Programme : Diploma in CE/EE/ET/ ME/MT/CM/IT
Programme Code : 01/02/03/04/05/06/07/15/16/17/18/19
Name of Course : English
Course Code : HU 161

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**02**	**32**
Practical	**02**	**32**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	**Two class tests each of 60 minutes.**	**03 Hrs.**	--	--	--
Marks	**20**	**80**	--	--	**25**

Course Rationale:

This is been noticed that diploma pass outs lack in grammatically correct written and oral communication in English. It is also been noticed that communication is not a problem of students, communication in correct English is the basic problem of diploma pass outs. Students will have to interact in this language so far as their career in industry is concerned. In order to enhance this ability in students English is introduced as a subject to groom their personality.

Course Objectives:

After studying this course, the student will be able to

- Comprehend the given passage.
- Answer correctly the questions on seen and unseen passages.
- Increase the vocabulary.
- Apply rules of grammar for correct writing.
- Speak correct English.

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Weigh tage
1.	**Part I: GRAMMAR**			
	1.1	Tenses: Past Perfect, Past Perfect Continuous	**12**	**20**
	1.2	Types of Sentences: Simple, Compound And Complex.		
	1.3	Verbs		
	1.4	Reported Speech: Complex Sentences		
	1.5	Uses of 'too' and 'enough': Conversion and synthesis		
	1.6	Modal Auxiliary: Will, shall, can, could		
	1.7	Articles		
	1.8	Prepositions		
	1.9	Linking words		
	1.10	Affirmative, negative, interrogative		
	1.11	Question tag		
	1.12	Conjunctions		
	1.13	Interjections		
2.	**PART II: PARAGRAPH WRITING**			
	2.1	Types of paragraphs (Narrative, Descriptive, Technical)	**04**	**10**
	2.2	Unseen passage for Comprehension.		
3.	**PART III: PHONETICS**			
	3.1	Consonants	**04**	**10**
	3.2	Vowels		
	3.3	Diphthongs		
4.	**PART IV**			
	4.1	Comprehension – Responding to the questions from the text.	**12**	**40**
	4.2	Vocabulary: Understanding meaning of new words from the text and use of such words in sentences.		
	(Yuvakbharati- A Course Book in English) **(**Selected topics: Unit One-1/3/4, Unit Two- 1/2/4 & Unit Three)			
		Total	**32**	**80**

List of Practicals/Experiments/Assignments:

Sr. No.	Name of Practical/Experiment/Assignment	Hrs
1.	Building of Vocabulary - 2 assignments 25 new words for each assignment with sentence	**04**
2.	Conversational Skills - Role play Student will perform the role on any 6 situations. Dialogue writing for the given situations.	**04**
3.	Grammar - 2 assignments	**04**
4.	Write paragraphs on given topics. 2 assignments	**04**
5.	Errors in English 2 assignments Find out the errors and rewrite the sentences given by the teacher.	**04**
6.	Essay writing 2 assignments. Write 2 essays on topic given by the teacher	**04**
7.	Phonetics. 2 assignments. Phonetic transcription of words.	**02**
8.	Biography (Write a short biography on your role model approximately in 250-300 words)	**04**
9.	Idioms and phrases Use of idioms and phrases in sentences (20 examples)	**02**
	Total	**32**

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1	PART I: GRAMMAR	Class room Teaching
2	PART II: : PARAGRAPH WRITING	Class room Teaching
3	PART III: PHONETICS	Class room Teaching
4	PART IV: COMPREHENSION OF TEXT	Class room Teaching

Text Books:

Sr. No	Author	Title	Publication
1.	Yuvakbharati	A Course Book in English.	---

Reference Books:

Sr. No	Author	Title	Publication
1.	J.D.O. Connors	Better English Pronunciation	London Cambridge University Press ELBS
2.	Geofrey Leech	A Communicative Grammar of English	Essex Longman Group Ltd.: ELBS
3.	Randolf Quirk	University Grammar of English	Essex Longman Group Ltd.: ELBS
4.	--	Spectrum- A Text Book on English (To be referred by students to improve comprehension ability)	MSBTE

Learning Resources:

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	PART I: GRAMMAR	--	10	10	20
2.	PART II: PARAGRAPH WRITING	--	05	05	10
3.	PART III: PHONETICS	--	--	10	10
4.	PART IV: COMPREHENSION OF TEXT	--	30	10	40
	Total	--	**45**	**35**	**80**

(Prof. M.A. Surdikar) **(Prof. S. B. Kulkarni)** **(Prof.R.M.Adhav)**

Prepared By **Secretary, PBOS** **Chairman, PBOS**

Programme : Diploma in CE/EE/ET/ MT/CM/IT
Programme Code : 01/02/03/05/06/07/15/16/17 /19
Name of Course : Communication Skills
Course Code : HU162

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**02**	**32**
Practical	**02**	**32**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Two Class Tests each of 60 Minutes + One Oral Compulsory	**03 Hrs.**	--	--	--
Marks	**20**	**80**	--	--	**25**

Course Rationale:

Classified under human sciences this subject is intended to introduce students with the process of communication so that they can identify conditions favourable to effective communication. They will also be taught basic and applied language skills viz. listening, speaking, reading and writing – all useful for the study of a technical course and communication. Specifically, writing and oral presentation skills are two top ranking capabilities needed for professional careers and must be developed systematically.

Course Objectives:

After studying this course, the student will be able to

- Understand and use the basic concepts of communication and principles of effective communication in an organized set up and social context.

- Give a positive feedback in various situations to use appropriate body language & to avoid barriers for effective communication.
- Write the various types of letters, reports and office drafting with the appropriate format.
- Communicate with the Industry Professionals.

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Weightage
1.	**Basic Concepts And Principles Of Communication**			
	1.1	**The Communication Event** The communication event : Definition The elements of communication: the sender, receiver, message, channel, feedback and context.	**12**	**24**
	1.2	**The communication Process** The Communication process: definition Stages in the process: defining the context, knowing the audience, designing the message, encoding, selecting proper channels, transmitting, receiving, decoding and giving feedback.		
	1.3	**Principles of Effective communication** Effective Communication: definition Communication Barriers and how to overcome them at each stage of communication process. Developing effective message: thinking about purpose, knowing the audience, structuring the message, selecting proper channels, minimizing barriers and facilitating feedback.		
2.	**Organizational Communication**			
	2.1	What is an organization? Goal, structure, hierarchy. Patterns of communication: Upward, Downward, Horizontal and Grapevine	**04**	**12**

3.	**Non-verbal Communication**			
	3.1	Non Verbal Codes: Kinesics (eye- contact, gestures, Postures, body movements and facial expressions) Proxemics (using space), Haptics (touch), Vocalics (aspects of speech like tone, emphasis, volume, pauses etc.) Physical Appearance, Chronemics (manipulating time), Silence .	**06**	**12**
4.	**Business Correspondence and Office Drafting**			
	4.1	Business Correspondence: Letter of Enquiry, Order letter, Complaint Letter and Adjustment letter.	**10**	**32**
	4.2	Report Writing: Feasibility report/ Survey Report, Accident Report and Progress Report.		
	4.3	Office Drafting: Circular, Notice and Memo.		
	4.4	Job Application with Resume.		
		Total	**32**	**80**

List of Practicals/Experiments/Assignments:

Sr. No.	Name of Practical/Experiment/Assignment	Hrs
1.	Self Introduction	**02**
2.	Elocution	**04**
3.	Extempore	**04**
4.	Mock Interview	**04**
5.	Debate	**02**
6.	Variety Applications/Reports.	**02**
7.	Writing Paragraphs on Technical Subjects	**02**
8.	Business letters	**02**
9.	Individual/Group Presentation on identified Topics	**02**
10.	Group Discussion	**02**
11.	Role Play	**06**
	Total	**32**

Text Books:

Sr. No	Author	Title	Publication
1.	MSBTE	Communication Skills	MSBTE

Reference Books:

Sr. No	Author	Title	Publication
1.	Joyeeta Bhatacharya	Communicaion Skills	Macmillan Co.
2.	Sarah Freeman	Written Communication in English	Orient Longman Ltd.
3.	Krishna Mohan and Meera Banerji	Developing Communication Skills	Macmillan India Ltd.

Learning Resources: Nil

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Basic Concepts and Principles of Communication	08	08	08	24
2.	Organizational Communication	04	04	04	12
3.	Non Verbal Communication	--	--	12	12
4.	Business Correspondence and Office Drafting	--	--	32	32
	Total	**12**	**12**	**56**	**80**

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(Prof. R.M. Adhav)
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Programme : Diploma in CE/EE/ET/ ME/MT/CM/IT
Programme Code : 01/02/03/04/05/06/07/15/16/17/18/19
Name of Course : Applied Mathematics – I
Course Code : SC 161

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**03**	**48**
Practical/Tutorial	**01**	**16**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Three Class Tests each of 60 Minutes	**03 Hrs.**	--	--	--
Marks	**20**	**80**	--	--	--

Course Rationale:

The students of Diploma in Engineering and technology must acquire some essential competencies in Mathematics.

Course Objectives:

- The students will be able to think logically and systematically. They will learn the importance of accuracy and develop attitude of problem solving with diligence and perseverance.

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Weightage
1.	**Algebra**			
	1.1	**Determinants**: Determinants of second and third orders, solution of simultaneous equations in two and three unknowns (Cramer's method), Properties of determinants of order 3 and examples.	**04**	**06**
	1.2	**Partial fractions**: Rational fractions, resolving given rational fraction into partial fraction (Type : Denominator containing non-repeated, repeated linear factors and quadratic factor non repeated)	**04**	**06**
	1.3	**Matrix Algebra** - Definition of a matrix, types of matrices, Equal Matrices, Addition, subtraction, multiplication of matrices. Scalar multiple of a matrix. Transpose of a matrix, Singular and Non singular Matrix. Adjoint of a square matrix. Inverse of a matrix. Solution of simultaneous linear equations in 3 unknowns	**04**	**06**
	1.4	**Binomial Theorem** Definition of factorial notation, definition of permutation and combinations with formula, Binomial theorem for positive index, General term, Binomial theorem for negative index, Approximate value (only formula)	**04**	**06**
2.	**Trigonometry**			
	2.1	Trigonometric ratios and fundamental identities.	**04**	**08**
	2.2	Trigonometric ratios of allied angles, compound angles, multiple angles (2A, 3A), sub multiple angle.	**06**	**08**
	2.3	Sum and product formulae.	**06**	**08**
	2.4	Inverse Circular functions. (Definition and simple problems)	**04**	**08**

3.	**Coordinate Geometry**			
	3.1	**Point and Distances** Distance formula, Section formula, midpoint, centroid of triangle. Area of triangle and condition of co linearity	**03**	**08**
	3.2	**Straight Line** Slope and intercept of straight line. Equation of straight line in slope point form, slope-intercept form, two-point form, two-intercept form, normal form. General equation of line. Angle between two straight lines condition of parallel and perpendicular lines. Intersection of two lines. Length of perpendicular from a point on the line and perpendicular distance between parallel lines	**05**	**08**
	3.3	**Circle** Equation of circle in standard form, centre – radius form, diameter form, two – intercept form. General equation of circle, its centre and radius.	**04**	**08**
		Total	**48**	**80**

List of Practicals/Experiments/Assignments:

Sr. No.	**Name of Practical/Experiment/Assignment**	**Hrs**
	Problems on following topics	
1.	Determinants	**02**
2.	Partial fractions	**01**
3.	Matrix Algebra	**02**
4.	Binomial Theorem	**02**
5.	Trigonometric ratios and fundamental identities	**01**
6.	Trigonometric ratios of allied angles, compound angles, multiple angles (2A, 3A), sub multiple angle.	**02**
7.	Sum and product formulae.	**01**
8.	Inverse Circular functions. (Definition and simple problems)	**01**
9.	Point and Distances	**01**
10	Straight Line	**02**
11.	Circle	**01**
	Total	**16**

Text Books:

Sr. No	Author	Title	Publication
1.	Shri.G.V.Kumbhojkar	Engineering Mathematics	Phadke Publication,Kolhapur
2.	Shri.Patel & Rawat	Engineering Mathematics	Nirali Prakashan

Reference Books:

Sr. No	Author	Title	Publication
1.	Shri S.P. Deshpande	Mathematics for Polytechnic Students	Pune Vidyarthi Griha
2.	Shri S.L. Loney	Plane Trigonometry	Macmillan and London
3.	Shri H.K. Dass	Mathematics for Engineers (Vol-I)	S.Chand and Comp.
4.	Shri Shantinarayan	Engg. Maths Vol-I and Vol-II	S. Chand and Comp.

Learning Resources: Chalk, Board etc

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Algebra	06	10	08	24
2.	Trigonometry	08	16	08	32
3.	Co-ordinate Geometry	06	10	08	24
	Total	**20**	**36**	**24**	**80**

(Prof. R.A.Pawar)
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Programme : Diploma in CE/EE/ET/ ME/MT/CM/IT
Programme Code : 01/02/03/04/05/06/07/15/16/17/18 /19
Name of Course : Applied Mathematics – II
Course Code : SC162

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**03**	**48**
Practical	**01**	**16**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Three Class Tests each of 60 Minutes	**03 Hrs.**	--	--	--
Marks	**20**	**80**	--	--	--

Course Rationale:

This subject intends to teach students basic facts, concepts, principles and procedure of Mathematics as a tool to analyze Engineering problems and as such it lays down foundation for the understanding of engineering science and core technology subjects.

Course Objectives:

After studying this course, the student will be able to

- Under stand basic facts of Mathematics about the field of analysis of any Engineering problem.
- Know the standard ways in which the problem can be approached.
- Apply basic concepts to engineering problems.

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Weightage
1.	**Functions and Limits**			
	1.1	Functions: Concept of functions, Types of functions; (only definitions)	**02**	**04**
	1.2	Limits: Concept of limits and limits of functions. (algebric, trigonometric, Logarithmic and exponential.)	**08**	**12**
2.	**Derivatives**			
	2.1	Definition of the derivative, derivatives of standard Functions.	**03**	**04**
	2.2	Differentiation of sum, difference, product and quotient of two or more functions	**03**	**04**
	2.3	Differentiation of composite, inverse, implicit functions.	**04**	**06**
	2.4	Differentiation of parametric exponential and logarithmic Functions.	**04**	**06**
	2.5	Successive differentiation.	**02**	**04**
3.	**Applications of Derivatives**			
	3.1	Geometrical meaning of derivative (Equations of tangents and Normals)	**04**	**08**
	3.2	Maxima and minima of functions.	**02**	**04**
4.	**Integration**			
	4.1	Definitions, standard formulae, integration of algebraic sum of two or more functions, integration by substitutions and by trigonometric , transformations, integration of $\sqrt{ax2+ bx+c}$, $1/\sqrt{ax2+ bx+c}$, integration by parts, integration by partial fractions.	**12**	**20**
5.	**Definite Integrals**			
	5.1	Definition and properties of definite integrals Example based on these properties	**06**	**12**
		Total	**48**	**80**

List of Practicals/Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment	Hrs
	Problems on following topics	
1.	Functions	01
2.	Limits	02
3.	Derivatives	04
4.	Applications of Derivatives	01
5.	Integration	06
6.	Definite Integrals	02
	Total	**16**

Text Books:

Sr. No	Author	Title	Publication
1.	S.P. Deshpande	Mathematic for polytechnic students I and II	Pune Vidyarthi Griha Prakashan
2.	G.V.Kumbhojkar	Applied Mathematics	Phadke Prakashan,Kolhapur
3.	Patel & Rawal	Applied Mathematics	Nirali Prakashan

Reference Books:

Sr. No	Author	Title	Publication
1.	Vishwanath	Engineering Mathematics Vol.I	Satya Prakashan, New Delhi
2.	H.K. Dass	Mathematics for Engineering Vol-I	S.Chand and Company
3.	Shantinarayan	Engineering Mathematics vol-I and II	S.Chand and Company

Learning Resources: Chalk, Board etc

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Function and Limits	04	06	06	16
2.	Derivatives	08	16	00	24
3.	Applications of derivatives	00	00	08	08
4.	Integration	06	10	04	20
5.	Definite Integrals	04	04	04	12
	Total	**22**	**36**	**22**	**80**

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Programme : Diploma in ET/ CM/ IT
Programme Code : 03/ 06/ 07/17
Name of Course : Applied Physics
Course Code : SC163

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**03**	**48**
Practical	**02**	**32**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Three Class Tests each of 60 Minutes	**03 Hrs.**	**03 Hrs.**	--	--
Marks	**20**	**80**	**50**	--	--

Course Rationale:

The development of various engineering topics is primarily based on the fundamental principles. The different principles of physics have a wide range of applications in all the braches of engineering. A reasonably good level of knowledge of physics, therefore, forms sound base for engineering students. Physics can be considered as a basic tool in the hands of an engineer through which he can purse his studies and research work in technical field. The foundation level of the subject acquired by the student is kept in mind for selection of the topics. To create interest in the students more stress is given on the applications, in engineering field.

Course Objectives:

- To appreciate the role of fundamentals of Physics in different branches of Engineering.
- To think in scientific manner and apply the knowledge gained in different situations.

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Weightage
1.	**General Physics**			
	1.1	**Units and Measurement:** Need of measurement, Unit of Physical Quantity, Requirements of standard unit, systems of unit, classification of physical quantities into fundamental and derived. Examples of conversion of unit.	**04**	**04**
	1.2	**Errors:** Instrumental, systematic and random error. Definition, Explanation, Examples.		
2.	**Sound**			
	2.1	Wave motion, Transverse and longitudinal waves ree and Forced vibrations, Resonance –explanation and example. Revision on reflection of sound, explanation of echo and reverberation of sound, absorption, reflection and transmission of sound, reverberation time (Sabine's formula), Acoustics ,factors affecting acoustical planning of building requirements of good acoustics, unit of audibility, decibel, simple problems.	**04**	**06**
3.	**Heat**			
	3.1	**Temperature measurements**: Thermometers-Mercury, Bimetallic, Pyrometer, Thermocouple, Platinum resistance and Thermister thermometers-**their principle and working**	**03**	**06**
4.	**Light**			
	4.1	Introduction to reflection and refraction of light, Snell's law, physical significance of refractive index, Total internal refraction of light, critical angle, simple problems.	**08**	**12**
	4.2	**Fiber optics** : Propagation of light through optical fiber, numerical aperture, types of optical fibers, methods of production, applications and comparison with electrical cable		
	4.3	**LASER :** Definition, spontaneous and stimulated emission, population inversion, He-Ne laser, construction and working, applications of LASER.		

	4.4	**Electro magnetic spectrum:** spectrum**,** origin of spectrum, electromagnetic spectral range, type of spectra, line, band and continuous spectra and their significance, applications of spectra.		
5.	**Electrostatics**			
	5.1	**Electric charge,** Coulomb's law of charges, unit charge, field, intensity of electric field, electric lines of forces (properties) electric flux, flux density.	**07**	**12**
	5.2	**Electric potential:** explanation, definition**,** potential due to a point charge, potential due to a charged sphere, absolute electric potential, expression for potential difference between two points. Simple problems.		
	5.3	**Electric condenser:** Concept, capacity of condenser, unit, Principle of condenser, series law and parallel law of condenser, simple problems. Applications of condensers.		
6.	**Current Electricity**			
	6.1	**Concept of resistance**, Specific resistance, Whetstone's network, meter bridge, balancing condition of meter bridge, measurement of unknown resistance using meter bridge. Problems.	**08**	**12**
	6.2	**Potential**, Potential drop along the length of wire, principle of potentiometer, potential gradient, E.M.F. unit, comparison of E.M.F using potentiometer.		
	6.3	**Electric work**, electric power, energy, units and calculations of electric bill.		
7.	**Thermo electricity**			
	7.1	Thermo couple, materials for thermocouples, Seeback effect, Peltier effect, variation of thermo e.m.f. with temperature, Thermo electric series, Law of intermediate temp. Uses of thermocouple.	**01**	**02**

8.	**Electromagnetism**			
	8.1	Magnetic effect of electric current, Ampere's rule, Intensity of magnetic field, magnetic Induction, relation between B and H, Biot and SavertLaw (Laplace's Law), Fleming's left hand rule, Force Experienced by current carrying straight conductor placed in magnetic field. Principle of galvanometer. Problems.	**04**	**08**
9.	**Magnetism**			
	9.1	Domain theory of magnetism, Intensity of magnetic field. Magnetic lines of forces (properties). Type of magnetic materials, para, dia and ferromagnetic substances – their properties and applications.	**02**	**04**
10.	**Modern Physics**			
	10.1	**Semiconductor**s- intrinsic, extrinsic, doping, p and n type semiconductors, electrical conduction through p and p semiconductors **Band theory** of solids, semiconductor, metal and insulator, temperature effect on the conductivity of semiconductors.	**07**	**14**
	10.2	**X- ray's;** production, properties and industrial applications.		
	10.3	**Ultrasonic** and infrasonic waves, properties and industrial applications..		
	10.4	**Nondestructive testing** methods - M.P.T., L.P.T (advantages and disadvantages), X rays, radiographic, ultrasonic		
	10.5	Introduction to Nanotechnology, methods and applications.		
	10.6	Introduction to superconductivity - properties and uses.		
		Total	**48**	**80**

List of Practicals/Experiments/Assignments:

Sr. No.	Name of Practical/Experiment/Assignment	Hrs
1.	Use of vernier calliper to measure the dimensions of different objects.	02
2.	To understand the concept of error in instrument and to measure the dimensions of different objects using micrometer screw gauge.	02
3.	To understand the concept of resonance and to determine the velocity of sound using resonance tube method.	02
4.	Measurement of unknown temperature using thermocouple.	02
5.	Measurement of unknown temperature using platinum resistance thermometer.	04
6.	To determine the refractive index using spectrometer.	02
7.	To determine the specific resistance using Ohm's law.	02
8.	To understand the concept of Whetstone's network and to determine the specific resistance using the meter bridge.	02
9.	To study the principle of potentiometer.	02
10.	To verify Ampere's rule using Orested experiment and find the variation of intensity of magnetic field with current and distance.	02
11.	To determine the forbidden gap in semiconductors.	02
12.	To verify series/parallel law of condensers.	04
13.	Measurements using light	04
	Total	**32**

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1.	General Physics	Class room Teaching, Demonstration, Models
2.	Sound	Class room Teaching, Demonstration, Models, Expert Lectures, Visits
3.	Heat	Class room Teaching, Demonstration, Models
4.	Light	Class room Teaching, Demonstration, Models, Expert Lectures, Visits
5.	Electrostatic	Class room Teaching, Demonstration, Models
6.	Current Electricity	Class room Teaching, Demonstration, Models, Expert Lectures, Visits
7	Thermoelectricity	Class room Teaching, Demonstration, Models, Expert Lectures, Visits

8	Electromagnetism	Class room Teaching, Demonstration, Models, Expert Lectures, Visits
9	Magnetism	Class room Teaching, Demonstration, Models, Expert Lectures, Visits
10	Modern Physics	Class room Teaching, Demonstration, Models,

Text Books:

Sr. No	Author	Title	Publication
1.	R.K. Gaur and S. L. Gupta	Engineering Physics	Dhanpal Rai and Sons Publications
2.	Manikpure, Prakash Deshpande and Dagwar	Basic Applied Physics.	S. Chand and Co. New Delhi.

Reference Books:

Sr. No	Author	Title	Publication
1.	Modern Physics	Text book in Physics for diploma Engg. Student.	Sony Publications Pvt. Ltd.
2.	Applid Physics	Schum's Series.	
3.	Kshirsagar, Avdhanalu-	Engineering Physics	

Learning Resources:

Chart , Black Board, Television, Internet, Educational CD's 6. Models, Experimentation, Diagram Demonstration Chalk, Board etc

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1	General Physics	2(3)	1(2)	1(1)	4(6)
2	Sound	3(4)	2(3)	1(2)	6(9)
3	Heat	3(4)	2(3)	1(2)	6(9)
4	Light	6(9)	4(6)	2(3)	12(18)
5	Electrostatic	6(9)	4(6)	2(3)	12(18)
6	Current Electricity	6(9)	4(6)	2(3)	12(18)
7	Thermoelectricity	1(2)	---	1(1)	2(3)
8	Electromagnetism	3(5)	3(5)	2(2)	8(12)
9	Magnetism	2(3)	1(2)	1(1)	4(6)
10	Modern Physics	5(8)	5(8)	4(5)	14(21)
	Total	**37**	**26**	**17**	**80**

(Prof. Dr. A. U. Warad)
Prepared By

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Programme : Diploma in ET/CM/IT
Programme Code : 03 / 06 /07 /17
Name of Course : Applied Chemistry
Course Code : SC165

Teaching Scheme:

	Hours /Week	Total Hours
Theory	**02**	**32**
Practical	**02**	**32**

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Two class tests , each of 60 Min. duration	03 Hrs	03 Hrs	---	---
Marks	**20**	**80**	**50**	---	---

Course Rationale:

Material Science is the science that investigates the composition and structure of matter, the changes that matter undergoes, the amount and kind of energy necessary for these changes, and the law that govern the changes.

Applications of Material Science and Chemical Principles have resulted into the Development of new materials used in modern medicines and automobiles, synthetic fibers polymers, alloys, new energy sources and many other important products and processes.

Hence, Material Science is an important and expanding branch in scientific engineering and economic field of our society.

Thus the principles of Material Science have a wide application in all the branches of engineering and technologies.

In this syllabus, the coverage of various topics will orient the students to appreciate the principles Material Science in the fields of engineering and Technology. The topic microstructure includes the basic structure of matter, which governs the Mechanical,

Electrical and Magnetic properties of the matter. Steels, alloys, plastic resins and Elastometers are included in the syllabus considering their present extensive use in automobiles, chemicals and heavy engineering industries.

Course Objectives:

- Develop interest in the fundamental structure of matter, which governs the properties of matter.
- Apply principles of chemistry, to Engineering situations.
- Understand applications of basic concepts in chemistry.
- Appreciate effect of chemical changes.
- Understand various Chemical Technology processes.

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Weigh tage
1.	**Introduction to Material Science**			
	1.1	**Atomic Structure and Chemical bonding –** Fundamental particles, Electronic configuration, Atomic Orbital, Main and sub energy levels, Quantum Numbers and their significance, formation of molecules, electrovalent and ionic Bonds, Covalent Bonds, Nuclear stability, mass defect Nuclear fusion, fission.	**04**	**10**
	1.2	**Introduction to crystal structu**re- Unit cell, , seven systems, closed packed structures, hexagonal closed packed structure, cubic close packed structure, body-centered cubic structure and explanation of metallic properties based on these structure. Inter Atomic Distances and Ionic Radii Correlation between Crystal structure and properties.		

2.	**Electrochemistry**			
	2.1	**Introduction** Definition of electrolyte ,metallic and electrolytic conduction degree of ionization ,factors affecting degree of ionization, conductivity of electrolytes Mechanism of electrolysis Activity series Electrolysis of H_2SO_4, KCl with platinum electrodes. NaCl fused and NaCl (aq) $CuSO_4$ solution with Pt electrodes and Cu electrodes.	**06**	**15**
	2.2	**Faraday's law of electrolysis.** Statements, Numerical examples based on Faraday's laws of electrolysis.		
	2.3	**Some electrochemical cells and cell reaction such as** i) Voltaic cells, chemical cell, concentration cell, reversible and irreversible cells. ii) Daniel cell with porous vessel and salt bridge. Concept of electrode potential, standard electrode potential (E^O), significance of oxidation –reduction potential, type of electrodes, active electrodes. EMF series and its application, constructions, working and reaction of lead accumulators, Nickel Cadmium cell. Applications of Electrolysis Electroplating and Electrrefining.		
3.	**Corrosion**			
	3.1	Definition Types of corrosion Atmospheric Corrosion, Factors affecting atmospheric corrosion, Corrosion by oxidation Mechanism of Oxidation corrosion Types of oxide films formed	**06**	**15**

	3.2	Electrochemical Corrosion, its mechanism, electrochemical series, Galvanic corrosion, concentration cell corrosion- Metal ion concentration, oxidation concentration. Factors affecting Electro-chemical corrosion Protection of metal from corrosion- i) Purification of metal and alloy formation. ii) Cathodic Protection. iii) Inorganic coating. iv) Metallic coating- Anodic and Cathodic coating, Electroplating, Hot dipping galvanizing and tinning, Cementation- Sherardizing, Metal cladding, Spraying		
4.	**Polymer**			
	4.1	**Plastic** i) Introduction ii) Definition of polymerization iii)	**04**	**10**
		Types of polymerization – Addition and Condensation iv) Structure of polymer v) Types of plastic – Thermosoft and thermoset, vi) Their structure and properties vii) Study of polymers such as cellulose, acetate, PVC, polythene, polystyrene Nylon, Teflon(Thermosoft) Bakelite, silicon (Thermoset plastic) Compounding of plastic, Properties and related applications in industries.		
	4.2	**B- Elastometers-** Natural Rubber drawback of natural rubber, polymerization and. Vulcanization of rubber, properties (tack rebound, elasticity, abrasion resistance) and application of rubber.		

5.	**Metal and Alloy**			
	5.1	Definition of metal, mineral, ore , properties and applications of different metals (Fe, Cu ,Al ,Cr ,Ni,Sn,Pb,Zn,Co,W,Ag)	**05**	**10**
	5.2	Definition of alloy ,formation of alloy, purposes of making alloy, classification (ferrous and nonferrous alloy) composition, properties and uses of heat resisting steel, magnetic steel ,shock resistance steel, stainless steel ,high speed steel spring steel, tool steel, and bronze brass monel metal babbit metal duralumin.		
6.	**Engineering Materials**			
	6.1	Definition, properties ,application of Composite material	**04**	**10**
	6.2	Insulating materials		
	6.3	Ceramics and Asbestos, Paint ,Adhesives,		
7.	**Environmental Effects (Awareness Level)**			
	7.1	Definition, types of pollution, air, water, soil, sound, nuclear pollution. (Causes, control method, effect), E-waste (origin effect control) deforestation, ozone depletion, green house effect, preventative environmental management activities.	**03**	**10**
		Total	**32**	**80**

List of Practicals/Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment	Hrs
1.	Drawing of Electronic configuration of items from Z = 1 to Z = 20 Drawing of Molecular structures of electrovalent and covalent compounds and + ve and –ve ions	02
2.	Qualitative Analysis of salts of metals such as Hg, Pb, Cu, Sn, Fe, Al, Cr, Ni, Zn, Mn, Ca, Ba, Mg, NH_4, K, Na (Any two)	04
3.	Draw the crystal structure of cu and graphite.	04
4.	To find the electrochemical equivalent of copper by electrolysis and to verify Faraday's 1st law of Electrolysis.	04

Sr. No.	Name of Experiment/Assignment	Hrs
5.	Determine conductivity of different electrolytes by using conductometer.	04
6.	Study of Mechanism of electrochemical Corrosion due to evolution of H_2 And absorption of O_2	04
7.	Formation of phenol formaldehyde resin.	02
8.	To estimate percentage of pure iron in iron alloy or impure iron by redox titration method.	02
9.	Preparation of chart of composition, properties, uses of metal and alloys.	04
10.	To determine co content in emission from petrol vehicle	02
	Total	**32**

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1.	Introduction to material science	Models of Hydrogen atom, Electrovalent and covalent molecules and crystal structure.
2.	Electrochemistry	Different Galvanic cells, and the working of dry cells and storage batteries, group discussion on laboratory experiment, based on this theory
3.	Corrosion	Comparison of the rate of corrosion in different environments such as water, moisture, acid, alkali, industrial area.
4.	Polymers	Collection the required data, from nearly polymer industry, to study the manufacturing conditions, and advantages of using polymer industry, to study the manufacturing conditions and advantages of using polymer over metallic material.
5.	Metal and alloy	Samples of different materials, chart
6.	Engg. Materials	Introduction to Engineering Materials – demonstration of material, samples and group discussion
7.	Environmental effects	Measure the level of pollutant and control method by using data group discussion

Text Books:

Sr. No	Author	Title	Publication
1.	S.N.Narkhede	Chemistry of Engineering Materials	Nirali Publication
2.	V. P. Mehta	Polytechnic Chemistry	Jain Brothers, New Delhi.
3.	P.C. Jain and Monica Jain	Applied Chemistry	Dhanpat Rai and sons, New Del hi

Reference Books:

Sr. No	Author	Title	Publication
1.	M.M. Uppal	Engineering Chemistry	Khanna Publisher, Delhi.
2.	J.C. Kurlacose J. Jairam	Chemistry in Engineering and Technology volume I and II.	Tata McGraw hill.
3.	Linus Pauling	The nature of Chemical Bond and the structure of Molecules and crystals	Oxford and IBH Publishing Co.
4.	C.M. Shrivastav C. Shrinivasam	Science of Engineering Materials.	Wiley Eastern Ltd.
5.	Lawrence H Van Vlack	Elements of Material science and Engineering (6^{th} Edition)	Wesley Publishing Co.
6.	Z bigniew D Jastrebski	The nature and properties of engineering material third edition.	John Eiley and Sons.
7.	T.T.T.I. Chandigarah	Civil Engineering Materials	Tata McGraw hill
8.	P.N. Balguni and p.Shah	Fiber Reinforced Cement composites	Tata McGraw hill

Learning Resources: Chalk, Board, Books, Video cassette no 51,55,56,60,61,63 of GPP Library

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Introduction to Material Science	05	02	03	10
2.	Electrochemistry	05	04	06	15
3.	Corrosion	07	04	04	15
4.	Polymers	04	04	02	10
5.	Metal and alloy	04	04	02	10
6.	Engg. Materials.	04	02	04	10
7.	Environmental effects	06	02	02	10
	Total	**35**	**22**	**23**	**80**

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