DIPLOMA IN AUTOMOBILE ENGINEERING

(GC101) Communication Skills

1. COURSE OBJECTIVE :

The course aims to develop Communication skills in English by improving students' ability to write ,speak, listen and read effectively. Emphasis is also laid on students' personality development, helping them to build their confidence in interpersonal / group communication.

2. TEACHING AND EXAMINATION SCHEME

Semester	**I**								
Course code & course title		**Periods/Week (in hours)**			**Total Hours**	**Examination Scheme**			
						Theory Marks		**Practical Marks**	**Total Marks**
(GC101) Communication Skills		**L**	**T**	**P**	**H**	**TH**	**TM**	**TW**	**PR/OR**
		-	**-**	**02**	**32**	**-**	**-**	**25**	**25**	**50**

3 . COURSE OUTCOMES:

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

GC101.CO1 Understand the essentials of effective Communication.

GC101CO2 Develop reading. writing, speaking , listening and effective presentation skills.

GC101.CO3 Select the appropriate mode of Communication .

GC101.CO4 Demonstrate reading. writing, speaking , listening and effective presentation skills.

4.Mapping Course Outcomes with Program Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO1	0	0	0	0	3	3	3
CO2	1	0	1	0	3	3	3
CO3	1	0	1	0	3	3	3
CO4	1	0	0	0	3	3	3

Relationship : Low-1 Medium-2 High-3

5. DETAILED COURSE CONTENTS / MICRO-LESSON PLAN

M = Marks	**Phr = Practical hours**	**CO = Course Outcomes**

Unit	**M**	**Phr**	**CO**
1 UNIT NAME: FUNDAMENTALS OF COMMUNICATION SKILLS	**-**		
1.1 **Communication Skills fundamentals** Definition, communication process, importance of Communication Skills, essentials of effective communication		01	**CO1** **CO2**
1.2 **Types of communication**: verbal Communication and Nonverbal communication (Body language, facial expressions, gestures, eye contact, posture, dress and grooming/personal appearance, deportment, personal hygiene) Paralinguistic (Volume, pace, pitch, pauses)		02	**CO3** **CO4**
1.3 **Barriers to communication:** physical barriers, psychological barriers and cultural barriers		01	
2. Unit: PRESENTATION SKILLS			
2.1 Presentations: Methods and style of presentation, Importance, planning a presentation, venue selection, audience awareness (age, gender, profession background, educational and social background) time and duration, audio visual aids (OHP, LCD projector, flip charts, white/black/green board, computer, microphone)		**02**	**CO2** **CO3** **CO4**
2.2 Public speaking: preparatory steps, tips for good beginning and end, delivery style, techniques for a good speech (repetition, signs, pictures, humor), body language		**02**	
3 UNIT: TECHNICAL Writing			**CO1**
3.1 Report **writing** Functions and parts of a report, Qualities of a good report, and types: Report on any institute function, Accident report, Industrial visit Report		04	**CO2** **CO4**

3.**2 Business letters** Principles of effective letter writing, parts of a business letter, formats (Full block style, Semi block style, modified block style) Routine/ Generic letters (letter to the heads of the institute, letter to the heads of various departments/sections of the institute) Types of letters: Enquiry Letter, Quotation, Purchase Order, Letter of Complaint		06	
3.3 **Job application** Tips for a good C.V and a Resume		02	
4 UNIT GRAMMAR	-		
4.1 Fundamentals of English writing Subject verb agreement, homonyms, homophones, homographs, articles, Punctuation, synonyms, fundamentals of sentence construction		**02**	**CO1** **CO2** **CO4**
4.2 Paragraph Writing: Developing Topics (the main idea), body (supporting sentences), conclusion, proof reading		**02**	
UNIT V: LANGUAGE WORKSHOP **5.1 Reading Skills** strategies to use for building vocabulary and reading fluencies (read extensively, identify new words, use of dictionary, online dictionary apps), reading comprehension, pronunciation, debate, role play,	-	08	**CO1** **CO2** **CO4**
5.2 Listening Skills How to listen effectively, listening comprehension			
5.3 Speaking skills speech, group discussion			
5.4 Writing skills précis writing, comprehension			
Total		**32**	

6. COURSE DELIVERY:

The Course will be delivered through lectures, class room interactions, videos, exercises

7. SPECIFICATION TABLE FOR THEORY/ MACRO-LESSON PLAN

Unit No	Unit	NO of lectures	Marks
1	Fundamental of Communications skills	04	-
2	Presentation Skills	04	-
3	Technical Writing	12	-
4	Grammar	04	-
5	Language workshop	08	-
	Total	32	25

8. SPECIFICATION TABLE FOR TERM WORK & PRACTICALS HOURS

No	Practical
1.	**Practical Title: Fundamental of Communications skills**
i.	Comprehension
ii.	Précis writing
iii.	Self-Introduction
2	**Practical Title: Presentation Skills**
iv.	Extempore speech
v.	Presentation on any given Topic
3	**Practical Title: Technical Writing**
vi.	Accident Report
vii.	Report on Institute function
viii.	Industrial visit report
ix.	Generic letters to the heads of various department/ Sections of the institute
x.	Inquiry letter
xi.	Quotation
xii.	Purchase or supply order
xiii.	Complaint letter
xiv.	Job application
4	**Grammar**
xv.	Exercises in subject – verb agreement
xvi.	Exercises in use of preposition
xvii.	Exercises in use of Homophones, homonyms, homographs
xviii.	Exercises in use of punctuation
xix.	Exercises relating to correcting the sentences
xx.	Paragraph writing
5	**Language workshop**
xxi.	Exercises to improve Reading skills
xxii.	Exercises to improve Writing skills
xxiii.	Group discussion
xxiv.	Listening comprehension

9. LEARNING RESOURCES

Text Books

S. No.	Author	Title of Books	Publishers
1	R. C. Sharma & Krishna Mohan	Business Correspondence and Technical Writing	Tata McGraw Hill
2	P. Prasad, Sharma, K. Rajendra	The Functional aspects of communication skills	S.k. Kataria& sons
3	SanjayKumar,Pushpa Lata	Communication Skills	Oxford University Press
4	A.K.Jain,A.M.Shaikh&Pravin S R Bhatia	Professional communication Skills	S.Chand
5	Wren & Martin	High School English Grammar & Composition	S. Chand, N. Delhi

10.Reference Books for further study

S. No.	Author	Title of Books	Publishers
1	Raul R. Timm	How to make winning presentations	Sneha Printers
2	Dale Carnegie, Training CPI	Stand and Deliver, How to become a masterful communicator and public speaker	Cox & Wyman, UK
3	John Seely	The Oxford Guide to Effective Writing and speaking	Oxford University Press

Autobiographies, self-help books, Audio speeches given by famous personalities

Internet and Web Resources

https://www.grammarly.com/

https://www.bbc.co.uk/programmes/articles/5QFnVy3xzT5htTh13cmP2P8/teacher-resources

https://Ted.com

Videos and Multimedia Tutorials

https://you.tu.be/AykYRO5d_II

(GC102) Engineering Mathematics I

1. COURSE OBJECTIVE:

1. The course is aimed at providing mathematical knowledge, developing computational skills and reasoning. It also helps students to think logically and in systematic manner so as to grasp mathematical concepts easily. It helps to build analytical thinking which play an important role in solving real world problems in all scientific discipline.

2.TEACHING AND EXAMINATION SCHEME

Semester	**I**							
Course code & course title		**Periods/Week (in hours)**			**Total hours**	**Examination Scheme**		
						Theory Marks	**Term Work**	**Total Marks**
(GC102) Engg.Maths I		**L**	**T**	**P**	**H**	**TH**	**TM**	**TW**
		4	**2**	**-**	**96**	**75**	**25**	**25**	**125**

3.COURSE OUTCOMES:

GC102.CO1. Understand the basic mathematical concepts for Engineering applications.

GC102.CO2. Identify and use appropriate formulae for solving practical engineering problems

GC102.CO3. Apply formulae of algebra, geometry, trigonometry and calculus for solving problems.

GC102.CO4 . Co-relate mathematical formulae to practical problems.

4.Mapping Course Outcomes with Program Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**
CO1	**3**	**2**	**1**	**0**	**0**	**0**	**2**
CO2	**3**	**3**	**1**	**0**	**1**	**0**	**1**
CO3	**2**	**2**	**3**	**3**	**2**	**0**	**1**
CO4	**2**	**3**	**3**	**2**	**1**	**1**	**1**

Relationship :Low-1 Medium-2 High-3

5. DETAILED COURSE CONTENTS / MICRO-LESSON PLAN

M = Marks	**Thr = Teaching hours**	**CO = Course Objectives**			
Unit			**Marks**	**Thr**	**CO**
1 MATHEMATICS FUNDAMENTAL			**8**	**6**	**CO1**
1.1 **Polynomials: Types** of polynomials, addition subtraction, (no question to be asked), Multiplication and division of polynomials			3	2	
1.2 **: Algebraic equations:**Different types of equations and their geometric meaning(line,circle parabola only) ,equations with one, two and three variables and solving equations with two and three variables Quadratic equations and nature of their solutions			3	2	
1.3: Logarithm: Definition of log, log with base 'e' and base'10' Properties of log, log and antilog , problems using definition and properties of log.			2	2	
2.STRAIGHT LINES AND CIRCLES			15	14	**CO1, CO4**
2.1: Straight line: Intercept, slope, intersection of lines Equations of line: 1. Slope intercept form, slope point form, two points form, parallel and perpendicular lines, angle between lines Perpendicular distance of a point from line			8	7	
2.2: Circle: circle as a locus, Centre, diameter, chord of a circle Equations of circle: Centre radius form, diameter form, general form and sums			7	7	
3. TRIGONOMETRY					**CO1, CO3**
3.1: Angle and measurement, degree and radians and conversion and related sums, arc length and area of sector and sums **3.2:** Trigonometric ratios and identities 3.3: Trigonometric ratios of compound and allied angles 3.4: Product formulae sinA$\pm$sinB, cosA$\pm$cosB **3.5:** Sum and difference formulae **3.6:** Multiple angle 2A, and their trigonometric ratios, **3.7**: Sine rule, Cosine rule in triangle, solution of triangle			12	15	

4 : MENSURATION	10	6	**CO1, CO4**
4.1: Areas of 2D figures like quadrilaterals, circle triangle etc (no questions to be asked) **4.2:** Surface area and volumes of cube, sphere, cylinder, cone, (no question to be asked) Surface areas and volumes of prism, pyramid, **4.3**: Frustum of cone, pyramid and their surface areas and volumes. **4.4:** Simpson's 1/3 rd rule for area and volume			
5 :CALCULUS	30	23	**CO1, CO2, CO3, CO4**
5.1:Limits 5.1.1 : Pre requisite : Sets , intervals, relation and function (no questions to be asked) 5.1.2 : Limit of a function , algebraic properties of limits 5.1.3: Limits of algebraic, trigonometric, exponential, logarithmic functions	7	6	
5.2 : Derivatives 5.2 .1: Derivative definition by first principle (no question to be asked) 5.2.2: Standard formulae, Algebraic properties of derivative (u±v) etc. 5.2.3: Derivatives of algebraic, trigonometric, exponential, logarithmic functions 5.2.4: Derivative of product of functions (uv rule). 5.2.6: Derivative of quotient of functions (u/v rule) 5.2.7: Derivative of composite functions 5.2.8: Derivative of parametric functions 5.2.9: Derivative of implicit functions 5.2.10 : Logarithmic differentiations 5.2.11: Second order derivatives (no question to be asked)	15	12	
5.3 : Applications of derivatives 5.3.1: Application to the geometry: i) derivative as a slope of a tangent ii) to find equations of tangent and normal at given point on the curve 5.3.2: Application to the Linear motion:i) displacement, velocity,acceleration 5.3.3: Application to the rate measure i) to find rate change in area and volume etc 5.3.4 : Maxima and minima	8	5	
Total	**75**	**64**	

6. COURSE DELIVERY:

The Course will be delivered through lectures, class room interactions, exercises

7. SPECIFICATION TABLE FOR THEORY

Unit No	Unit	Number of lectures	Marks
1	**Mathematics Fundamental**	06	8
2	**Straight line and circle**	14	15
3	**Trigonometry**	15	12
4	**Mensuration**	06	10
5	**Calculus**	23	30
	Total	**64**	**75**

8. SPECIFICATION TABLE FOR TERM WORK & PRACTICALS HOURS

- Tutorial books should be maintained by students (5 marks)
- Two home assignments per semester (5 marks)

  The Two assignments each comprises of thirty questions which includes 15 short questions and fifteen long questions. First assignment will cover fifty percent of syllabus

  and second assignment will cover remaining portion of syllabus

- Topic-wise class assignment (15 marks)

  Class assignment comprises of ten short and ten long questions.

9. LEARNING RESOURCES

Text Books

S. No.	Title of Books	Author	Publishers
1	Mathematics for Polytechnic Students(Basic Mathematics)	S.P. Deshpande	Pune VidyarthiGrihaPrakashan 1786, Sadashiv Peth, Pune
2	Mathematics for Polytechnic Students(Engineering Mathematics)	S.P. Deshpande	Pune VidyarthiGrihaPrakashan 1786, Sadashiv Peth, Pune
3	S.B. Gore, M.B.Patil, S.P. Pawar	Applied Mathematics	Vrinda Publications

Reference Books for further study

S. No.	Title of Books	Author	Publishers
1	Applied Mathematics I	Dr. U.B.Jangam, K.P. Patil, Nalini Kumthekar	Nandu Printers& Publishers pvt. Ltd. Mumbai
2	Applied Mathematics for Polytechnics	H.K. Dass	CBS Publishers and distributers Pvt.Ltd. ,Pune
3	Set Theory and related topics	Seymour Lipschutz	McGraw-Hill

(GC103) APPLIED PHYSICS-I

1.COURSE OBJECTIVE :

On successful completion of the course, Students completing the Applied Physics I course will be able to demonstrate competency and understanding of the basic concepts found in, Units and Dimensions, Kinematics of motion in one dimension Force Work Power and Energy, Circular Motion and Gravitation, Properties of Matter and Heat and will be able to utilize the knowledge to demonstrate competency with experimental methods that are used to discover and verify the concepts related to content knowledge

2.TEACHING AND EXAMINATION SCHEME

Semester	**I**								
Course code & course title		**Periods/Week (in hours)**			**Total Hours**	**Examination Scheme**			
						Theory Marks		**Practical Marks**	**Total Marks**
(GC103) Applied Physics I		**L**	**T**	**P**	**H**	**TH**	**TM**	**TW**	**PR/OR**
		03	**0**	**02**	**80**	**75**	**25**	**25**	**-**

3.COURSE OUTCOMES:

GC103.CO1: Understand the Fundamental concepts of physical quantities, Force, Power, Energy, Motion, Matter and heat transfer used in Engineering applications.

GC103.CO2: Explain the concepts of Dimensions, Work, Power , Energy ,Motion, properties of matter and heat transfer

GC103.CO3: Apply the Knowledge of Physical quantities, Types of motions, Force, work ,Power, properties of matter and heat transfer in Engineering applications

GC103. CO4: Analyze different types of Physical quantities, motions, properties of matter, and modes of heat transfer

4. Mapping Course Outcomes with Program Outcomes

Relationship: 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline Specific Knowledge	**Problem Analysis**	**Design and Devlopment of Solutions**	**Engg. Tools, Experimentatn& Testing**	**Engg. Practices for Society,Sustainabilit y& Environment**	**Project Management**	**Life -long Learning**
CO 1	3	1	1	3	2	0	3
CO 2	3	1	2	3	0	0	3
CO 3	3	1	2	2	0	1	1
CO 4	1	1	2	2	0	1	1

5. DETAILED COURSE CONTENTS / MICRO-LESSON PLAN

M = Marks	**Thr = Teaching hours**	**CO = Course Outcomes**

Unit	**Thr**	**M**	**CO**
1 UNIT NAME: UNITS AND DIMENSIONS	**08**	**12**	**CO1, CO2, CO3, CO4**
1.1 Fundamental and Derived units ,			
1.2 Different system of units, SI unit conversion from one system to other,			
1.3 Principle of Homogeneity,			
1.4 Dimensions, dimensional formula,			
1.5 dimensonal correctness of given equation using dimensions			
1.6 least count of vernier calliper and screw gauge			
1.7 zero errors-- in case of vernier calliper and screw gauge			
1.8 Types of error.			
2. UNIT NAME: MOTION IN ONE DIMENSION, FORCE, WORK,POWER AND ENERGY	**10**	**16**	**CO1, CO2, CO3, CO4**
2.1 Distance and displacement,			
2.2 Scalar and Vectors			
2.3**,** Speed and Velocity, Uniform Velocity, ,			

2.4 Uniform acceleration,acceleration due to gravity			
2.5 Equation of motion ($v=u+at$, $v^2=u^2+2as$, $s=ut+1/2at^2$)(no derivation)			
2.6 Motion under gravity. Force and its unit.			
2.7 Work and its unit. Energy, law of conservation of energy,			
2.8. Kinetic and Potential energy equation and examples.			
3. UNIT NAME: Uniform Circular Motion and Gravitation	**10**	**16**	**CO1, CO2, CO3, CO4**
3.1 Unifrom circular motion,			
3.2 Definition angular displacement,angular velocity, ,			
3.3 Conversion from rpm to rad/sec,$v=r\omega$, tangential velocity, radial acceleration			
3.4 Centripetal force and centrifugal force, examples,			
3.5 Banking of roads,superelevation, expression for angle of banking			
3.6 Newtons law of gravitation, acceleration due to gravity ,			
3.7 Expression for acceleration due to gravity. Escape velocity, Critical velocity, and periodic time definition and expression (no derivation)			
3.8. Sattellite, types(Geosationary,communication remote sensing)			
4. UNIT NAME: PROPERTIES OF MATTER	**10**	**16**	**CO1, CO2, CO3, CO4**
4.1 Elasticity ,			
4.2 Stress, Strain,Hooke's law,			
4.3 Youngs Modulus,			
4.4 Bulk Modulus, Rigidity Modulus,			
4.5 Stress v/s Strain graph			
4.6 Yield point, breaking stress,factor of safety, ,			
4.7 Surface tension definition and example			
4.8. Adhesive and cohesive force, application,			
4.9 liquid miniscus and angle of contact, capillarity,			
4.10 Expression for surface tension (no derivation), applications. viscocity,			
4.11 Definition velocity gradient, newtons law of viscocity, terminal velocity,stokes law,			

4.12 Streamline flow and turbulent flow,critical velocity, application of viscocity.			
5. UNIT NAME: HEAT	**10**	**15**	**CO1, CO2, CO3, CO4**
5.1 Statements of boyles law,charles law,gay lussacs law			
5.2 General gas equation,specific heat definition and unit, Latent heat definition and unit			
5.3 Modes of transfer of heat, conduction, convection and radiation,			
5.4 Conduction of heat through a metall rod,			
5.5 Variable and Steady state			
5.6 law of thermal conductivity (With Derivation)			
5.7 Applications of thermal conductivity, ,			
5.8. Thermal expansion of solids			
5.9 linear expansion,superficial expansion,			
5.10 Cubical Expansion			
5.11 Realtion betwenn α,β,γ (no derivation)			
5.12 Engineering applications of expansion of solids.			

6. COURSE DELIVERY:

The Course will be delivered through lectures, class room interactions, exercises and case studies.

7. SPECIFICATION TABLE FOR THEORY/ MACRO-LESSON PLAN

Unit No	**Unit**	**Number of lectures**	**Marks**
1	UNITS AND DIMENSIONS	8	12
2	MOTION IN ONE DIMENSION, FORCE, WORK AND ENERGY	10	16
3	UNIFORM CIRCULAR MOTION AND GRAVITATION	10	16
4	PROPERTIES OF MATTER	10	16
5	HEAT	10	15
	Total	48	75

8. SPECIFICATION TABLE FOR TERM WORK & PRACTICALS

No	Practicals	Marks
1.	Basic Conversion Techniques from one system of units to the other	25
2.	Use of Vernier callipers to find the Volume of Hollow cylinder, Block	25
3.	Use of Screw gauge to find the cross-sectional area of a wire and thickness of a clip	25
4.	To find the Coefficient of Viscosity of a given liquid by stokes method	25
5.	To Find the coefficient of Thermal Conductivity by Searle's Method	25
6	To Find the Surface Tension of a given liquid by capillary rise method	25
7	To Find Young's Modulus by Searles Method	25
8	To Find acceleration due to gravity by simple pendulum method.	25
	Total (Average)	25

9. LEARNING RESOURCES

Text Books

S. No.	Author	Title of Books	Publishers
1	B G Dhande	Applied Physics of Polytechnics	Pune Vidyarthi Griha Prakashan
2	Bhandarkar	Applied Physics of Polytechnics	Vrinda publication
3	R K Gaur and S L Gupta	Engineering Physics	Dhanpat Rai & Sons Delhi
4	Dr. Vasudev R Bhagwat	A Text Book of Applied Physics for Polytechnics	Broadway Publishing House
5	B L Thereja	Engineering Technology	S. Chand

Reference Books for further study

S. No.	Author	Title of Books	Publishers
1	Halliday D and Resnick	Physics Part I-II	Wiley Eastern Ltd.
2	Satish k. Gupta	ABC of Physics I&II	Modern Publisher
3	Saxena HC and Singh Prabhakar	Applied Physics Vol I & II	S. Chand Publisher

(GC104) Applied Chemistry

1. COURSE OBJECTIVE:

Chemistry is the branch of Science which deals with the study of composition, properties and changes in matter. An understanding of the basic concepts of Applied Chemistry, chemical principles and chemical properties of materials is essential to all the engineers. The emphasis is on applying the knowledge of principles of chemistry in all the fields of engineering wherein students appreciate the significance of chemistry in day to day life. The subject develops in students the habit of scientific enquiry, the ability to investigate cause and effect relationship & the ability to interpret & analyze the results.

2. TEACHING AND EXAMINATION SCHEME

Semester	I								
Course code & course title		Periods/Week (in hours)			Total Credits (Hours)	Examination Scheme			
						Theory Marks		Practical Marks		Total Marks
(GN104) Applied Chemistry		L	T	P	H	TH	TM	TW	PR/OR	
		3	-	2	80	75	25	25	-	125

3. COURSE OUTCOMES:

GC 104.CO1: Understand the fundamental concepts of Atomic Structure, electrochemistry, water quality, corrosion and polymers.

GC 104.CO2: Explain the process of Chemical bonding, water softening, electroplating, corrosion control and polymerization

GC 104.CO3: Relate the principles of Chemical Bonding, Electrolysis, water hardness for domestic and Industrial applications and properties of polymers.

GC 104.CO4: Distinguish between types of Chemical bonding, Water softening methods, corrosion control methods, different processes of metal coating and different polymers.

4. Mapping Course Outcomes with Program Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline Specific Knowledge	Problem Analysis	Design and Development of Solutions	Engg. Tools, Experimenting & Testing	Engg. Practices for Society, Sustainability & Environment	Project Management	Life -long Learning
CO1	3	2	1	1	2	1	1
CO2	2	3	2	1	3	1	2
CO3	3	2	2	2	3	1	2
CO4	3	2	2	2	2	1	1

Relationship : Low-1 Medium-2 High-3

5. DETAILED COURSE CONTENTS / MICRO-LESSON PLAN

M = Marks | **Thr = Teaching hours** | **CO = Course Objectives**			
Unit	**Mks**	**Thr**	**CO**
UNIT 1.0 : ATOMIC STRUCTURE AND CHEMICAL BONDING	**15**	**10**	CO1 CO2 CO3 CO4
1.1 Atomic Structure 1.1.1 Fundamental particles and their characteristics. 1.1.2 Energy levels - Definition & designation 1.1.3 Sub Energy levels- Definition & designation 1.1.4 Orbital – Concept & shape (s and p only) **1.2** Quantum numbers 1.2.1 Designation, definition, values.			
1.3 Electronic distribution (Elements from atomic Number 1-20) 1.3.1 Bohr – Bury's laws for distribution of electrons in shells (1st three laws only) 1.3.2 Aufbau Principle. for distribution of electrons in sub-shells 1.3.3 Pauli's Exclusion Principle. 1.3.4 Hund's Rule of maximum multiplicity 1.3.5 Orbital Electronic Configuration of elements (from atomic numbers 1 to 20 only).			
1.4 Chemical Bonding 1.4.1 Lewis and Longmuir concept of stable configuration. 1.4.2 Electrovalent - Bond - Concept Formation of Electrovalent Compound (NaCL & MgO) 1.4.3 Covalent Bond – Concept Formation of Colvalent Compounds (Cl_2, O_2, N_2) 1.4.4 Co-ordinate Bond - Concept Formation of Co-ordinate Compounds (O_3) 1.4.5 Properties of Electrovalent, Colvalent & Co-Ordinate compounds.			

UNIT 2.0 : WATER	**15**	**10**	CO1 CO2 CO3 CO4
2.1 Hardness of Water 2.1.1 Soft and Hard Water - Concept Soap Test (Chemical Equation not expected) 2.1.2 Causes of Hardness 2.1.3 Types of Hardness 2.1.4 Degree of Hardness & Units of Hardness (mg/L & ppm)			
2.2 Disadvantages of Hard Water 2.2.1 Domestic Purpose Drinking, cooking, Washing & Bathing. 2.2.2 Industrial Purpose (Paper Industry, Textile & Dyeing Industry, Sugar Industry, Bakery & Concrete Making) 2.2.3 Boilers- Steam Generation Purpose. Sludge formation – causes & Disadvantages (No chemical equation expected)			
2.3 Water Softening 2.3.1 Zeolite and Ion Exchange process of water softening			
2.4 Desalination of water 2.4.1 Electrodialysis & Reverse Osmosis process. 2.4.2 pH- Concept, pH scale & Importance of pH			
UNIT 3.0 : <u>ELECTROCHEMISTRY</u>	**12**	**08**	CO1 CO2 CO3 CO4
3.1 Electrolytic dissociation 3.1.1 Arrhenius theory of Electrolytic dissociation 3.1.2 Factors affecting degree of Ionization- nature of solute, nature of solvent, concentration of solution and temperature.			
3.2 Electrolysis 3.2.1 Mechanism of Electrolysis. Ionization Reactions Reactions at cathode, Activity series of Cations. Reactions at Anode, Activity series of Anions. 3.2.2 Electrolysis of Molten NaCl using Carbon Electrodes. Aqueous NaCl using Platinum Electrodes. Aqueous $CuSO_4$ using Platinum Electrodes. Aqueous CuSO4 using copper Electrodes.			
3.3 Electrochemical series – Definition and Significance			
UNIT 4.0 : CORROSION AND ITS CONTROL	**25**	**14**	CO1 CO2 CO3
4.1 Dry **/**Direct Chemical corrosion 4.1.1 Definition			

4.1.2 Oxidation corrosion 4.1.3 Corrosion due to other gases.			CO4
4.3 Types of Electrochemical corrosion. 4.3.1 Galvanic Cell corrosion 4.3.2 Concentration cell corrosion(Metal ion concentration & differential Aeration)			
4.4 Corrosion Control Protection of metals by: 4.4.1. Using Pure Metals & Metal alloys 4.4.2 Proper designing 4.4.3 Modifying the environment (De- aeration, Deactivation, Dehumidification, Alkaline neutralization) 4.4.4 Cathodic protection (Sacrificial anode and Impressed current cathodic protection) 4.4.5 Metal Coating (Galvanizing, Tinning, Metal-Spraying, Electroplating & powder coating)			
UNIT 5: POLYMERS	**08**	**06**	CO1 CO2 CO3 CO4
5.1 Concept of Monomers & Polymers **5.2**Polymerization- Definition. 5. 2.1 Addition polymerization-Definition. 5.2.2 General equation of polymerization of :- Ethylene to Polyethylene. Vinyl chloride to Polyvinylchloride Tetra fluoro ethylene to Poly tetra fluoroethylene(PTFE) 5.2.3 Condensation Polymerization-Definition 5.2.4 General Equation for formation of Phenol formaldehyde Resin. **5.3** Plastics. 5.3.1 Types of plastic (Thermosetting and Thermo softening), Examples 5.3.2 Properties and applications of Poly-ethylene, PVC, polystyrene, Nylons, Bakelite & silicones.			
5.4 Rubber 5.4.1 Natural Rubber 5.4.2 Drawbacks of Crude rubber. 5.4.3 Vulcanization of Rubber (General Equation) 5.4.4 Rubber examples. 5.4.5 Properties of Synthetic Rubber & related applications.			

8. COURSE DELIVERY:

The Course will be delivered through lectures, class room interactions, exercises and case studies

9. SPECIFICATION TABLE FOR THEORY/ MACRO-LESSON PLAN

Unit No	Unit	Number of lectures	Marks
1	**ATOMIC STRUCTURE AND CHEMICAL BONDING**	10	15
2	**WATER**	10	15
3	**ELECTROCHEMISTRY**	08	12
4	**CORROSION & IT'S CONTROL**	14	25
5	**POLYMERS**	06	08
	Total	**48**	**75**

10. SPECIFICATION TABLE FOR TERM WORK & PRACTICALS HOURS

No	Practical
	Practical Title
1.	Double Acid-Base Titration using Phenolphthalein.
2.	Acid- Base titration using Methyl orange.
3.	Redox Titration of $KMnO_4$ soln., $FeSO_4$ soln. and Oxalic acid
4.	Determination of degree of Hardness by E.D.T.A method.
5.	Determination of Total Alkalinity of water sample.
6.	Determination of Chloride content of water sample by Mohr's method.
7.	pH- Metric titration.
8.	Conduct metric Titration.
9.	Determination of Conductivity of water samples from different water body sources.
10.	Corrosion Susceptibility of Aluminum to Acid or Base.
11.	Determination of pH of different food items.
	Total Marks: 25
	No Class room Assignments

*** Any TEN of the above.**

****Term Work Assessment Scheme**: 1. Performance:15 marks (Carrying out experiment, Readings, Calculations and Results)
2.Knowledge :05 Marks(Theory of the experiment)
3. Journal : 05 Marks

11. LEARNING RESOURCES

Text Books

S. No.	Author	Title of Books	Publishers
1	M.M. Uppal	Text book of Engg. Chemistry	Khanna Publisher
2	V.P.Mehta	Text book of Engg. Chemistry	Jain Bros. Delhi
3	S.N Narkhede	Textbook of Engg. Chemistry	Niraj Prakashan
5	S S Dara	A Textbook of Engg. Chemistry	S Chand & Co
4	P.C. Jain and M.Jain	Engg. Chemistry.	Dhanpat Rai Publishing Co.

(GC105) Basic Engineering Practice (Electronics& Comp.)

1. COURSE OBJECTIVE:

The students will be able to acquire knowledge about safety aspects, firefighting, first-aid and carpentry, fitting, plumbing skills. The students will learn proper ways of using various hand tools, measuring devices in acquiring these skills and will also interpret simple electrical drawings/circuit diagrams.

2. TEACHING AND EXAMINATION SCHEME

Course Code & Course Title	Periods/ Week (In Hours)			Total Hours	Examination Scheme				
					Theory Marks		Practical Marks		Total Marks
(GC 106)	L	T	P	H	TH	TM	PR/OR	TW	
Basic Engineering Practice	0	0	5	80	-	-	50	100	150

3. COURSE OUTCOMES:

PART A

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

GC106.CO1. Understand safety procedures to be followed in carpentry, fitting, and plumbing.

GC106.CO2. Identify various tools used for carpentry, fitting, and plumbing.

GC106.CO3: Demonstrate basic working skills in carpentry, fitting and plumbing.

GC106.CO4: Plan & execute a job/activity using job drawing.

PART B

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

GC106.CO1. List the safety measures.to be observed in electrical workshop.

GC106.CO2. Identify various electrical tools, fittings used for electrical measurements & troubleshooting.

GC106.CO3: Distinguish between single phase and three phase supply.

GC106.CO4: Plan & execute a job/activity from electrical circuit drawing.

4. MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES

PART A

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline Specific Knowledge	Problem Analysis	Design and Development of Solutions	Engg. Tools, Experimentation& Testing	Engg. Practices for Society, Sustainability & Environment	Project Management	Life -long Learning
CO1	2	1	1	3	2	2	3
CO2	2	1	2	3	2	2	2
CO3	2	1	1	3	2	2	2
CO4	2	1	3	3	2	3	2

Relationship: Low-1 Medium-2 High-3

PART B

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline Specific Knowledge	Problem Analysis	Design and Development of Solutions	Engg. Tools, Experimentation& Testing	Engg. Practices for Society, Sustainability & Environment	Project Management	Life -long Learning
CO1	2	1	1	3	2	2	3
CO2	2	1	2	3	2	2	2
CO3	3	1	1	2	2	1	2
CO4	2	1	3	3	2	3	2

Relationship: Low-1 Medium-2 High-

5. DETAILED COURSE CONTENTS / MICRO-LESSON PLAN

M = Marks | **Hr = Practical Hours** | **CO = Course Outcomes**			
Unit	**M**	**Hr**	**CO**
1 General Safety, Housekeeping, Fire Fighting & First Aid	10	06	
1.1Introduction to General Safety aspects of engineering workshop 1.2 Meaning and importance of housekeeping. 1.3 Fire hazards, fire triangle, types of fire extinguishers – selection and use. 1.4Basic knowledge of first aid with specific inputs on cuts, burns, electric shocks, artificial respiration, handling emergencies.			CO1
2 Fitting Workshop Practice	30	18	
2.1 Introduction to the trade. 2.2 Introduction to various hand Tools, Measuring and Marking Tools, cutting tools, Holding tools, Striking tools 2.3 Types of files and filing methods.			CO1 CO2 CO3

2.4 Drill bits and drilling Processes, using portable and pillar drilling machine. 2.5 Operations performed in fitting shop such as measuring, marking, chipping, filing, grinding, sawing, drilling 2.6 Threading using taps and dies.			
3 Carpentry Workshop Practice	20	18	
3.1 Introduction to carpentry 3.2 Types of wood and its characteristics, forms of wood, defects in timber and its identification, wood working hand tools 3.3 Wood working processes. 3.4 Different types of joints and their usage. 3.5 Introduction to wood working machines: 3.6 Lathe 3.7 Circular saw 3.8 Band saw 3.9 Wood planner 3.10 Universal wood working machine			CO1 CO2 CO3
4 Electrical Workshop Practice	30	32	
4.1 Brief introduction to power distribution and Electrical Safety. 4.2 Use of different hand tools used in electrical trade 4.3 Collection of details of motors and transformers. 4.4Introduction to Control Panel and its various sections/components. 4.5 Making of wire joints. 4.6Measurement of current, voltage, frequency and Power Consumption. 4.7 Connecting and starting of Induction Motor & Measurement of its speed. Changing of Direction of rotation of induction motor. 4.8 Introduction to commonly used electrical Fittings (Domestic & Industrial). 4.9Wiring of Simple Electric Circuit (Bulb & plug point and switches) on wooden board 4.10 Study, connection & use of Energy Meter 4.11Testing of components using Series test lamp & Multimeter 4.12Study of Fuses & practice replacement of Fuse 4.13 Study & Troubleshooting of Tube Light			CO1 CO2 CO3 CO4
5 Plumbing	10	06	
5.1Plumbing tools, pipe fittings and method of joining pvc pipes. 5.2 Use of spirit level and plumb bob. 5.3 Minor repairs and replacement of fittings. 5.4 Reading of plumbing drawings. *[Note: Plumbing restricted to domestic plumbing and pvc piping.]*			CO1 CO2 CO3
Total	**100**	**80**	

6. COURSE DELIVERY:

The Course will be delivered through workshop practical sessions in mechanical and electrical workshops.

7. SPECIFICATION TABLE FOR PRACTICALS/ MACRO-LESSON PLAN

Unit No	Unit	Number of hrs.	Marks
1	General Safety, Housekeeping, Fire Fighting & First Aid	06	10
2	Fitting Workshop Practice	18	30
3	Carpentry Workshop Practice	18	20
4	Electrical Workshop Practice	32	30
5	Plumbing	06	10
	Total	80	100

8. SPECIFICATION TABLE FOR TERM WORK & PRACTICALS HOURS

No	Practical	Hrs.
1	**General Safety, Housekeeping, Fire Fighting & First Aid**	**06**
a	Demonstration on use of Safety Measures while working in Workshop and use of safety signs.	03
b	Demonstration on use of First Aid and Artificial Respiration procedure ,Training on fire and emergency services (using video presentation /fire and safety expert talk)	03
2	**Fitting Workshop Practice**	**18**
a	Identification of various hand Tools, Measuring and Marking Tools, cutting tools, Holding tools, Striking tools	03
b	Identification of various types of files and demonstration on filing methods.	03
c	Identification of various types of Drill bits, taps, dies and Drilling machines such as portable and Pillar Drilling machine.	03
d	Job involving filing, marking, cutting operation on MS Flat.	06
e	Job involving Drilling and Tapping operation on MS flat.	03
3	**Carpentry Workshop Practice**	**18**
a	Identification of various types of woods and wood working hand tools	03
b	Identification of various types of Carpentry joints and their usage.	03
c	Introduction to wood working machines such as wood working Lathe, Circular saw ,Band saw, Wood planner, Universal wood working machine	03
d	Job involving marking, measuring, planning, sawing, chiseling, joint preparation and assembly of wooden blocks.	06
e	Preparation of job on wood working lathe.	03
4	**Electrical Workshop Practice**	**32**
a	Measurement of Single Phase and Three Phase supply Voltage using multimeter.	02
b	Identification of various hand tools used in electrical trade.	02
c	Measurement of electric circuit parameters using Ammeter, Voltmeter, Frequency meter, Wattmeter.	04
d	Making of Straight and T wire joints.	02
e	Testing of electrical components such as Choke, starter, Fuse, Switch using Series Test lamp and Multimeter	02
f	Starting of induction motor using DOL Starter	02
g	Reversal of direction of rotation of Three phase induction motor	02

h	Identification of commonly used electrical fittings.	02
i	Wiring of simple electrical circuit using bulb and socket.	04
j	Measurement of Energy using Energy Meter.	02
k	Identification of Different types of Fuses and their replacement in circuit.	02
l	Testing of various components and connection of Tube light circuit.	02
m	Collecting Name plate Details of Motors and Transformers and operating and controlling speed of motor from Control panel.	04
5	**Plumbing**	**06**
a	Identification of Plumbing tools and pipe fittings , Reading of plumbing drawings, methods of joining PVC pipes, use of spirit level and plumb bob in piping.	03
b	To carry out minor repairs and replacement of fittings.	03

9. LEARNING RESOURCES

TEXT BOOKS

S. No.	Author	Title of Books	Publishers
1	N. Sesha Prakash	Manual of Fire Safety	CBS Publishers and Distributers
2	S.K. Hajara-Chaudhary	Workshop Technology	Media Promoters
3	B.S. Raghuwanshi	Workshop Technology-	Dhanpat Rai and sons, New Delhi
4	R K Jain-	Production Technology	Khanna Publishers, New Delhi
5	H. S .Bawa	Workshop Technology	Tata McGraw Hill Publishers, New Delhi
6	Kent	Mechanical Engineering Hand book	John Wiley and Sons, New York
7	B.L. Theraja	Fundamentals of Electrical Engineering and Electronics	S. Chand – New Delhi

REFERENCE BOOKS FOR FURTHER STUDY

S. No.	Author	Title of Books	Publishers
1	CIMI- Central Instructional Media Institute Madras	Turner – Trade Theory – Ist and IInd Year	Wiley Eastern Ltd. New Delhi

(GC106) Basic Engineering Practice (Mech & Elect.)

2. COURSE OBJECTIVE:

The students will be able to acquire knowledge about safety aspects, firefighting, first-aid and carpentry, fitting, plumbing skills. The students will learn proper ways of using various hand tools, measuring devices in acquiring these skills and will also interpret simple electrical drawings/circuit diagrams.

2. TEACHING AND EXAMINATION SCHEME

Course Code & Course Title	Periods/ Week (In Hours)			Total Hours	Examination Scheme				
					Theory Marks		Practical Marks		Total Marks
	L	T	P	H	TH	TM	PR/OR	TW	
(GC 106) Basic Engineering Practice	0	0	5	80	-	-	50	75	125

3. COURSE OUTCOMES:

PART A

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

GC106.CO1. Understand safety procedures to be followed in carpentry, fitting, and plumbing.

GC106.CO2. Identify various tools used for carpentry, fitting, and plumbing.

GC106.CO3: Demonstrate basic working skills in carpentry, fitting and plumbing.

GC106.CO4: Plan & execute a job/activity using job drawing.

PART B

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

GC106.CO1. List the safety measures.to be observed in electrical workshop.

GC106.CO2. Identify various electrical tools, fittings used for electrical measurements & troubleshooting.

GC106.CO3: Distinguish between single phase and three phase supply.

GC106.CO4: Plan & execute a job/activity from electrical circuit drawing.

4. MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES

PART A

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline Specific Knowledge	Problem Analysis	Design and Development of Solutions	Engg. Tools, Experimentation& Testing	Engg. Practices for Society, Sustainability & Environment	Project Management	Life -long Learning
CO1	2	1	1	3	2	2	3
CO2	2	1	2	3	2	2	2
CO3	2	1	1	3	2	2	2
CO4	2	1	3	3	2	3	2

Relationship: Low-1 Medium-2 High-3

PART B

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
	Basic & Discipline Specific Knowledge	Problem Analysis	Design and Development of Solutions	Engg. Tools, Experimentation& Testing	Engg. Practices for Society, Sustainability & Environment	Project Management	Life -long Learning
CO1	2	1	1	3	2	2	3
CO2	2	1	2	3	2	2	2
CO3	3	1	1	2	2	1	2
CO4	2	1	3	3	2	3	2

Relationship: Low-1 Medium-2 High-

5. DETAILED COURSE CONTENTS / MICRO-LESSON PLAN

M = Marks	**Hr = Practical Hours**	**CO = Course Outcomes**			
Unit			**M**	**Hr**	**CO**
1 General Safety, Housekeeping, Fire Fighting & First Aid				06	
1.1Introduction to General Safety aspects of engineering workshop 1.2 Meaning and importance of housekeeping. 1.3 Fire hazards, fire triangle, types of fire extinguishers – selection and use. 1.4Basic knowledge of first aid with specific inputs on cuts, burns, electric shocks, artificial respiration, handling emergencies.					CO1
2 Fitting Workshop Practice				18	
2.7 Introduction to the trade. 2.8 Introduction to various hand Tools, Measuring and Marking Tools, cutting tools, Holding tools, Striking tools 2.9 Types of files and filing methods. 2.10 Drill bits and drilling Processes, using portable and pillar drilling machine. 2.11 Operations performed in fitting shop such as measuring, marking, chipping, filing, grinding, sawing, drilling 2.12 Threading using taps and dies.					CO1 CO2 CO3
3 Carpentry Workshop Practice			20	18	
3.10 Introduction to carpentry 3.11Types of wood and its characteristics, forms of wood, defects in timber and its identification, wood working hand tools 3.12 Wood working processes. 3.13 Different types of joints and their usage. 3.14 Introduction to wood working machines: a. Lathe b. Circular saw c. Band saw d. Wood planner e. Universal wood working machine					CO1 CO2 CO3
4 Electrical Workshop Practice			30	32	
4.1 Brief introduction to power distribution and Electrical Safety. 4.2 Use of different hand tools used in electrical trade 4.3 Collection of details of motors and transformers. 4.4 Introduction to Control Panel and its various sections/components. 4.5 Making of wire joints. 4.6Measurement of current, voltage, frequency and Power Consumption. 4.7 Connecting and starting of Induction Motor & Measurement of					CO1 CO2 CO3 CO4

its speed. Changing of Direction of rotation of induction motor. 4.8 Introduction to commonly used electrical Fittings (Domestic & Industrial). 4.9Wiring of Simple Electric Circuit (Bulb & plug point and switches) on wooden board 4.10 Study, connection & use of Energy Meter 4.11Testing of components using Series test lamp & Multimeter 4.12Study of Fuses & practice replacement of Fuse 4.13 Study & Troubleshooting of Tube Light			
5 Plumbing		06	
5.1 Plumbing tools, pipe fittings and method of joining pvc pipes. 5.2 Use of spirit level and plumb bob. 5.3 Minor repairs and replacement of fittings. 5.4 Reading of plumbing drawings. *[Note: Plumbing restricted to domestic plumbing and pvc piping.]*			CO1 CO2 CO3
Total		**80**	

6. COURSE DELIVERY:

The Course will be delivered through workshop practical sessions in mechanical and electrical workshops.

7. SPECIFICATION TABLE FOR PRACTICALS/ MACRO-LESSON PLAN

Unit No	**Unit**	**Number of hrs.**	**Marks**
1	General Safety, Housekeeping, Fire Fighting & First Aid		10
2	Fitting Workshop Practice		30
3	Carpentry Workshop Practice		20
4	Electrical Workshop Practice		30
5	Plumbing		10
	Total		100

8. SPECIFICATION TABLE FOR TERM WORK & PRACTICALS HOURS

No	Practical	Hrs.
1	**General Safety, Housekeeping, Fire Fighting & First Aid**	**06**
a	Demonstration on use of Safety Measures while working in Workshop and use of safety signs.	03
b	Demonstration on use of First Aid and Artificial Respiration procedure ,Training on fire and emergency services (using video presentation /fire and safety expert talk)	03
2	**Fitting Workshop Practice**	**18**
a	Identification of various hand Tools, Measuring and Marking Tools, cutting tools, Holding tools, Striking tools	03
b	Identification of various types of files and demonstration on filing methods.	03
c	Identification of various types of Drill bits, taps, dies and Drilling machines such as portable and Pillar Drilling machine.	03
d	Job involving filing, marking, cutting operation on MS Flat.	06
e	Job involving Drilling and Tapping operation on MS flat.	03
3	**Carpentry Workshop Practice**	**18**
a	Identification of various types of woods and wood working hand tools	03
b	Identification of various types of Carpentry joints and their usage.	03
c	Introduction to wood working machines such as wood working Lathe, Circular saw ,Band saw, Wood planner, Universal wood working machine	03
d	Job involving marking, measuring, planning, sawing, chiseling, joint preparation and assembly of wooden blocks.	06
e	Preparation of job on wood working lathe.	03
4	**Electrical Workshop Practice**	**32**
a	Measurement of Single Phase and Three Phase supply Voltage using multimeter.	02
b	Identification of various hand tools used in electrical trade.	02
c	Measurement of electric circuit parameters using Ammeter, Voltmeter, Frequency meter, Wattmeter.	04

d	Making of Straight and T wire joints.	02
e	Testing of electrical components such as Choke, starter, Fuse, Switch using Series Test lamp and Multimeter	02
f	Starting of induction motor using DOL Starter	02
g	Reversal of direction of rotation of Three phase induction motor	02
h	Identification of commonly used electrical fittings.	02
i	Wiring of simple electrical circuit using bulb and socket.	04
j	Measurement of Energy using Energy Meter.	02
k	Identification of Different types of Fuses and their replacement in circuit.	02
l	Testing of various components and connection of Tube light circuit.	02
m	Collecting Name plate Details of Motors and Transformers and operating and controlling speed of motor from Control panel.	04
5	**Plumbing**	**06**
a	Identification of Plumbing tools and pipe fittings , Reading of plumbing drawings, methods of joining PVC pipes, use of spirit level and plumb bob in piping.	03
b	To carry out minor repairs and replacement of fittings.	03

9. LEARNING RESOURCES

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S. No.	**Author**	**Title of Books**	**Publishers**
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2	S.K. Hajara-Chaudhary	Workshop Technology	Media Promoters
3	B.S. Raghuwanshi	Workshop Technology-	Dhanpat Rai and sons, New Delhi
4	R K Jain-	Production Technology	Khanna Publishers, New Delhi
5	H. S .Bawa	Workshop Technology	Tata McGraw Hill Publishers, New Delhi
6	Kent	Mechanical Engineering Hand book	John Wiley and Sons, New York

7	B.L. Theraja	Fundamentals of Electrical Engineering and Electronics	S. Chand – New Delhi

REFERENCE BOOKS FOR FURTHER STUDY

S. No.	Author	Title of Books	Publishers
1	CIMI- Central Instructional Media Institute Madras	Turner – Trade Theory – Ist and IInd Year	Wiley Eastern Ltd. New Delhi