- Expression for acceleration due to gravity- Factors affecting the value of g- variation of acceleration due to gravity- satellites- Artificial satellites- orbital velocity and period of a satellite-gravitational potential –escape velocity- geostationary satellites and it's uses- polar satellites and it's uses - uses of artificial satellites

MODULE - III ELECTROMAGNETISM (13Hrs)

Electric charge – potential difference – Ohm's law – verification of Ohm's law – resistivity – conductivity – law of resistances – Kirchhoff's laws – Wheatstone's Bridge – Metre Bridge- magnetic effect of electric current—Biot-savart law-magnetic field due to a current carrying conductor- force on a current carrying conductor placed in a magnetic field- Moving Coil Galvanometer and its working – shunt- conversion of a galvanometer into an ammeter - conversion of a galvanometer into a voltmeter – problems.

MODULE - IV MODERN PHYSICS (10Hrs)

Quantum theory – photoelectric effect – experiment to illustrate photoelectric effect – laws of photoelectric effect – Einstein's photoelectric equation – applications of photoelectric effect – problems.

Laser – principle of laser – characteristics – Ruby laser and its working–gas laser – Helium Neon gas laser and its working – advantages of gas laser over solid state laser – applications of laser.

Nuclear fission – chain reaction – nuclear reactor and its working – uses – nuclear fusion.- alternative forms of energy sources.

REFERENCE BOOKS

1. Resnick and Halliday   -   Physics
2. D.S.Mathur   -   Mechanics
3. Narayana Kurup   -   Mechanics
4. Murukesan   -   Modern Physics
5. A.Marikani   -   Engineering Physics
6. M N Avadhanulu   -   An Introduction to Lasers- Theory and Applications
7. H D Young   -   University Physics

COURSE TITLE   **: ENGINEERING CHEMISTRY - II**
COURSE CODE   **: 2004**
COURSE CATEGORY   **: F**
PERIODS PER WEEK   **: 3**
PERIODS /SEMESTER   **: 45**
CREDITS   **: 3**

TIME SCHEDULE

Module	Topic	Periods
1	Atomic Structure II and Chemical bonding	11
2	Electrochemistry and Corrosion	12
3	Basic Organic Chemistry and Polymers	9
4	Fuels and Environmental Chemistry	9
	Theory	41
	Test	4
Total		**45**

COURSE OUTCOME

Student will be able to

- Enable the students to understand the latest concepts of atom model.
- Develop the basic theoretical concepts of orbitals and facts related to it. Develop the skill of writing electronics configuration of atoms.
- Introduce the concept of Chemical bonding and distinguish different types of chemical bond.
- Distinguish and justify different materials based on conductivity in Science and Technology
- Illustrate the mechanism of electrolysis with examples and to solve the problems related to electrolysis. Apply the concept of fuel cell in modern technology.
- Summarise the concept of corrosion and its after effects, solve the practical Problems related to it.
- Distinguish different types of refractories and glasses and apply this in industrial field.
- Compare, differentiate, explain, relate and extend the concept of polymers and polymerisation with examples.

- Understand, list and differentiate the concept of fuels, Identify and relate the impact of environmental pollution in daily life and to point out the remedial steps for it.

SPECIFIC OUTCOME

MODULE - I:

1.1.0   ATOMIC STRUCTURE – II AND CHEMICAL BONDING

1.1.1   Explain Bohr model of atom with merits and demerits

1.1.2   Explain dual nature of atom, deBroglie relation and Uncertainity Principle

1.1.3   Introduce the concept of orbit, orbital and quantum numbers with shapes of s
          and p – orbitals

1.1.4   Explain Aufbau principle, Pauli's exclusion principle and Hund's rule of maximum
           multiplicity

1.1.5   Illustrate Electronic configuration of atoms of elements up to atomic number 20

1.1.6   Understand the idea of chemical bonding using octet rule

 1.1.7   Explain different types of chemical bonds – Ionic bond, Covalent bond, Coordinate
          bond and Hydrogen bonding with examples.

MODULE - II

2.1.0 : ELECTROCHEMISTRY AND CORROSION

2.1.1. Distinguish between
             a) Conductors and Insulators
             b) Metallic and electrolytic Conductors
             c) Strong and Weak Electrolytes

2.1.2   Illustrate electrolysis taking molten NaCl and aqueous NaCl solution as examples

2.1.3   Explain qualitative and quantitative statement of Faradays laws of electrolysis.

2.1.4   Explain the applications of electrolysis (electroplating and anodizing)

2.1.5   Outline schematic representation of galvanic cell

2.1.6   Explain the classification of galvanic cell as primary, secondary and fuel cells

2.1.7   Illustrate primary cell with Daniel Cell as example

2.1.8   Explain the concept of fuel cell taking H_2-O_2 fuel cell with advantages and
            applications

2.1.9   Introduce the concept of electrode potential and EMF of cell

2.1.10 Explain Electrochemical Series with applications

2.1.11 Define Corrosion

2.1.12 Explain rusting of Iron and mention the conditions of rusting

2.1.13 Explain electrochemical theory of corrosion

2.1.14 Describe the methods of prevention of corrosion (Barrier Protection, Sacrificial
            Protection, Cathodic Protection and Antirust Solutions.)

MODULE - III :

3.1.0 CHEMISTRY OF MATERIALS AND POLYMERS
3.1.1   Understand the fundamental ideas of Organic Chemistry
3.1.2   List the differences between Organic and Inorganic Compounds
3.1.3   Describe Uniqueness of Carbon atom
3.1.4   Distinguish between Saturated and Unsaturated Compounds and introduce
          Concept of functional group
3.1.5   Understand the retractories with the classification and properties
3.1.6   Explain general properties and types of glasses – soda glass, Borosilicate glass,
          safety glass and Insulating glass with their Contents and Uses
3.1.7   List the uses and advantages of optical fibres
3.1.8   Understand the term polymers, and polymerization
3.1.9   Explain the Various Classification of polymers
3.1.10 Distinguish between Natural and Synthetic rubber
3.1.11 Explain Vulcanisation and its merits
3.1..12 Introduce Common polymers- Poly ethene, polypropene, polystyrene,
          PVC, Neoprene, Teflon, Buna-s, Buna-N, Nylon-6 ,Nylon-66 and Bakelilte with their
monomers and uses.

MODULE- IV

4.1.0: FUELS AND ENVIRONMENTAL CHEMISTRY
4.1.1   Understand the term fuel
4.1.2   Define Caloric Value
4.1.3   List the qualities of a good fuel
4.1.4   Explain the Classification into solid, liquid, gaseous and nuclearfuels with
          examples.
4.1.5   Explain preparation and properties of water gas and producer gas
4.1.6   Define cracking and distinguish between thermal and catalytic cracking
4.1.7   Introduce different regions of atmosphere
4.1.8   Recollect the terms Pollutant and Pollution
4.1.9   Understand different types of pollution – Air Pollution, Water Pollution
          and Soil   Pollution
4.1.10   Understand the terms – ozone depletion, green house effect and acid
          rain
4.1.11   Explain different types of smog
4.1.12   Understand the relevance of Green Chemistry
          (Principle and scope in the present scenario)

CONTENT DETAILS

MODULE - I :

Atomic Structure II and Chemical Bonding (11+1=12 hours)

Bohr Model of atom – Postulates, Merits and Demerits - Dual nature of matter – de Broglie relation – Uncertainty Principle – Concept of Orbit and Orbital – Quantum numbers – Sub energy levels (s,p,d,f) - shape of s and p orbitals.

Electronic Configuration of atom – Aufbau principle, Pauli's exclusion principle, Hund's rule of maximum multiplicity – electronic configuration of elements upto atomic number 20.

Chemical bonding – Octet rule – Electro negativity- Types of Chemical bonds - Ionic (Electrovalent) bond – Covalent bond, Coordinate bond and hydrogen bonding – Definition with two examples for each.

MODULE - II:

Electrochemistry and Corrosion (12+1=13 hours)

Classification of materials based on conduction – conductors, Semiconductors and Insulators – Definition with two examples each – Types of Conductors – Metallic and electrolytic conductors – Any four differences.

Electrolytes and Non - electrolytes – Definition with two examples – Strong and Weak Electrolytes – Definition with two examples -

Electrolysis – Definition – Electrolysis of molten NaCl and aqueous NaCl solution using Pt electrodes – Faraday's laws of electrolysis (Qualitative and Quantitative Statements only). Applications of electrolysis – Electroplating and Anodising – Any two differences – Electroplating of Nickel on mild steel – Anode, Cathode, electrolyte and half cell reactions – Electrochemical cell – Daniel cell – Representation of the cell – half cell and over all cell reactions – Primary and Secondary cells – definition and examples only – fuel cell – H_2-O_2 fuel cell – Cell reactions, advantages and applications – Electrode potential – standard electrode potential – EMF of cell – Electrochemical Series and its applications.

Corrosion – Definition and examples – rusting of iron Factors affecting rusting - conditions of rusting – Mechanism of rusting – Electrochemical theory – Types of Corrosion – Chemical and Electro chemical Corrosion – Prevention of Corrosion – Barrier Protection, Sacrificial Protection, Cathodic protection and Anti rust solutions.

MODULE - III:

Chemistry of Materials and Polymers (9+1=10 hours)

Introduction to organic chemistry – Differences between organic and inorganic compounds – Uniqueness of Carbon – Saturated and Unsaturated hydrocarbons –concept of functional group.
Refractories – Classification and properties – Glasses – General properties and types of glasses – Soda glass, Borosilicate glass, Safety glass and Insulating glass – Content and uses – Uses and advantages of Optical Fibres.

Polymers – definition – Classification of Polymers based on nature of monomers origin(source), structure, mode of synthesis and magnitude of intermolecular forces with two examples each – Natural rubber – Vulcanisation – Properties and merits – Common Polymers - monomers and uses – Polythene, Polypropene, Polystyrene, PVC, Neoprene, Teflon, Buna – S, Buna – N, Nylon-6, Nylon-66 and Bakelite.

MODULE - IV:

Fuels and Environmental Chemistry (9+1=10 hour)

Fuel - Definition – Calorific value – Qualities of a good fuel – classification of fuels – solid, Liquid, gaseous and nuclear fuels with three examples each – water gas and Producer gas – Preparation and Properties –Cracking – Thermal and Catalytic Cracking.

Environmental Chemistry - Regions of atmosphere – Pollutant and Pollution – Definition – Types of pollution – Air pollution, water pollution and Soil Pollution – Mention only major pollutants – Impact of Air Pollution – Ozone depletion, green house effect, acid rain and smog – Types of smog – Elementary ideas of green Chemistry.

REFERENCE :

Jain and Jain	Engineering Chemistry	Dhanpat Rai and Sons
S. S. Dara	Engineering Chemistry	S. Chand Publication
B. K Sharma	Industrial Chemistry	Geol Publication
S. S. Dara	Environmental Chemistry and Pollution Control	S. Chand Publication
	Wiley "All in One"	Wiley India Pvt. Ltd 2012 Editon.

COURSE TITLE   **: ENGINEERING GRAPHICS**

COURSE TITLE   **: ENGINEERING GRAPHICS**
COURSE CODE   **: 2005**
COURSE CATEGORY   **: F**
PERIODS/WEEK   **: 4**
PERIODS/SEMESTER **: 60**
CREDITS   **: 5**

TIME SCHEDULE

MODULE	TOPIC	PERIODS
1	Orthographic Projection	15
2	Sectional views and auxiliary views	15
3	Pictorial drawing	15
4	Visualisation and Development of surfaces	15
TOTAL		**60**

COURSE OUTCOME

After the completion of the course student will be able to

- o   Understand the orthographic projections of various objects
- o   Appreciate the sectional views of objects
- o   Appreciate the auxiliary views of objects
- o   Identify the pictorial drawings of various objects
- o   Understand the visualisation
- o   Understand the development of surfaces

SPECIFIC OUTCOME

MODULE - I

1.1.0 Understand the orthographic projections of various objects
    1.1.1   Apply principles of orthographic projection
    1.1.2   Explain the principle of orthographic projection with simple sketches
    1.1.3   Prepare an engineering drawing of a given simple engineering part in first angle projection only.
    1.1.4   Sketch (free hand) the orthographic views of simple objects
    1.1.5   Draw the orthographic views of an object, given its pictorial drawing
    1.1.6   Select the minimum number of views needed to represent a given object fully
    1.1.7   Identify the engineering part correctly from a number of orthographic drawings

MODULE - II

2.1.0 Appreciate the sectional views of objects
    2.1.1   Recognize the need of sectional views
    2.1.2   Explain the need to draw sectional views
    2.1.3   Select the section place for a given component to reveal maximum information
    2.1.4   Free hand sectional views of simple objects
    2.1.5   Draw the sectional views of simple engineering components
    2.1.6   Sketch simple sections (Full and half) for a range of simple engineering objects
    2.1.7   Select the component from a given sectional view
    2.1.8   Auxiliary views

2.2.0 Recognize the need of auxiliary views
    2.2.1   State whether the auxiliary view is needed, given an engineering drawing
    2.2.2   Draw the auxiliary views of a given engineering drawing

MODULE - III

3.1.0 Identify the pictorial drawing of various objects
    3.1.1   Prepare pictorial drawing
    3.1.2   Explain the need for and types of commonly used pictorial drawing
    3.1.3   Prepare isometric drawing of simple objects using appropriate construction procedure,   given   their appropriate drawing
    3.1.4   Sketch the isometric views of simple engineering objects given either[1] orthographic   drawing or actual components
    3.1.5   Prepare oblique drawing –Cavalier and cabinet –of simple engineering objects given either orthographic drawing or actual drawing
    3.1.6   Understand the visualisation
    3.1.7   Visualise and object in 3D, given its orthographic drawing
    3.1.8   Compare an engineering part with its drawing
    3.1.9   Identify surfaces with reference to orthographic drawing wing
    3.1.10 Prepare a model of the part, given its orthographic drawing

MODULE - IV

4.1.0 Understand the development of surfaces
    4.1.1   Prepare development of surfaces
    4.1.2   State the need for preparing the development drawing
    4.1.3   Prepare development of surfaces of simple engineering components

like tray, funnel, bucket and ducts(rectangular and squarehooper)

4.1.4   Prepare development of surfaces of surfaces of 90^0 elbow

4.2.0   Computer Aided Drafting

4.2.1   Introduction to CAD

4.2.3   Compare conventional drawing and CAD

4.2.4   Familiarisation of different CAD software

4.2.5   Application of CAD in engineering drawing

4.2.6   Opening of CAD

4.2.7   Setting of units and limits

4.2.8   Saving of drawing

4.2.9   Commands-draw commands- line, circle, arc, ellipse, polygon (2D primitives) hatch, modify, erase, move, rotate, copy, mirror, break ,trim, extent, scale, stretch, array fillet, chamfer, offset etc.

4.2.10 Dimensioning and text commands

4.2.11 Practice- Different methods of drawing lines

4.2.12 Absolute coordinate system

4.2.13 Relative coordinate system

4.2.14 Polar coordinate system

4.2.15 Direct distance entry

4.2.16 Rectangle, circle, ellipse,

4.2.17 Practice to draw orthographic views of simple objects and

4.2.18 familiarise with the above commands

CONTENT DETAILS

MODULE - I

1.1.0   Orthographic projection of objects
Explanation of the meaning of orthographic projection using a viewing box and a model-number views obtained need of only three views for displaying the object.
Concept front view - top view and side view-sketching these views for a number of engineering objects- explanation of the meaning of first angle and third angle projection – symbol of projection

MODULE - II
2.1.0   Sectional views of objects

Need for sectional drawing of an engineering object- selection of the section plane to reveal the maximum information – sectional views (full and half section) of simple engineering objects.

2.1.1 Auxiliary views

Need of auxiliary views – auxiliary views given engineering drawings

MODULE - III

3.1.0   Pictorial Drawing
 Isometric projections-construction of isometric scale-isometric projection of simple engineering object Oblique-cavalier-and cabinet projections of simple engineering Object

3.1.1   Visualization
 Preparation of pictorial view from a group of orthographic Drawing

MODULE - IV

4.1.0   Development of surfaces
 Development of surfaces of simple engineering components tray, funnel, bucket, duct (rectangular, square hooper) and 90^0 elbow

4.1.1 Computer Aided Drafting –
Introduction to CAD, Importance of CAD in engineering drawing- Applications

4.1.2 Opening CAD- setting and saving of drawing- CAD commands

4.1.3 Visualization Drawing with CAD- method of drawing straight line and simple figures.

TEXT BOOKS

1. Engineering Graphics - K. C Jon, PHI Learning Private Limited

2. Engineering Graphics - P. I. Varghese, VIP Publishers

REFERENCE BOOKS

1. Engineering Drawing - N D Bhatt

2. Engineering Graphics - Sageer & Abu

3 Engineering Drawing - M. B. Shah and B.C.Rana, Pearson Publications

4. Engineering Drawing & Graphics using Autocad – T.Jayapoovan,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

<u>Hand tools & Marking tools</u> – 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.

<u>Cutting tools</u> – 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**

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TITLE              : LIFE SKILL
COURSE CODE        : 2009
COURSE CATEGORY    : C
PERIODS/ WEEK      : 2
PERIODS/ SEMESTER  : 30
CREDIT             : 2
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COURSE OUTCOME:-

Providing direction for the next generation and equipping them for successful living.

Specific Outcome:

* To make students aware of their thinking styles and to enable them to convert thinking into performance

* To make students learn and practice the steps involved in time management

* To give training for positive thinking which will keep the students in a good stead at the time of crisis.

* To translate performance of skills into efficient habits

* To make students understand the concept and components of personality, thereby to apply the acquired knowledge to themselves and to march towards excellence in their respective academic careers.

* To bring out creativity and other latent talents with proper goal setting so that self-esteem gets enhanced.

* To train students in order to ground concepts/ideas in their own experience

* To give inputs on some of the important interpersonal skills such as group decision-making, negotiation and leadership skills.

  Introduce the basic concepts of body language for conflict management.

* To enable students to convert the conceptual understanding of communication into everyday practice.

* To help students understand the mechanism of stress particularly negative emotions such as anxiety, anger and depression for effective management.

MODULE	TOPIC	PERIODS
I	Self Awareness and Empathy Logical Thinking and Creative Thinking	8
II	Decision Making And Problem Solving	6
III	Effective Communication	8
IV	Inter Personal Relations Coping with Stress and Emotion	8
TOTAL		30

MODULE - I - Self Awareness and Empathy

Logical Thinking and Creative Thinking

Self Concept – SWOT Analysis – Self Growth – Goal Setting – Time Management - Personal Well Being – Empathy – Understanding –Empathy Acknowledgement – Psychological Hug – Empathetic Language – Thinking – Process, types and components – Learning – creativity – Creative Problem Solving Right and left Brain thinking – Generative thinking techniques – Synthesis – Thinking outside the box – Lateral thinking – Risk taking

MODULE - II   Decision Making and Problem Solving

Factors influencing Decision making – Values and Ethics – Emotional and physical considerations – Role conflict – Decision Making methods – Problem Solving – Process – Steps – Establishing frameworks, Analysing, evaluating options, and implementing solutions – Problem solving techniques

MODULE - III Effective Communication

Importance – Benefits – Levels/Dimensions - Barriers – Types – LRSW – Oral Communication – Non verbal communication, Body Language – Written Communication

MODULE - IV   Interpersonal Relationship - Coping with Stress and Coping with Emotion

Nature - Factors influencing IPR – Trust – Strategies – Johari Window – Transactional Analysis – Team work – Assertive communication
Stress – Nature, types – Personality and stress – Managing stress – Relaxation techniques – Improving attitudes – Emotions - Emotional competence – Components – Promoting EI – Anger Management

Text Books:

1. Barun K Mitra (Oxford) - Personality Development and Soft Skills
2. Gopalaswamy Ramesh & Mahadevan Ramesh (Pearson) - The ACE of Soft Skills Attitude, Communication and Etiquette for Success

COURSE TITLE   :   **PROGRAMMING IN C**
COURSE CODE   :   **2131**
COURSE CATEGORY   :   **Basic Engineering**
PERIODS/WEEK   :   **4**
PERIODS/SEMESTER   :   **60**
CREDITS   :   **4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Basic Programming Concepts in C	**15**
2	Functions and Pointers	**15**
3	One and Two-dimensional Arrays	**15**
4	Strings and Structures	**15**

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able :
1	1	To comprehend the basic programming concepts in C
2	1	To understand the use of functions and Pointers
3	1	To know and apply One and Two-dimensional Arrays
4	1	To understand Strings
	2	To understand Structures

Specific Outcomes:

Module I - Basic Programming Concepts in C

    1. To comprehend the basic programming concepts in C

        1.1   To know the C Character Set

        1.2   To describe the concept of Constants, Variable and Keywords

        1.3   To discuss C Instructions

        1.4   To know Control Instructions in C

        1.5   To know decision control structures

        1.6   To know logical operators

        1.7   To know conditional operators

        1.8   To know loop Control Structures

        1.9   To know Case Control Structure

Module II - Functions and Pointers

    2. To understand the use of Functions and Pointers

        2.1   To know Functions

        2.2   To discuss passing values between Functions

        2.3   To know scope rule of Functions

        2.4   To know Function declaration and Prototypes

        2.5   To know Pointers

        2.6   To know Recursion

        2.7   To understand Data Types

        2.8   To list and use Storage Classes

        2.9   To know features of C Preprocessor

        2.10 To know Macros

        2.11 To know File Inclusion

Module III - One and Two dimensional Arrays

    3.   To know and apply One and Two-dimensional Arrays

        3.1   To know Arrays

        3.2   To understand passing Array elements to a Function

        3.3   To know Pointers and Arrays

        3.4   To discuss Two-Dimensional Array

        3.5   To know Pointers and Two – Dimensional Arrays

        3.6   To know Array of Pointers

Module IV - Strings and Structures

    4.1 To understand Strings

        4.1.1 To know about strings

        4.1.2 To know about standard Library String Functions

        4.1.3 To know about Two- Dimensional Array of Characters

        4.1.4 To know array of Pointers to Strings

    4.2 To understand Structures

        4.2.1 To know about Structures

        4.2.2 To discuss Array of Structures

Module I- Basic Programming concepts in C

 Basics of C – The C Character Set – Constants, Variables and Keywords – Types of C Constants – Types of C Variables – C Key Words – C Instructions -Type Declaration - Arithmetic Instruction- Integer and Float Conversion – Type Conversion in Assignment – Hierarchy of Operations - Associativity of operations – Control Instructions in C – The if Statement- Multiple statements within if- The if-else statement- Nested if-else- Use of logical operators- Hierarchy of logical operators- Conditional Operators – Loop Control structures – The while loop-The for loop- Nesting of Loops – Break Statement – The continue statement – The do-while loop – Case Control Structures – Decisions using Switch – The goto statement.

Module II- Functions and Pointers

Function –Usage of Functions – Passing values between Functions – Scope rule of Functions – Function declaration and prototypes – Call by value and Call by reference- Introduction to Pointers – Pointer Notation – Function Calls-Recursion – Recursion and Stack – Adding Functions to Library.
Data types – Integers, Long and Short, Signed and Unsigned – Characters, Signed and Unsigned- Float and Double – Storage classes in C – Automatic, Register, Static, External – Features of C Preprocessor – Macros with Arguments – Macros versus Functions- File inclusion

Module III – One and Two dimensional Arrays

Arrays – Array Initialization – Bounds Checking – Passing Array elements to a Function – Pointers and Arrays – Passing an entire Array to Function – Initializing a Two Dimensional Array – Memory map of Two Dimensional Array -Pointers and Two Dimensional Arrays –Pointer to an Array – Passing Two Dimensional Array to a Function - Array of Pointers

Module IV – Strings and Structures

Strings- Standard Library String Functions – strlen(),strcpy(),strcat(),strcmp() - Two-Dimensional Array of Characters- Array of pointers to Strings
Structures – Use of Structures – Declaring a structures – Accessing Structure elements- Array of Structures

Text Book(s):
 1. Let Us C – Yashavant Kanetkar, BPB Publications, 13th Edition.

References:
 1. Programming in ANSI C, E.Balagurusamy, TataMc-Graw Hill, 3ʳᵈ Edition.
 2. A Text Book on C ,E.Karthikeyan ,PHI Private Limited, 2008.
 3. Programming in C D.Ravichandran, New Age International Publishers, 2011.
 4. The C Programming Language, **Brian Kernighan and Dennis Ritchie, Prentice Hall , 2 Edition.**

Web Site :
http://freecomputerbooks.com/The-C-Programming-Language.html

COURSE TITLE	:	PROGRAMMING IN C LAB
COURSE CODE	:	2139
COURSE CATEGORY	:	BASIC ENGINEERING
PERIODS/WEEK	:	3
PERIODS/SEMESTER	:	45
CREDITS	:	2

Hardware Requirement : Desk Top Computer.

Software Requirement : : Linux Operating System with GCC

Course General Outcomes:

At the end of the Course, the students will be able to
- Develop the logic to solve the given problem.
- Understand the concepts of constants, variables, data types and operators.
- Develop programs using input and output operations.
- Write programs using decision control structures in C.
- Write programs using loop control structures in C.
- Write programs using case control structures in C.
- Write programs based on arrays.
- Write Programs using string handling functions.
- Write programs using user-defined functions,
- Write programs using structures
- Write programs using the concept of Pointers.

List of Experiments

1. **To apply programming concepts in C**
    a. Demonstrate output functions and input function for a simple application.
    b. Write programs for simple expression evaluation.

Create a Sample application   for inputting details such as regno, branch code, semester and 5 marks of a student, calculate and display total mark along with student details.
    c. Write programs using simple if statement.
    d. Write programs using if..else, elseif and nested if.
    e. Write programs using switch statement.

*Sample Experiment :: Modify the sample application to calculate and display the **grade** based on the total mark along with student details.*

1. **To apply Looping controls and arrays**
    a. Write programs using while, do..while and for statements.

Sample Experiment :: Modify the sample application to calculate and display the details along with the total mark and grade of 'n' number of students.

b. Write programs using one dimensional array.

c. Write programs to perform one dimensional operations like

Insert, delete, search, sort, largest, smallest, second largest, and compute sum and

average of array elements

d. . Write programs using two dimensional arrays.

e. Write programs to perform two dimensional array operations like

Transpose of a matrix, checking of symmetric matrix, sum of elements of matrix, row sum,

column sum, sum of diagonal elements, matrix addition, matrix multiplication

Sample Experiment :: Modify the sample application to store the details of 'n' students into multiple arrays, calculate and display the total mark along with the student details in the order of total mark.

3. To apply Pointers and Strings

1.12   Write programs to apply pointers
1.13   Write programs for string manipulations
Sample Experiment :: Modify the sample application to store the details of 'n' students with following data elements regno, name (character array), branch, semester and 5 marks (integer array) and display student details along with total mark and grade based on boundary conditions.

4. To apply Functions

a. Write simple programs based on library functions
b.   Write programs to illustrate 'User-defined functions"
c.   Write Function subprograms using arrays and pointers
d. Write Function subprograms to illustrate array as argument
e. Write Function subprograms to Illustrate pointers as arguments
Sample Experiment :: Modify the sample application to store the details of n number of students in multiple arrays with following data elements – regno, name, branch, semester and 5 marks and display the student details along with total mark and grade based on boundary condition. Use function for grade calculation. Display the output with proper headings and format.

f. Write programs to illustrate structure

Sample Experiment :: Modify the sample application by creating a structure named student_details and display above mentioned students details.