



**UTTARAKHAND BOARD OF TECHNICAL EDUCATION**  
**JOINT ENTRANCE EXAMINATION AND TRAINING, RESEARCH DEVELOPMENT CELL, DEHRADUN**  
**STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME**

**BRANCH NAME-COMMON TO ALL ENGINEERING BRANCHES**

**SEMESTER – SECOND**

Subject Code	Subject	L	T	P	T	O	T	EVALUATION SCHEME										Total Marks	Credit Point		
								Internal				External									
								Period/Weeks				Theory		Practical		Theory				Practical	
												Max Marks	Max Marks	Max Marks	Hrs.	Max Marks	Hrs.				
992001	English and Communication Skills –II	3	1	2	6			20	30	50	2:30	50	3:00	150	3						
992002	Applied Mathematics –II	3	2	-	5			50	-	100	2:30	-	-	150	4						
992003	Applied Physics –II	3	1	2	6			25	25	50	2:30	50	3:00	150	4						
992004	Applied Chemistry –II	3	1	2	6			25	25	50	2:30	50	3:00	150	3						
992005	Environmental Science & Energy Management	3	-	-	3			20	-	80	2:30	-	-	100	2						
992006	Engineering Graphics–II	8	-	-	8			50	-	100	3:00	-	-	150	4						
992007	General Workshop Practice –II	-	-	8	8			-	50	-	-	50	3:00	100	5						
992051	General Proficiency#	-	-	6	6			-	25	25	-	-	-	25	-						
992052	Industrial Exposure (Assessment at Inst. Level)+	-	-	-	-			-	25	25	-	-	-	25	-						
TOTAL		23	5	20	48			190	180	430	-	200	-	1000	25						

#General Proficiency will comprise of various co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, NCC, NSS, cultural activities and discipline etc.

+Industrial Exposure compulsory at minimum 2 Industries or Departments

Note:1- Each period will be 50 minutes. 2- Each session will be of 16weeks. 3- Effective teaching will be at least 12.5 week



## ENGLISH AND COMMUNICATION SKILL - II

Subject Code : 992001

L	T	P
3	1	2

### COURSE OUTCOME

After completing this course, the learner will be able to acquire all the four areas of language learning –listening, speaking, reading, writing. While reading and writing skills are parts of theory component, listening and speaking skills will be transmitted through lessons in the practical component. Understanding skills, on the other hand, shall be gained both in theory and practical sessions.

Learning objectives in different areas are defined as follows:

#### I. Reading Skills:

After completing this course, the learner will be able to read and comprehend texts from simple to moderate levels of difficulty

#### II. Writing Skills:

After completing this course, the learner will be able to

- Write simple to moderately complex sentences.
- Develop a simple idea into a short paragraph.
- Write business and personal letters at a functional level.
- Write specific formats like circulars, notices, press release, memo, agenda and minutes, e-mail, resume.

#### III. Listening Skills:

After completing this course, the learner will be able to listen and understand

- The spoken communication of fellow workers.
- News broadcast on TV and Radio.
- Lectures available on the internet.
- Films and shows in theatres and on TV.

#### IV. Speaking Skills:

After completing this course, the learners will be able to communicate ideas with moderate fluency of speech to their fellow-listeners, using moderately correct speech forms and pronunciation so as to be understandable to a mixed English-speaking audience.

**V. Understanding Skills:** After completing this course, the learners will be able to interpret the common and technical conversation in the language.



## Methodology of Revision

Among the five skills listed in the Objectives of the Course, the two skills of Listening and Speaking will be part of practical classes, and will also be tested through Practical Examination. The two skills of Reading and Writing are exclusively the theoretical part of the Course. The fifth skill of Understanding has both theoretical and practical components.

All the five skills are to be taught in both the Semesters. The basics of each component will be covered in Semester I, and relatively advanced topics to be covered in Semester II.

### Theory

Total Marks 40%

1. **Literature:** Fiction and Poetry. Fiction and Poetry are equally part of the reading regimen of any educated person. The lessons are to be equally divided among Indian and English authors. There will be three stories and three poems, six lessons in all. Suggested pieces/authors are: Fiction - Ruskin Bond, R K Narayan; Poetry: Shakespeare, Keats, Tagore

2. **Unseen Comprehension Passage:** Passages from stories and poems appearing in popular newspapers and magazines.

**Language and Writing Skills:** Advanced Specific writing skill Total Marks: 30%

- a) Notice
- b) Circulars
- c) Memo
- d) Agenda for a Meeting
- e) Minutes of the Meeting
- f) Press Release
- g) E-Mail
- h) Resume

### Communication Skills

Total Marks: 30%

#### 1. Barriers to Communication

- a) Barriers on the part of Sender
- b) Barriers on the part of Receiver
- c) Organisational and other barriers

#### 2. Listening as a Tool of Communication

- a) Importance of Listening and Empathy



- b) Common Faults in Effective Listening
  - (1) Listening versus Hearing
  - (2) Poor Listening Habits
- c) Improving Listening Skill
- d) Humour in communication

## ECS SYLLABUS SEMESTER - II THEORY

### I. Reading Skills:

(16 Periods)

#### A Literature: Fiction and Poetry

1. Ruskin Bond : The Prospect Of Flowers
2. R K Narayan : An Astrologer's Day
3. Shakespeare : Let Me Not To The Marriage of True Minds ( Sonnet No. 116)
4. John Keats : Ode To A Nightingale
5. Tagore : Thou Hast Made Me Endless (Verse-I Gitanjali)

**B Unseen Comprehension Passage.** Passages from stories and poems appearing in popular newspapers and magazines.

### II. Language and Writing Skills: Advanced

(20 Periods)

#### Specific writing skills

- a) Notice
- b) Circulars
- c) Memo
- d) Agenda for a Meeting
- e) Minutes of the Meeting
- f) Press Release
- g) E-Mail
- h) Resume

### III. Communication Skills

(12 Periods)

#### 1. Barriers to Communication

- a) Barriers on the part of Sender
- b) Barriers on the part of Receiver
- c) Organisational and other barriers



2. **Listening as a Tool of Communication**
  - a) Importance of Listening and Empathy
  - b) Common Faults in Effective Listening
    - (1) Listening versus Hearing
    - (2) Poor Listening Habits
  - c) Improving Listening Skill
  - d) Humour in communication

**SEMESTER - II PRACTICAL**  
(Listening, Speaking and Communication Skills)

**A. Interviews**

**1. Job Interviews**

- a) Stages of Interview
- b) Face-to-face Interviews: Campus and On Site
- c) Telephonic Interview

**2. Media Interviews**

**3. Press Conference**

**B. Discussions**

1. Introducing Oneself and Others
2. Leading and Directing Discussions
3. Expressing Opinions and Ideas
4. Expressing Agreement / Disagreement
5. Raising Questions

**C. Group Discussions**

1. Speaking in a Group Discussion
2. Discussing Problems and Solutions
3. Using Persuasive Strategies
4. Turn Taking Strategies
5. Effective Intervention
6. Reaching a Decision

**D. Organisational GD**

1. Brainstorming



2. Nominal Group Techniques
3. Delphi Technique
4. GD as Part of a Selection Process

**E. Debate**

1. Art of Debating
2. Debating Local Issues
3. Debating National Issues
4. Debating International Issues

**F. Watching a Film / Visual Presentation**

1. Summarizing the Film / Visual Presentation
2. Critically Appreciating the Main Points
3. Leading a Further Discussion and Debate

**SUGGESTED DISTRIBUTION OF MARKS**

Unit no.	Period Allotted for lectures and Tutorials (Periods)	Marks allotted (%)
1	16	35
2	20	40
3	12	25
<b>TOTAL</b>	<b>48</b>	<b>100</b>

**Reference/text Book**

1. Developing Communication Skills By Krishna Mohan & Meera Banerjee (Trinity Press, New Delhi)
2. Communication Skills By Sanjay Kumar And Pusph Lata (Oxford Univ Press, New Delhi).
3. Wren & Martin High School English Grammar & Composition (S. Chand, New Delhi).
4. English & Communication Skills-1 By Vinit Kumar (Book World, Dehradun)
5. Communication Effectively In English, Book-1 By Revathi Srinivas, Abhisekh Publications, Chandigarh.
6. High School English Grammer And Composition By Wren & martin, S. chand Publication & Company Ltd. Delhi.
7. Communication Technics And Skill By R.K. Chadha; Dhanpat Rai Publications, New Delhi.



Subject Code : 992002

## 1. RATIONALE

Mathematics is the core course to develop the competencies of most of the technological courses. The subject Applied Mathematics is being introduced into the diploma course to provide mathematical background to the students so that they can be able to grasp the engineering subjects properly. Applied Mathematics is widely used in every engineering field. Mathematics is more than too for solving problems. The mathematics course can develop intellectual maturity. This course is an attempt to initiate the multi-dimensional logical thinking and reasoning capabilities. It will help to apply the principles of basic mathematics to solve related technology problems. Hence the course provides the insight to analyze engineering problems scientifically using integration, application of integration, differential equation, coordinate geometry and statistics.

## 2. COURSE OUTCOMES

The theory practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented COs associated with the above mentioned competency:

- a. Apply the concepts of Integration to solve engineering related problems.
- b. Utilize basic concepts of geometry to solve elementary engineering problems.
- c. Apply the concept of differential equation to solve basic engineering problems.
- d. Use basic concepts of statistics to solve engineering related problems.

## 3. THEORY COMPONENTS

The following topics/subtopics should be taught and assessed in order to develop LOs in the cognitive domain for achieving the COs to attain the identified competency.

### Unit. I Co-ordinate Geometry

(25 Periods)

- 1.1 Equation of straight line in various standard forms (one point slope form, slope intercept form, two point form, intercept form & normal form), intersection of two straight lines, angle between two lines. Perpendicular distance formula.
- 1.2 General equation of a circle and its characteristics. To find the equation of a circle given (i) Centre and radius (ii) Three points on it (iii) Co-ordinates of end points of a diameter.
- 1.3 Equations of conics (ellipse, parabola and hyperbola), simple problems related to engineering (standard forms only).



## Unit. II Integral Calculus

(30 Periods)

- 1.1 Integration as inverse operation of differentiation with simple examples.
- 1.2 Simple Standard integrals and related problems.
- 1.3 Simple integration by substitution, by parts and by partial fractions (for linear factors only).
- 1.4 Properties of definite integrals.
- 1.5 Evaluation of definite integrals (simple problems)-

$$\text{Evaluation of } \int_0^{\pi/2} \sin x \, dx, \int_0^{\pi/2} \cos^n x \, dx, \int_0^{\pi/2} \sin^m x \cos^n x \, dx,$$

using formulae without proof (m and n being positive integers only)

- 1.6 Applications of integration for:-

- (a) Simple problem on evaluation of area bounded by a curve and axes.
- (b) Calculation of volume of a solid formed by revolution of an area about axes (Simple problems).
- (c) Numerical integration by Simpson's Rule and Trapezoidal Rule (Simple problems).

## Unit. III Ordinary Differential Equations

(10 Periods)

- 1.1 Definition, Order, Degree, Linear and Non-linear differential equations.
- 1.2 Formation of differential equations (upto second order).
- 1.3 Solution of first order differential equation-
  - (a) Variable Separable
  - (b) Homogeneous
  - (c) Reducible to Homogeneous
  - (d) Linear differential equation
  - (e) Bernoulli's Equation (simple problem)
  - (f) Exact differential Equation.

## Unit. IV Statistics

(15 Periods)

- 1.1 Measures of Central Tendency: Mean, Median, Mode
- 1.2 Measures of Dispersion: Mean deviation, Standard deviation
- 1.3 Co-efficient of rank correlation.

Suggested distribution of marks

Topic No.	Period allotted for lectures and tutorials (Periods)	Marks Allotted
1	25	30
2	30	35
3	10	15
4	15	20
Total	80	100



## Reference Book/Text Book

1. Higher Algebra By Hall & Knight
2. Plane Trigonometry By S.L. Loney
3. Engineering Mathematics By Sastry (Phi Learning)
4. Engineering Mathematics By B.S. Grewal (Khanna Publishers)
5. Engineering Mathematics By A.B. Mathur (Khanna Publishers)
6. Applied Mathematics-I & II, By M.K. Kanyal (Khanna Publishers, New Delhi)
7. Applied Mathematics-I, By Dr A.K. Sinha, Satyaprakashan, New Delhi
8. Engineering Mathematics, By C.B. Gupta, S.R. Singh, Mukesh Kumar, Mc Graw Hill Education.
9. Applied Mathematics By R.D. Sharma, Dhanpat Rai Publications, New Delhi
10. Engineering Mathematics, Vol-I & II, By S.S. Sabrwal And Sunita Jain, Eagle Prakashan, Jalandher
11. Basic Engineering Mathematics, By Jhon Bird, Newnes Publications.
12. A Text Book Of Engineering Mathematics, By A. Ganesh, G. Balasubramnium.
13. Polytechnic Mathematics, By Dr. D.S. Prakash, S. Chand, Publications, New Delhi.
14. A Text Book Of Engineering Mathematics, By N.P. Bali & Dr. Manish Goyal, Kindly Publication.
15. Engineering Mathematics, By C.B. Guta, S.R. Singh & Mukesh Kumar, Mc Graw-Hill Publications, Delhi
16. Applied Mathematics, By Kapoor, Nav Distributor, Meerut.



L	T	P
3	1	2

Subject Code : 992003

### **RATIONALE**

Applied physics includes the study of a large number of diverse topics all related to things that go on in the world around us. It aims to give an understanding of this world both by observation and by prediction of the way in which objects will behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content.

**Note:-** Teachers should give examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles.

### **DETAILED CONTENTS**

#### **UNIT-I Structure of atom and Origin of Spectra (Qualitative only) (08 Periods)**

- 1.1 Thomson's Model of atom, Rutherford's Model, Bohr's Model ,
- 1.2 Energy - levels of atom - concept of energy levels, ionizations and excitation potentials, Energy Band
- 1.3 Spectrum- Emission Spectrum & Absorption Spectrum Line Spectrum and Band Spectrum
- 1.4 Optics: Review of basic optics laws: reflection and refraction
- 1.5 Refraction and refractive index, total internal Reflection and their applications

#### **UNIT-II Electrostatics**

**(13 Periods)**

- 2.1 Coulomb's law, unit of charge, electric potential and electric potential difference
- 2.2 Electric field, electric field intensity, electric lines of force, electric flux and Gauss's Law
- 2.3 Applications of Gauss law in finding electric field of point charge, straight charged conductor, plane charged sheet and between two plane parallel charged sheets
- 2.4 Capacitance: types of capacitors, capacitance of parallel plate capacitor, series and parallel combination of capacitors, Dielectric and its effect on capacitance, and dielectric break down
- 2.5 Application of electrostatics in electrostatic precipitator

#### **UNIT-III Electricity**

**(12 Periods)**

- 3.1 Concept of electricity, current and its unit, direct and alternating current, voltage, resistance and resistivity, potential difference and e.m.f.



3.2 Ohm's law and its applications, concept of resistance, conductance, specific resistance, effect of temperature on resistance, temperature co-efficient of resistance, series and parallel combination of resistors. Introduction to super conductivity.

3.3 Kirchhoff's laws, Wheatstone bridge principle and its applications (Slide Wire Bridge)

3.4 Heating effect of current and concept of electric power, energy and their units, related numerical problems.

#### UNIT-IV Electromagnetism

(13 Periods)

4.1 Magnetic field and its unit, magnetic intensity, magnetic lines of force, magnetic flux and their units, Right hand thumb rule, magnetic lines of force due to straight conductor, circular coil and solenoid

4.2 Force on a charge moving in a uniform magnetic field (Lorentz force). Force on a current carrying straight conductor. Torque on a current carrying rectangular coil. Force between two infinite parallel current carrying conductor.

4.3 Moving coil galvanometer; its principle, construction and working, conversion of a galvanometer into ammeter and voltmeter.

4.4 Electromagnetic induction; Faradays Laws, Lenz's Law. Self and Mutual Induction, Eddy current

#### UNIT-V Semiconductor physics

(08 Periods)

5.1 Energy bands, intrinsic and extrinsic semiconductors, p-n junction diode and its characteristics

5.2 Diode as rectifier – half wave and full wave rectifier. Transistor: pnp and npn (concept only). Types of Diodes

#### UNIT-VI Modern Physics

(10 Periods)

6.1 Electromagnetic spectrum, photo electric effect and work function, X rays-properties, Applications of X-rays in medicine and industries.

6.2 Lasers: spontaneous and stimulated emission; lasers and its characteristics, population inversion, types of lasers and its engineering and medical applications.

6.3 Fiber optics: introduction to optical fiber materials, types, light propagation and applications in Communication and Medical.

#### LIST OF PRACTICALS (To perform minimum Six experiments)

1. Conversion of Galvanometer into an Ammeter of given range.
2. Conversion of Galvanometer into Voltmeter of given range.
3. To verify ohm's laws by drawing a graph between voltage and current.
4. To verify laws of resistances in series and in parallel combinations.
5. To draw characteristics of a pn junction diode and find resistance of diode



6. Verification of Kirchhoff's Laws
7. Determination of resistivity by Meter bridge
8. To assemble the components of a given electrical circuit.
9. To identify a Diode, LED, transistor, Resistor, Capacitor from mixed collection of such items and draw their notation.
10. Use of Multi meter to :
  - (i) To measure value of given resistance.
  - (ii) Distinguish between n-p-n and p-n-p transistors.
  - (iii) See the unidirectional flow of a current in case of a Diode and LED

### INSTRUCTIONAL STRATEGY

Teacher may use various instructional media like models, charts and graphs while imparting instructions. The field application should be made clear before teaching the basics of waves, sound, light, electrostatics, dc circuits, electromagnetism, and semiconductor physics etc to develop proper understanding of the physical phenomenon. Use of demonstration can make the subject interesting and develop scientific temper in the students.

### SUGGESTED DISTRIBUTION OF MARKS

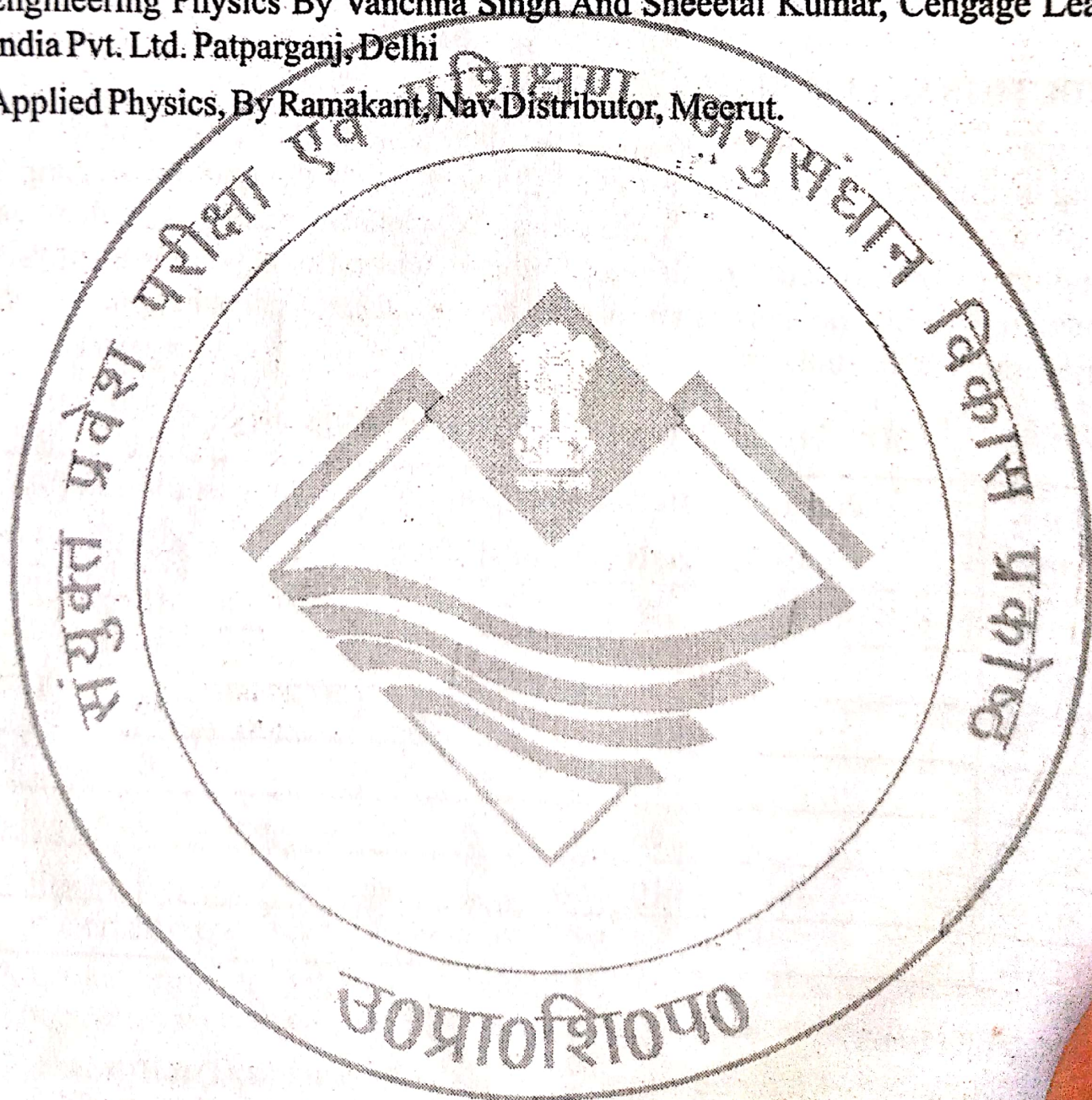
Unit no.	Period Allotted for lectures and Tutorials (Periods)	Marks allotted (%)
1	08	15
2	13	20
3	12	20
4	13	20
5	08	10
6	10	15
TOTAL	64	100

### Reference/Text Book

1. Applied Physics By Arthur Beiser (Mcgraw Hill Education, New Delhi)
2. Physics By Resnick & Halliday (Wiley India, New Delhi)
3. Engineering Physics By Gaur & Gupta (Dhantpat Rai, New Delhi)
4. Engineering Physics By Marikani (Phi Learning New Delhi)
5. Engineering Physics, By S.K. Malik, A.K. Singh, Mc Graw Hill Education.
6. Text Book Of Physics For Class XI (Part-I, Part-II) N.C.E.R.T
7. Text Book Of Physics For Class XII (Part-I, Part-II) N.C.E.R.T
8. Applied Physics Vol. I And Vol. II, Tti Publications, Tata Mcgraw Hill, New Delhi.



9. Concepts In Physics By H.C. Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi.
10. Berkeley Physics Course, Vol. I, II & III, Tata Mcgraw Hill, Delhi
11. Comprehensive Practical Physics, Vol. I & II, J.N. Jaiswal, Laxmi Publishers
12. Engineering Physics By P.V. Naik, Pearson Education Pvt. Ltd, New Delhi
13. Applied Physics I & II By R.A. Banwait & R Dogra, Eagle Parkashan, Jalandhar
14. Applied Physics By Jasmer Kaur And Bhupinder Singh, Lords Publications, Jalandhar
15. Applied Physics -1 By Dr. Prajapati Palariya ( Khanna Publishers, New Delhi)
16. Engineering Physics By Vanchna Singh And Sheetal Kumar, Cengage Learning india Pvt. Ltd. Patparganj, Delhi
17. Applied Physics, By Ramakant, Nav Distributor, Meerut.





Subject Code : 992004

L	T	P
3	1	2

**RATIONALE**

The role of Chemistry and chemical products in every branch of engineering is expanding greatly. Now a days various products of chemical industries are playing important role in the field of engineering with increasing number of such products each successive years. The strength of materials, the chemical composition of substances, their behaviour when subjected to different treatment and environment, and the laws of heat and dynamic energy have entered in almost every activity of modern life. Chemistry is considered as one of the core subjects for diploma students in engineering and technology for developing in them scientific temper and appreciation of chemical properties of materials, which they have to handle in their professional career. Effort should be made to teach this subject through demonstration and with the active involvement of students.

**DETAILED CONTENTS****1. Metallurgy****(12 Periods)**

- 1.1 Introduction of Metallurgy, mineral, ore, gangue or matrix, flux and slag, Concentration methods of the ores, roasting, calcination, smelting and refining as applied in relation to various metallurgical operations
- 1.2 Metallurgy of (i) Aluminum (ii) Iron
- 1.3 Definition of an alloy, purposes of alloying, composition and uses of alloys like magnalium, duralumin, alnico, invar and stainless steel.

**2. Fuels and combustion****(16 Periods)**

- 2.1 Introduction of 'Fuel', characteristics of a good fuel and classification of fuels with suitable examples
- 2.2 Definition of Calorific value of a fuel and its determination for a solid fuel with the help of Bomb calorimeter with simple numerical problems.
- 2.3 Manufacture, composition, properties and uses of (i) Water gas (ii) Oil gas (iii) Biogas (iv) Compressed Natural gas (CNG)
- 2.4 Octane Number, Cetane Number and Power alcohol
- 2.5 Nuclear Fuel-Fission and fusion.

**3 Corrosion and its Preventions****(08 Periods)**

- 3.1 Meaning of the term 'corrosion' and its definition



3.2 Theories of corrosion (i) direct chemical action theory and (ii) electro chemical theory

3.3 Prevention of corrosion by

- (a) Alloying
- (b) Providing metallic coatings
- (c) Sacrificial cathodic protections

#### 4 Lubricants

(08 Periods)

4.1 Definition of (i) lubricant (ii) lubrication

4.2 Classification of lubricants.

4.3 Principles of lubrication

- (i) fluid film lubrication.
- (ii) boundary lubrication.

4.4 Properties of lubricants

4.5 Importance of additives in lubricants

4.6 Dewaxing and solvent refining of liquid lubricants

#### 5. Silicate Technology

(04 Periods)

5.1 General introduction to cement, varieties of cements raw materials of cements.

5.2 Manufacture of Cement (i) Wet Process (ii) Dry Process. Setting and Hardening of cements.

5.3 Definition of Glass, Different variety of glass, raw material, Manufacture of glass.

#### 6. Classification and Nomenclature of Organic Compounds

(16 Periods)

6.1 Classification of Organic Compounds, functional group, Homologous Series, difference between organic and inorganic compound.

6.2 Physical and Chemical properties and industrial use of Organic Compound

6.3 IUPAC system of nomenclature of Carboxylic acid, Alcohols, Phenols, Aldehydes, Ketones and Amines (first five members of each series only).

#### 7. Chemistry of engineering material

( 08 Periods)

7.1 Introduction and Definition of Polymers.

7.2 Plastics-

7.2.1 Classification and constituent, Type of polymerization Thermoplastic and Thermosetting polymer.



7.2.2 Preparation Properties and uses of polyethylene, Bakelite, terylene, PVC, Teflon, Urea, Formaldehyde and Nylon.

7.3 Rubber -

7.3.1. Natural Rubber and vulcanization of rubber, Synthetic Rubber, Buna-N, Buna-S, Butyl and Neoprene.

### LIST OF PRACTICALS

1. Gravimetric analysis and study of apparatus used there in.
2. To determine the percentage composition of a mixture consisting of a volatile and a non-volatile substances.
3. Estimate the amount of moisture in the given sample of coal.
4. Esterification and ceric ammonium tests of alcohol.
5. Sodium carbonate and Ester test of carboxylic acids
6. To determination the amount of copper in the given sample of copper sulphate with the help of N/20 sodium thiosulphate solution.
7. Detection of metal iron in the rust (solution of rust in concentrated HCl may be given)
8. Demonstration to determine calorific value of a solid fuel with the help of Bomb Calorimeter.

### SUGGESTED DISTRIBUTION OF MARKS

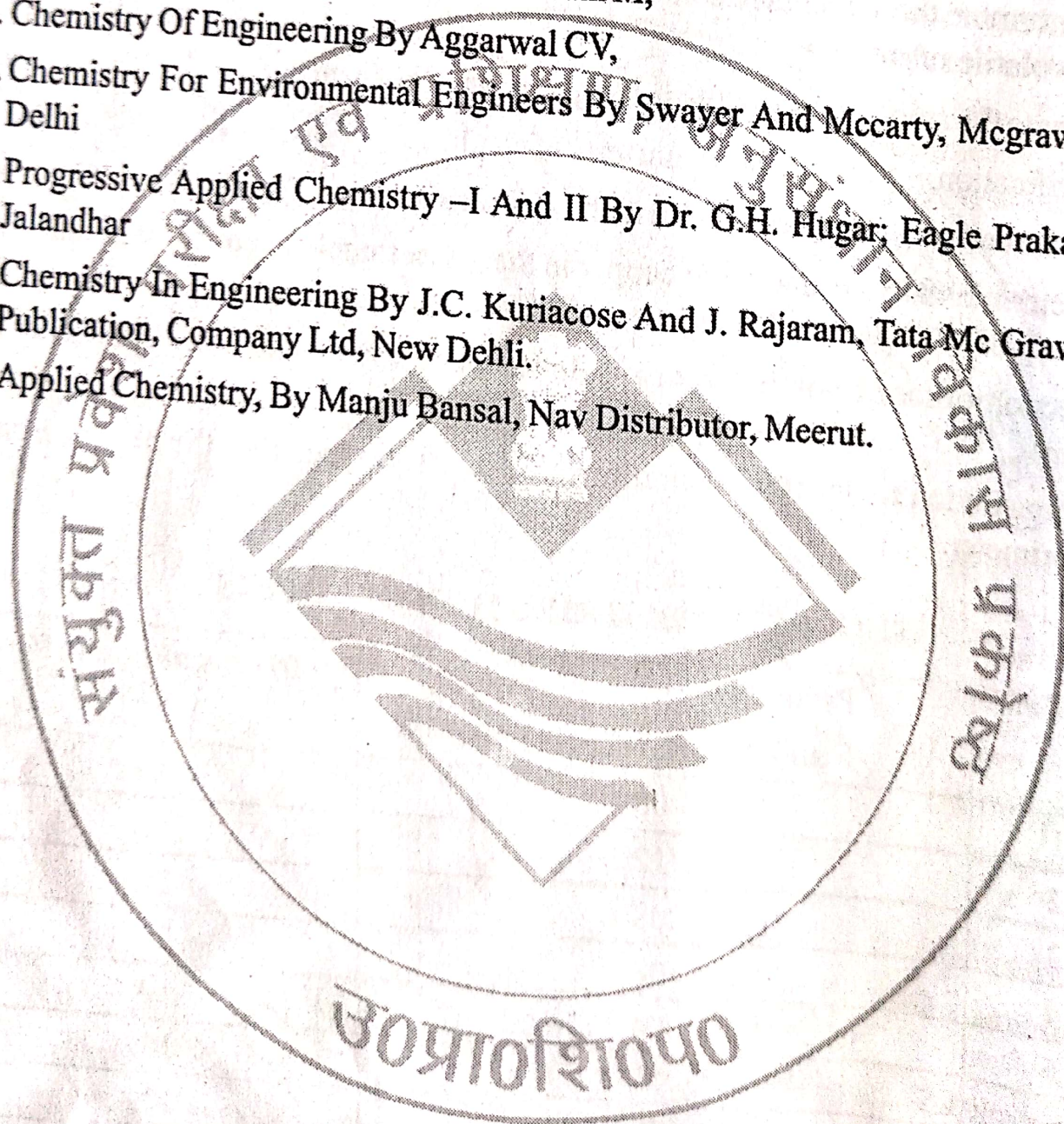
Topic No.	Period Allotted for lectures and Tutorials (Periods)	Marks allotted (%)
1	08	10
2	12	20
3	08	20
4	08	20
5	04	10
6	16	10
7	08	10
Total	64	100

### Reference Book/Text Book

1. Engineering Chemistry By Jain & Jain (Dhanpat Rai, Delhi)
2. Engineering Chemistry By S. S. Dara (S. Chand, New Delhi)
3. Engineering Chemistry By K. S. Quansong (Phi Learning New Delhi)
4. Engineering Chemistry By O. P. Agarwal (Khanna Publishers, New Delhi)



5. Chemistry In Engineering By J.C. Kuriacose And J. Rajaram; Tata Mcgraw-Hill Publishing Company Limited, New Delhi
6. Engineering Chemistry By Dr. S. Rabindra And Prof. B.K. Mishra; Kumar And Kumar Publishers (P) Ltd. Bangalore-4
7. A Text Book Of Applied Chemistry-I By Ss Kumar; Tata Mcgraw Hill, Delhi
8. A Text Book Of Applied Chemistry-I By Sharma And Others; Technical Bureau Of India, Jalandhar
9. Applied Chemistry-I By Dr Indu Singh ( Book World Dehradun)
10. Engineering Chemistry By Jain Pc And Jain M,
11. Chemistry Of Engineering By Aggarwal CV,
12. Chemistry For Environmental Engineers By Swayer And Mccarty, Mcgraw Hill, Delhi
13. Progressive Applied Chemistry –I And II By Dr. G.H. Hugar; Eagle Prakashan, Jalandhar
14. Chemistry In Engineering By J.C. Kuriacose And J. Rajaram, Tata Mc Graw-Hill Publication, Company Ltd, New Dehli.
15. Applied Chemistry, By Manju Bansal, Nav Distributor, Meerut.





# ENVIRONMENTAL SCIENCE AND ENERGY MANAGEMENT

L	T	P
3	-	-

Subject Code : 992005

## RATIONALE

The importance of environment science cannot be disputed. The need for sustainable development is a key to the future of mankind. A diploma holder must have knowledge of different types of pollution caused due to industries, constructional activities and agricultural inputs so that he may help in balancing the ecosystem and controlling pollution by pollution control measures. He should also be aware of various social issues on environment and environment laws related to the control of pollution.

One of the reasons for India not been able to catch up with the desired extent of modernization of industrial processes in light of challenges posed by multinationals is the non-availability of required energy supply. The solution primarily lies in tapping all possible energy generation sources and efficient use of available energy important. Energy management focuses on these aspects. This course will develop awareness amongst the diploma engineers and will enable them to practice the energy management techniques in whatever field they are engaged in.

## DETAILED CONTENTS

### Unit : 1 Environment, Ecosystem and Natural Resources.

(11 Periods)

- Definition of Environment.
- Scope of Environment.
- Effects of Environment on human life.
- Concept of ecosystem.
- Components of ecosystem.
- Structure of ecosystem.
- Function of ecosystem.
- Aspects, Methods, objectives and principle of sustainable Development.
- Water and forest resources.

### Unit: 2 Environmental Pollution, Social issues and the Environment.

(12 Periods)

- Air pollution
- Water Pollution
- Soil Pollution



- Marine pollution
- Noise pollution
- Thermal pollution
- Solid waste Management : Nature of wastes, Disposal methods, waste-to-energy, Industrial waste.
- Role of an individual in prevention of pollution.

### **Unit :3 Social Issues and Environment**

**(10 Periods)**

- Water conservation, rain water harvesting, water shed management.
- Climate change, global warming, acid rain, ozone layer depletion.
- Disaster management.
- Green Building Technology
- Environment Protection Act.
- Air (prevention and control of pollution) Act.
- Water (prevention and control of pollution) Act.
- Role of Organic farming, bio-fertilizers and bio-pesticides in environment protection.

### **Unit : 4 Energy Conservation efficiency and energy Audit**

**(10 Periods)**

- Energy Conservation and objectives.
- Energy efficiency.
- Energy Conservation in lighting arrangement and appliance used in domestic sector.
- Needs for energy efficient devices.
- Energy efficient motors.
- How to maximize the efficiency of equipments.
- CFL and LED lamps.
- Needs of energy audit.
- Energy Audit methodology.
- About bureau of Energy efficiency and its scheme.

### **Unit : 5 Renewable Energy**

**(5 Periods)**

- Introduction.
- Types of Renewable Energy source.
- Electric vehicle

### **Recommended Books :**

- Fundamental concept in Environmental Studies, D D Mishra, S Chand & Co Ltd.



- Environmental Science by Deswal and Deswal, Dhanpat Rai and Sons Ltd.
- Handbook of Organic farming by P.D. Gera, Abhishek Publications, New Delhi.
- Environmental studies by Daniel, Wiley India. M Ajni Reddy, Text book of Environmental Science, BS Publication, Hyderabad.
- Manual on Energy Efficiency at Design Stage, CII Energy Management Cell
- Manual on Energy Efficiency in Pumping System, CII Energy Management Cell
- Manual on Variable Speed Drives for Energy Efficiency CII Energy Management Cell
- Energy Conservation-case studies in ceramic industry, sugar industry, fertilizer industry, cement industry, CII, Energy Management Cell etc.

### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Period Allotted for Lectures (Periods)	Marks Allotted (%)
1	11	20
2	12	25
3	10	20
4	10	25
5	5	10
Total	48	100

### Recommended Books :

1. Fundamental Concept In Environmental Studies, D.D. Mishra, S. Chand & Co Ltd.
2. Environmental Science By Deswal And Deswal, Dhanpat Rai And Sons Ltd.
3. Handbook Of Organic Farming By P.D. Gera, Abhishek Publications, New Delhi.
4. Environmental Studies By Daniel, Wiley India.
5. M. Ajni Reddy, Text Book Of Environmental Science, B.S. Publication, Hyderabad.
6. Manual On Energy Efficiency At Design Stage, CII Energy Management Cell
7. Manual On Energy Efficiency In Pumping System, CII Energy Management Cell
8. Manual On Variable Speed Drives For Energy Efficiency CII Energy Management Cell
9. Energy Conservation-Case Studies In Ceramic Industry, Sugar Industry, Fertilizer Industry, Cement Industry, CII, Energy Management Cell Etc.



Subject Code : 992006

L	T	P
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**RATIONALE**

Engineering Graphics is said to be the language of engineers and technicians. Reading and interpreting Engineering Graphics is their day-to-day responsibility. The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering graphics, their reading and interpretation.

- Note: 1. First angle projection is to be followed  
 2. Minimum of 15 sheets to be prepared by each student  
 3. SP 46 – 1988 should be followed.  
 4. Instructions relevant to various drawings may be given along with Appropriate demonstration, before assigning drawing practice to the Students.

**DETAILED CONTENTS**

**Unit 1 Introduction to Section of Solids – (12 Periods)**  
 Why is sectioning necessary, Hatching – BIS Conventions, Section of Prisms and Cubes, Section of Pyramids and Tetrahedrons, Section of Cylinders, Section of Cones, Section of Spheres, Section of Combinations of Solids and Section of Truncated or Frustum Solid, Sectional views & Conventions of Materials and Steel Sections (03 sheets)

**Unit 2 Development of Surfaces – (12 Periods)**  
 Method of development of Lateral surface, Development of Cubes, Development of Prism and Cylinder, Development of Truncated Prism and Cylinders, Development of Pyramids and Cones, Development of Frustum or Truncated Pyramids and Cones and their Application Such as Tray, Funnel, Chimney, Pipe Bends etc. (03 sheets)

**Unit 3 Threads (03 sheets) (12 Periods)**  
 Nomenclature of threads, Types of threads, Forms of various external thread, Sections such as V, Square and Acme threads, BA, BSW and Knuckle, Metric, Seller Thread, Buttress Threads, Simplified conventions of left hand and right hand threads, both external and internal threads, Single start, double start and multiple start threads

**Unit 4- Nuts and Bolts (03 sheets) (09 Periods)**  
 Different views of hexagonal and square nuts; Assembly of hexagonal headed, square headed, square headed with square neck, bolts with hexagonal and square nuts and washers. Locking Devices - Lock nut, castle nut, split pin nut, sawn nut, slotted nut



**Unit 5 - Screws, Studs and Washers (02 sheet)****(09 Periods)**

Drawing various types of machine screws, Drawing various types of studs and set screws, drawing various type of wooden screws

**Unit 6 - Keys and Cotters (03 sheets)****(12 Periods)**

Various types of keys and cotters and their practical application and Preparation of drawing of various keys and cotters showing keys and Cotters in position, Cotter joints  
(i) Gib and Cotter Joint (ii) Knuckle Joint

**Unit -7 Free hand sketching (03 sheets)****(15 Periods)**

Rivets and Riveted Joints Types of structural and general purposes rivet heads, Caulking and fullering of riveted joints, Types of riveted joints – lap, butt (single riveted, double riveted lap joint, single cover plate and double cover plate), chain and zig – zag riveting, Muff or Box coupling, half lap muff coupling

**Unit-8 QCAD Window (for Practical's and viva only)****(15 Periods)**

Drawing Lines- Point Line, Point Line Extended, Line From an Angle, Horizontal Line, Vertical Line, 2-Point Rectangle, Rectangle with Dimensions, Angle Bisector, Parallel Line, with Distance, Parallel Line thru a Point, Line Tangent to Point and Circle or Arc, Line Tangent to 2-Circles or Arcs, Line from Relative Angle, Orthogonal Line, Polygon Centre and Point, Polygon 2-Points. Modify Tools- Move Tool, Rotate Tool, Scale Tool, Mirror Tool, Move and Rotate Tool, Rotate Tool, Trim Tool, Trim Both Tool, Lengthen and Shorten Tool, Stretch Tool, Clip to Rectangle Tool. Text Tools- Text Size and Layers, Text Tool Window, Complex Text in Dimensions, Edit Text with Property Editor

Block- Insert Block, Modify Block Insertion Parameters, Replicate Block in Drawing with, Modify Tool, Block Configure Menu, Where is Block Stored, Create and Edit a Block Create Empty Block.

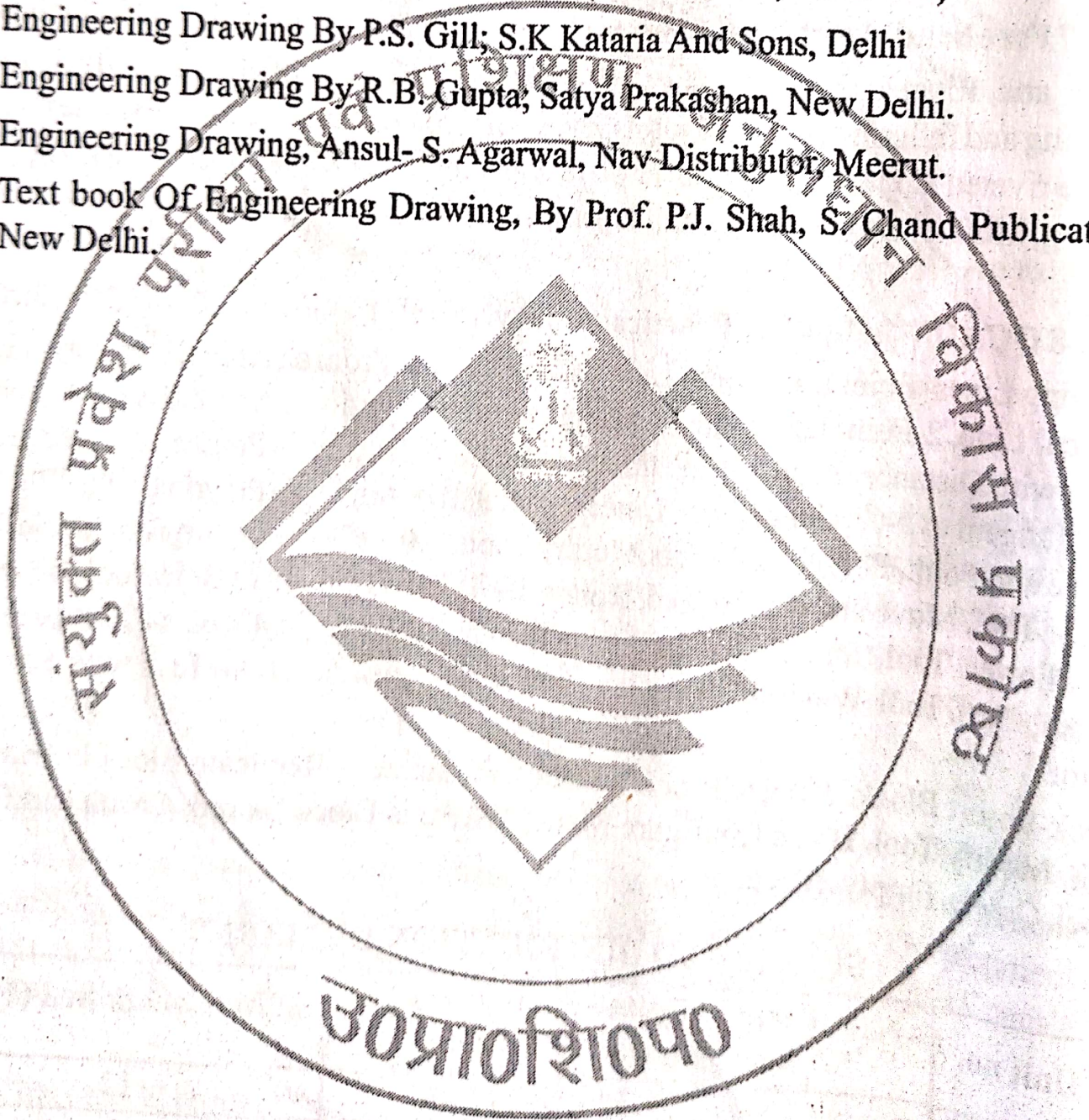
**SUGGESTED DISTRIBUTION OF MARKS**

Unit no.	Period Allotted for lectures and Tutorials (Periods)	Marks allotted (%)
1	12	12
2	12	12
3	12	12
4	9	10
5	9	10
6	12	12
7	15	16
8	15	16
<b>Total</b>	<b>96</b>	<b>100</b>



### Reference/Text Book

1. Engineering Drawing By N.D. Bhatt (Charotar Pub House, Anand (Guj))
2. Engineering Drawing And Graphics+ Autocad By Venugopal (New Age Publication, Delhi)
3. Engineering Drawing By R.K. Dhawan (S. Chand Co.)
4. Engineering Drawing By C.M. Verma, Takniki parkashak, Roorkee.
5. A Text Book Of Engineering Drawing By Surjit Singh; Dhanpat Rai And Co., Delhi
6. Engineering Graphics – I By Vivek Goel ( Book World, Dehradun)
7. Engineering Drawing By P.S. Gill; S.K Kataria And Sons, Delhi
8. Engineering Drawing By R.B. Gupta, Satya Prakashan, New Delhi.
9. Engineering Drawing, Ansul- S. Agarwal, Nav-Distributor, Meerut.
10. Text book Of Engineering Drawing, By Prof. P.J. Shah, S. Chand Publications, New Delhi.





Subject Code : 992007

L	T	P
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**RATIONALE**

The student will be able to know basic workshop processes. Read and interpret job drawings. Identify, select and use various marking, measuring, holding, striking cutting tools & equipments in different shops. Operate, control different machines and equipments. Select proper welding rods and fluxes. Produce jobs as per specified dimensions. Adopt safety practices while working on various machines.

**DETAILED CONTENTS (PRACTICALS)**

Note: The students are supposed to come in proper workshop dress prescribed by the institute. Wearing shoes in the workshop(s) is compulsory. Importance of safety and cleanliness, safety measures and upkeep of tools, equipment and environment in each of the following shops should be explained and practiced. The students should prepare sketches of various tools/jobs in their practical Notebook.

**COURSE CONTENT****1. SHEET METAL SHOP****(30 Periods)**

- 1.1 Layout of Shop
- 1.2 Sketch & Label Details of shop layout.
- 1.3 Know the different jobs produced in sheet metal shop e.g. Open tray, cylinder, prism, Funnel etc.
- 1.4 Commonly used raw materials: -M.S. sheet (black), G.I. sheet, M.S. Rivets, and aluminum rivet etc.
- 1.5 Understand foil, sheet and plate.
- 1.6 Tools used:-Different snips, shears, stacks, latter punch, figure punch, Solid punch, hollow punch, mallet, soft hammers, channel, Square bars, std. Sheet gauge.
- 1.7 Types of Joints and Operations- Introduction of various sheet metal operations & joints e.g. seaming, single seam, double seam, Grooved seam, corner joint, cap joint etc.
- 1.8 Preparation of job (any two): - Open tray, cylinder, prism, Funnel etc.
- 1.9 Choose correct shape & size of sheet for a given job drawing considering allowances for joint or seam.
- 1.10 Do marking as per drawing using correct method, tools and sequence.



- 1.11 Identify correct operation e.g. shearing, punching, bending, debarring, folding, strengthening, stamping, riveting, etc.
- 1.12 Select appropriate Tool , inspection & measuring Instruments.
- 1.13 Holding the job in correct position.
- 1.14 Perform the operation with appropriate body posture, method & precision exercising personal Judgment of need of the force.
- 1.15 Inspect for proper joint quality and take remedial steps.

## 2. WELDING SHOP

(30 Periods)

- 2.1 Layout of Shop
- 2.2 Sketch & Label Details of shop Layout
- 2.3 Types of welding
- 2.4 Type of jobs produced in Welding shop e.g. Lap joint, single butt, double butt, corner, T joint, etc
- 2.5 Tools & equipments used:- Specifications & use of various tools and equipments used in Welding shop e.g. . A.C. welding transformer, Gas welding set, electrode used, chipping hammer, wire brush, shield, gloves, apron etc
- 2.6 Preparation of job: - Lap joint, single butt, double butt, corner, T joint, etc.
- 2.7 Safety measures:- Know the safety regulation in Welding shop.

## 3. BLACKSMITHY SHOP

(25 Periods)

- 3.1 Understand the function of black smithy & forging shop
- 3.2 Layout of Shop
- 3.3 Sketch & Label Details of shop layout
- 3.4 Know the different jobs produced in smithy shop e.g. round to hexagonal shapes or vice versa J-hook, S-hook, circle, chain etc
- 3.5 Commonly used raw materials: - M.S. Bars of different shapes and size
- 3.6 Smithy Tools: - Know various smithy tools with their specifications e.g. different type of hammers, hot / cold chisel, flatters, tongs, leg vice, swage, block, anvils, open hearth and furnaces etc
- 3.7 Preparation of job : J-hook, S-hook, chain, circle, tong, chisel etc.
- 3.8 Safety measures: Know the safety regulation in black smithy shop

## 4. ELECTRONIC SHOP

(25 Periods)

- 4.1 Identification and familiarization with the following tools used in electronic shop: Such as Tweezers, Screw drivers (different sizes), Insulated Pliers, Cutter, Sniper, Philips Screw Driver (Star Screw Driver), L- Keys, Soldering Iron, soldering wire, flux. Their demonstration and uses.



- 4.2 Identification and familiarization with Multimeter (analog and digital)
- 4.3 Identification and familiarization with ear phone speaker connector, telephone jacks and similar male and female connectors (audio, video)
- 4.4 Identification and familiarization with soldering and desoldering practice
- 4.5 Introduction to thimbles and crimping tools
- 4.6 Cut, strip, join an insulated wire with the help of soldering iron with different types of wires

(18 Periods)

## 5. PLASTIC MOULDING

- 5.1 Know the commonly used plastic materials i.e. Thermosetting, Thermo plastic.
- 5.2 Sketch & label various parts of bench moulding m/c
- 5.3 Production of any product on bench moulding m/c

### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Period Allotted (Hrs)	Marks Allotted (%)
1	30	30
2	30	30
3	25	20
4	25	10
5	18	10
Total	128	100

### Reference/Text book

1. Workshop Technology By R.S. Khurmi (S. Chandpubsihers)
2. Workshop Technology By Hajra Chaudhry Part 1 & 2 (Media Promoter, Mumbai)
3. Workshop Technology By T.L. Choudhary (Khanna Publishers, New Delhi)
4. Workshop Technology By Raghuvanshi Part 1 & 2 (Dhanpat Rai & Co.,)
5. Workshop Technology I, II, III, By S.K. Hajra, Choudhary And A.K. Chaoudhary. Media Promoters And Publishers Pvt. Ltd., Bombay
6. Workshop Technology By Manchanda Vol. I, II, III India Publishing House, Jalandhar.
7. Manual On Workshop Practice By K. Venkata Reddy, K.L. Narayana Et Al; Macmillan India Ltd. New Delhi
8. Basic Workshop Practice Manual By T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
9. Workshop Technology By B.S. Raghuvanshi, Dhanpat Rai And Co., New Delhi
10. Workshop Technology By H.S. Bawa, Tata McGraw Hill Publishers, New Delhi.
11. Workshop Technology by HS Bawa, Tata McGraw Hill Publishers, New Delhi.



7. Basic Workshop Practice Manual By T. Jeyapoovan; Vikas Publishing House (p) Ltd., New Delhi
8. Workshop Technology By B.S. Raghuwanshi, Dhanpat Rai And Co., New Delhi
9. Workshop Technology By H.S. Bawa, Tata Mcgraw Hill Publishers, New Delhi.

