

GOVERNMENT OF ASSAM
DIRECTORATE OF TECHNICAL EDUCATION
ASSAM



FINALDRAFT SYLLABUS OF 2nd SEMESTER

| DRAFT COURSE STRUCTURE OF 2nd SEMESTER (COMMON) | | | | | | | | | | | | | | | |
|---|----------|------------------------------|----------------------|---|-----------|-------------------|----------------|----|---------------|-----------------------|----------------------------|---------------|--------------------------|-------|--------|
| Sl No | Code No. | Subject | Study Scheme | | | Evaluation Scheme | | | | | | | | Total | Credit |
| | | | (Contact hours/week) | | | Theory | | | | Practical | | | Marks(Theory+ Practical) | | |
| | | | L | T | P | ESE | Sessional (SS) | | Pass(ESE +SS) | Practical Test (PT) # | Practical Assessment(PA) @ | Pass (PT+ PA) | | | |
| | | | | | | | TA | HA | | | | | | | |
| 1 | Hu-201 | Communication in English-II | 3 | | | 70 | 10 | 20 | 30 | 30 | - | - | - | 100 | 3 |
| 2 | Sc-202 | Mathematics-II | 3 | 1 | | 70 | 10 | 20 | 30 | 30 | - | - | - | 100 | 4 |
| 3 | Sc-203 | Chemistry-II | 3 | | 3 | 70 | 10 | 20 | 30 | 30 | 50 | 50 | 30 | 200 | 4 |
| 4 | Sc-204 | Applied Physics-II | 3 | | 3 | 70 | 10 | 20 | 30 | 30 | 50 | 50 | 30 | 200 | 4 |
| 5 | Me-201 | Engineering Mechanics | 3 | 1 | 3 | 70 | 10 | 20 | 30 | 30 | 50 | 50 | 30 | 200 | 5 |
| 6 | W-201 | Basic Workshop Practice-II | | | 6 | - | - | - | - | - | 100 | 50 | 45 | 150 | 3 |
| 7 | LS-210 | Development of Life Skill II | 1 | | 2 | | | | | | 25 | 25 | 15 | 50 | 2 |
| | | | 16 | 2 | 17 | | | | | | | | | 1000 | 25 |
| | | Total | | | 35 | | | | | | | | | | |



1. Communication in English -II

SEMESTER-II

1. Course Title: **COMMUNICATION IN ENGLISH-II**

2. Course Code: **Hu/201**

3. Semester: II

4. **Aim of the course:**

The general aim of a course in English language and communication is aimed at the three domains of learning: knowledge, skills and attitudes. In keeping up with this aim, it is attempted to develop all the four skills of language learning in the learner – listening, speaking, reading and writing and also to enable the students to use the grammar of the English language correctly. Since, all these four skills are interrelated to each other, this course is aimed at achieving language proficiency in all the four skills so that at the end of the course the student is a confident user of the General Indian English (GIE), with the added knowledge of the other variants as British English and American English. This, it is attempted to achieve, by building a carefree, tension free classroom atmosphere in which the language classes incorporate activities related to these four skills. It is aimed that at the end of the course, the student can relate to the English language as a language of communication and conduct of everyday affairs.

5. **Course outcome:**

On completion of the course on Communication in English-II, student will be able to

- CO₁ = Comprehend meaning of a passage in English.
- CO₂ = Arrive at the gist of a passage and also write the gist in one's own words.
- CO₃ = Understand the differences between general English and official English.
- CO₄ = Face an interview with confidence and fluency and a positive attitude.

6. Teaching Scheme (in hours)

| Lecture | Tutorial/Class Test | Practical | Total |
|---------|---------------------|-----------|-------|
| 30 | 2 | 0 | 32 |



7. Examination Scheme:

| Theory | | | | Practical | | | | Total Marks |
|------------------------|----------------------|-------------|------------|-------------|-----------|-------|------------|-------------|
| Examination Full Marks | Sessional Full Marks | Total Marks | Pass Marks | Examination | Sessional | Total | Pass Marks | |
| 70 | 30 | 100 | 21 | 0 | 0 | 0 | 0 | 100 |

8. Detailed Course Content:

| Chapter no. | Chapter Title | Content / area of focus | Intended Learning Outcome | Duration in hours |
|-------------|--|---|--|-------------------|
| 1. | Letter Writing | 1.1 Formal letter formats, greetings, salutation, body of the letter, practice of letter writing in different situations: Order letter, Complaint letter, Letter of Adjustment, Quotation letter, Letter to the Editor, Application for leave of absence | 1. Explain how to write different types of formal letters | 5 |
| 2. | Job Application and Cover Letter, Resume, Curriculum Vitae, bio data | 2.1 Format of a job application, Cover Letter, formats of Resume and CV for a fresher and for someone with experience, Differences between Resume, CV, Bio-data, and choice of referees | 1. Explain how to write Job Applications, Cover Letter, Resume, Curriculum Vitae, bio data | 5 |
| 3. | Paragraph Writing | 3.1 Definition, Cohesion and Linkage using Transition words on everyday topics | 1. Describe how to compose coherent passages. | 3 |



| | | | | |
|----|-----------------------|---|--|---|
| 4. | Summary writing | 4.1 Definition, Use of Transition words, important points to remember while summarizing | 1. Explain how to arrive at a summary of a paragraph / text. | 2 |
| 5. | Reading Comprehension | 5.1 Developing the comprehension skill of the students and the ability to reproduce grammatically and semantically correct English sentences | 1. Describe how to comprehend passages for understanding. | 2 |
| 6. | Memo Writing | 6.1 Definition and format | 1. Explain how to write a formal Memo. | 2 |
| 7. | Amplification | 7.1 Definition and format | 1. Explain how to write a formal memo | 2 |
| 8. | Report writing | 8.1 Definition, types of reports with a focus on annual report, non-profit annual report, technical and academic report, necessity and purpose of writing a report, qualities of a good report, language used in a report, different formats of reports and sample reports | 1. Explain how to write a formal report for office correspondence. | 2 |
| 9. | E- mail writing | 9.1 writing the perfect e-mail, steps to the perfect e-mail, formal and informal greetings, requests through an e-mail, writing an apology, complaint and seeking help and information in an e-mail, informing about a file attached in in an email, writing the formal ending of an e-mail | 1. Explain how to write formal and informal emails. | 2 |



| | | | | |
|-----|--------------------------------------|--|--|---|
| 10. | Facing an interview and dress code | 10.1 How to approach, what to speak, how to speak in an interview and answer interview questions, the business etiquettes to maintain, body language , negative body language, handling an awkward situation in an interview, the perfect handshake, points to remember while applying for a job | 1. Discuss how to face an interview for success. | 3 |
| 11. | British English and American English | 10.1 Difference between American and British English words – vocabulary and spelling | 1. Distinguish between British English and American English. | 2 |

BOOKS RECOMMENDED:

1. ***Student's handbook of Written English and Phonetics*** by Dr Papori Rani Barooah
(Eastern Book House Publishers)
2. ***Strengthening your writing*** -V.R. Nayaranswami (Orient Longman)

9. TABLE OF SPECIFICATIONS for Communication in English-II

| Sl. No. | Topic (a) | Time allotted in hours (b) | Percentage Weightage (c) | Knowledge | Comprehension | Application | HA |
|---------|--|----------------------------|--------------------------|-----------|---------------|-------------|----|
| 1 | Letter Writing | 5 | 17 | 1 | 1 | 1 | 2 |
| 2 | Job Application and Cover Letter, Resume, Curriculum Vitae, bio data | 5 | 17 | 2 | 1 | 1 | 4 |
| 3 | Paragraph Writing | 3 | 8 | 2 | 1 | 1 | 1 |
| 4 | Summary writing | 2 | 7 | 2 | 1 | 1 | 1 |
| 5 | Reading Comprehension | 2 | 7 | 2 | 2 | 2 | 2 |
| 6 | Memo Writing | 2 | 7 | 1 | 1 | 1 | 2 |
| 7 | Amplification | 2 | 7 | 1 | 1 | 1 | 2 |
| 8 | Report writing | 2 | 7 | 1 | 1 | 1 | 0 |
| 9 | E- mail writing | 2 | 7 | 1 | 1 | 1 | 2 |
| 10 | Facing an interview and dress code | 3 | 8 | 1 | 0 | 1 | 1 |
| 11 | British English and American English | 2 | 7 | 1 | 0 | 1 | 1 |
| | Total | 30 | 100 | 15 | 10 | 12 | 18 |

K=Knowledge, C=Comprehension, A=Application, HA=Higher Than Application(Analysis, Synthesis, Evaluation), $C = \frac{b}{\sum b} \times 100$

10. Distribution of Marks:

Detailed Table of Specifications for Communication in English-II

| Sl. No. | Topic | Objective Type | | | | Short Answer Type | | | | | Essay Type | | | | | Grand Total |
|---------|--|----------------|----------|----------|-----------|-------------------|----------|----------|-----------|-----------|------------|----------|----------|-----------|-----------|-------------|
| | | K | C | A | T | K | C | A | HA | T | K | C | A | HA | T | |
| 1 | Letter Writing | 3 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 8 |
| 2 | Job Application and Cover Letter, Resume, Curriculum Vitae, bio data | 1 | 2 | | 3 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 5 | 0 | 5 | 10 |
| 3 | Paragraph Writing | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 2 | 2 | 5 |
| 4 | Summary writing | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 5 |
| 5 | Reading Comprehension | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 5 |
| 6 | Memo Writing | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 4 |
| 7 | Amplification | 1 | 1 | 1 | 3 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 3 | 3 | 8 |
| 8 | Report writing | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 5 |
| 9 | E- mail writing | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 2 | 5 |
| 10 | Facing an interview and dress code | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 5 |
| 11 | British English and American English | 2 | 2 | 0 | 4 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 4 | 4 | 10 |
| | Total | 14 | 7 | 4 | 25 | 0 | 0 | 2 | 10 | 10 | 0 | 0 | 7 | 22 | 34 | 70 |

K=Knowledge C=Comprehension A=Application HA=Higher Than Application T=Total

Course Title : Applied Physics - II

1. **Course Code** : Sc-204
 2. **Semester** : 2nd semester

3. **Rationale of the subject:** Physics is a foundation of all core technology subjects. Study of Physics is essential for Diploma holders in engineering and technology to develop in them proper understanding of physical phenomenon, scientific temper and engineering aptitude. Curriculum of Applied Physics includes fundamental concepts used in industrial applications. So, physics is taught in the 1st and 2nd semester in all disciplines of Diploma Engineering.

4. **Course outcome** : After completion of the course, students will be able to:

- **C.O.1:** apply the knowledge of total internal reflection to comprehend the principle and working of Optical Fiber.
- **C.O.2:** understand the concepts of charge, current, resistance, capacitance.
- **C.O.3:** apply core concept in materials (magnetic and di-electric) to select proper material for engineering application
- **C.O.4** : learn the applications of electromagnetic induction in transformers, motors etc. in industrial engineering.
- **C.O.5** : to use the properties of laser, X-rays and photoelectric effect for various Engineering applications.
- **C.O.6:** acquire basic knowledge on semiconductor and applications of p-n junction diode.
-

5. **Teaching Scheme (in hours):**

| Theory | | | Practical | Total |
|----------|----------|------------|-----------|-------|
| Lectures | Tutorial | Class Test | 30 | 85 |
| 42 | 10 | 3 | | |

6. **Teaching scheme(in hours)/ week**

| Lectures | Tutorial | practical | Credit point |
|----------|----------|-----------|--------------|
| 4 | 1 | 2 | 5 |

7. Examination Scheme:

| Theory | | | | Practical | | | | Total Marks |
|-------------|------------|------------|------------|----------------|------------|------------|------------|-------------|
| Examination | | Sessional | | Practical Viva | | Sessional | | 200 |
| Full Marks | Pass Marks | Full Marks | Pass Marks | Full Marks | Pass marks | Full Marks | Pass Marks | |
| 70 | 21 | 30 | 09 | 50 | 15 | 50 | 15 | |

8. DETAILED COURSE CONTENTS:

| Chapter | Title of Chapter | Topics and Sub-topics | Hours |
|---------|------------------|---|-------|
| 1 | LIGHT | 1.1 Recapitulation of Reflection of light, reflection from spherical mirror, idea of real and virtual image, mirror formula, (mirror formula to be assumed), sign convention, nature, position and size of images for different positions of object. | 2 |
| | | 1.2 Refraction of light, Refractive index, critical angle, total internal reflection, relation between critical angle and refractive index, Optical Fibre: application of principle of T. I. R., core, cladding and acceptance angle. | 2 |
| | | 1.3 Refraction through prism, minimum deviation. Relation between R.I. and angle of minimum deviation. | 1 |
| | | 1.4 Lens, refraction through lens, lens formula (to be assumed), sign convention, nature, position and size of images for different positions of object, power of a lens. (Numericals on above topics) | 2 |
| | | 1.5 Optical instruments: Telescope (Terrestrial and Astronomical) | 1 |
| 2 | MAGNETISM | 2.1 Natural and artificial magnet, theory of magnetism, different types of magnets, induced magnetism. | 1 |
| | | 2.2 Inverse Square law of magnetism, its explanation with mathematical expression, magnetic field, uniform and non-uniform field, magnetic potential & magnetic intensity, calculation of magnetic intensity due to a dipole on end-on & broad-side on position, , magnetic moment, couple on a magnet in an uniform magnetic field, Tangent law and its mathematical | 3 |

| | | | |
|---|----------------------------|--|-----------------------|
| | | expression, Deflection Magnetometer. 2.3 Terrestrial magnetism, elements of terrestrial magnetism, explanation of declination, dip/inclination and horizontal component of earth's magnetic field. | 1 |
| 3 | ELECTRO STATICS | 3.1 Concept of Electric charge according to Modern Electron Theory, Inverse Square law of Electrostatic force, Unit of Charge, Electric Field, Electric Intensity, Electric lines of Force and its property. 3.2 Electric Potential and its unit, relation between potential and intensity, calculation of electrostatic Potential at a point due to a point charge. 3.3 Capacity of a condenser, principle of capacitor or condenser, series and parallel combination of condensers, numerical problems. | 2 1 2 |
| 4 | CURRENT ELECTRICITY | 4.1 Potential difference and current with their mathematical expression and units. 4.2 Simple Voltaic Cell, Defects of Simple Voltaic cell, explanation of local action and Polarization, different types of cells, Lechlanche Cell, Daniel Cell, Dry Cell, difference between e.m.f. and P.D. 4.3 Primary and Secondary Cell, Difference between primary and secondary cell, storage cell, Lead & Edision accumulator (construction not required), Groupings of cell- series, parallel and mixed grouping of cells. 4.4 Basic D.C circuit, Ohm's Law statement, verification and mathematical expression, Wheatstone bridge principle with its proof, Kirchhoff's Law with explanations. 4.5 Definition of resistance and Conductance, Specific resistance, Series and parallel combination of resistances. | 1 2 2 2 1 |
| 5 | EFFECTS OF CURRENT | 5.1 Heating Effect of Current, Joule's Law, Experimental verification of Joule's law, Electric energy and Power, numerical problems. 5.2 Thermo-electricity, See-Back effect, Peltier effect, Thomson effect, thermo-couple, and application of thermo-electricity. 5.3 Chemical effect of current, Electrolysis, Theory of electrolytic dissociation, | 1 1 1 |

| | | | |
|---|---------------------------------------|--|-----------------------|
| | | voltmeter, Faraday's law of Electrolysis, Electro-plating. | |
| 6 | ELECTRO-MAGNETISM | 6.1 Magnetic effect of current, nature of magnetic field due to straight, circular conductor and due to solenoid, Fleming's left hand rule, effect of current flowing through two parallel conductors. 6.2 Electromagnetic Induction, e.m.f. induced in a coil due to magnet, explanation of Faraday's law of electro-magnetic induction, Lenz law, self and mutual induction, Fleming –Right hand rule. 6.3 Transformer, step up and step down transformer, numerical problems. | 1 2 1 |
| 7 | MODERN PHYSICS | 7.1 Photo Electric Emission, Explanation and demonstration of photo-electric current, deduction of photo-electric equation with its physical significance, application of photoemission (photo-electric cell). 7.2 Nuclear Energy, Atomic mass unit (a.m.u.), mass-energy equivalence, mass defect. 7.3 X-rays, properties and application in industry and medical field (production apparatus not necessary). 7.4 Radio-activity, natural and artificial radio-activity, emission of alpha, beta and gamma radiation, their properties and it uses. 7.5 LASER, spontaneous and stimulated emission, population inversion, Properties and applications of LASER, different types of LASER. | 2 1 1 1 1 |
| 8 | ELECTRONICS AND SEMI-CONDUCTOR | 8.1 Energy band in solids (Idea only). Introduction to semi conductor in terms of energy band diagram, its properties, intrinsic and extrinsic semiconductor, Doping material (impurity) trivalent and pentavalent. 8.2 P-type and N-type semiconductor. P-N junction diode, simple introduction of forward and reverse bias. Concept of rectifier, use of P-N junction diode as rectifier, half wave rectifier, full wave rectifier, bridge rectifier, simple idea of LED and its use. | 1 2 |

9. Distribution of Marks:

| Chapter No. | Chapter Title | Hours | Type of Question | | | Total Marks |
|-------------|--------------------------------|-------|---------------------------|----------------|----------------------|-------------|
| | | | Objective type Compulsory | Short Question | Descriptive Question | |
| 1 | LIGHT | 8 | 4 | - | 6 | 10 |
| 2 | MAGNETISM | 5 | 3 | - | 3 | 6 |
| 3 | ELECTROSTATICS | 5 | 1 | 1 | 4 | 6 |
| 4 | CURRENT ELECTRICITY | 8 | 6 | 1 | 6 | 13 |
| 5 | EFFECTS OF CURRENT | 3 | 2 | 1 | 4 | 7 |
| 6 | ELECTROMAGNETISM | 4 | 2 | 1 | 6 | 9 |
| 7 | MODERN PHYSICS | 6 | 4 | 2 | 6 | 12 |
| 8 | ELECTRONICS and SEMI CONDUCTOR | 3 | 3 | 1 | 3 | 7 |
| TOTAL: | | 42 | 25 | 07 | 38 | 70 |

10. DETAILED TABLE OF SPECIFICATIONS FOR THEORY

| Sr. NO. | Topic | OBJECTIVE TYPE | | | | SHORT ANSWER TYPE | | | | | ESSAY TYPE | | | | |
|---------|-------------------------------|----------------|---|---|---|-------------------|---|---|----|---|------------|---|---|----|---|
| | | K | C | A | T | K | C | A | HA | T | K | C | A | HA | T |
| 1 | LIGHT | 2 | 1 | 1 | 4 | - | - | - | - | - | 2 | 2 | 2 | - | 6 |
| 2 | MAGNETISM | 1 | 1 | 1 | 3 | - | - | - | - | - | 1 | 1 | 1 | - | 3 |
| 3 | ELECTROSTATICS | 1 | - | - | 1 | 1 | - | - | - | 1 | 2 | 1 | 1 | - | 4 |
| 4 | CURRENT ELECTRICITY | 2 | 2 | 2 | 6 | 1 | - | - | - | 1 | 1 | 2 | 3 | - | 6 |
| 5 | EFFECTS OF CURRENT | 1 | 1 | - | 2 | 1 | - | - | - | 1 | 1 | 2 | 1 | - | 4 |
| 6 | ELECTROMAGNETISM | 1 | 1 | - | 2 | 1 | - | - | - | 1 | 2 | 2 | 2 | - | 6 |
| 7 | MODERN PHYSICS | 2 | 1 | 1 | 4 | 1 | 1 | - | - | 2 | 2 | 2 | 2 | - | 6 |
| 8 | ELECTRONICS AND SEMICONDUCTOR | 1 | 1 | 1 | 3 | 1 | - | - | - | 1 | - | - | 3 | - | 3 |
| | | | | | | | | | | | | | | | |

K=Knowledge, C= Comprehension, A= Application, HA= Higher than application

(analysis, synthesis, Evaluation) and T=Total.



Annexure-1

12. TABLE OF SPECIFICATIONS FOR THEORY

| Sr. No: | Topics (a) | Time allotted in hours (b) | Percentage Weightage (c) % | K | C | A | HA |
|---------|-------------------------------|----------------------------|----------------------------|---|---|---|----|
| 1 | LIGHT | 8 | 19 | 4 | 3 | 3 | |
| 2 | MAGNETISM | 5 | 12 | 2 | 2 | 2 | |
| 3 | ELECTROSTATICS | 5 | 12 | 4 | 1 | 1 | |
| 4 | CURRENT ELECTRICITY | 8 | 19 | 4 | 4 | 5 | |
| 5 | EFFECTS OF CURRENT | 3 | 7 | 3 | 3 | 1 | |
| 6 | ELECTROMAGNETISM | 4 | 10 | 4 | 3 | 2 | |
| 7 | MODERN PHYSICS | 6 | 14 | 5 | 4 | 3 | |
| 8 | ELECTRONICS AND SEMICONDUCTOR | 3 | 7 | 2 | 1 | 4 | |
| TOTAL | | 42 Σb | 100% | | | | |

K=Knowledge, C= Comprehension, A= Application, HA= Higher than application (analysis, synthesis, Evaluation)

$$C = \frac{b}{\Sigma b} \times 100$$

2 APPLIED PHYSICS-II Practical

Course title: Applied Physics-II

Course Code: Sc-204

Total Marks: 100

Practical Examination : 50 Marks

Pass marks: 15

Practical sessional Marks : 50

Pass marks: 15

| Chapter Title | Content |
|---------------|--|
| LIGHT | 1.0 To verify the laws of reflection using a plane mirror and to study the characteristics of image formed. |
| | 2.0 To determine the refractive index of the material of the glass slab by pin method. |
| | 3.0 To determine the focal length of a convex lens by U-V method. |
| | 4.0 To determine the focal length of a convex lens by plane mirror method. |
| | 5.0 To draw I-D curve and to determine the refractive index of the material of a prism. |
| MAGNETISM | 6.0 To locate the poles of a bar magnet and to measure the magnetic length. |
| | 7.0 To plot magnetic lines of force of a bar magnet with north pole pointing north and to locate the neutral point/to plot magnetic lines of force of a bar magnet with south pole pointing north and to locate the neutral point. |
| ELECTRICITY | 8.0 To verify Ohm's law by Ammeter-voltmeter method. |
| | 9.0 To find equivalent resistance using voltmeter with I. Three resistances connected in series II. Three resistances connected in parallel. |
| | 10.0 To measure the unknown resistance of the material of a wire by meter bridge using Wheatstone bridge principle. |



13. Suggested learning Resource:**A. Book list:**

| Sl. No. | Title | Author | Publisher |
|---------|--|---|---------------------------------------|
| 1 | Modern Approach To Physics Part I & II | Dilip Sarma, N G Chakraborty, K N Sharma | Kalyani Publishers- New Delhi |
| 2 | Applied Physics Part I | Manpreet Singh, Dr. Major Singh, Mrs. Hitashi Gupta | S K Kataria & Sons- New Delhi |
| 3 | Applied Physics Part II | Manpreet Singh, Dr. Major Singh, Mrs. Hitashi Gupta | S K Kataria & Sons- New Delhi |
| 4 | Basic Applied Physics | R K Gaur | Dhanpat Rai Publication- New Delhi |
| 5 | Physics- Std XI, Std XII | - | HSC board/CBSE Board |

B. Websites:

- I. <http://hyperphysics.phy-astr.gsu.edu/>
- II. <http://physics.info>

C. By using Models, Video etc

XXXXXXXXXXXXXXXXXXXXXXXXXXXX



3. Course Title: Chemistry-II

- Course Code** :Sc-203
- Semester** :2nd semester
- Rationale of the subject:** Chemistry is an integral component of basic science. Knowledge of basic science is prerequisite for pursuing of any branch of Engineering. Without basic knowledge of chemistry a student cannot properly understand Engineering subjects. So, chemistry is taught in the 1st year in all disciplines of Engineering.
- Course outcome :**
After completion of the course, students will be able to
C.O.1 : Design remedies to control Air, Water and Soil pollution.
C.O.2: Describe different processes for manufacturing metals and control of their corrosion.
C.O.3 : Describe different types of fuels and their properties and uses.
C.O.4 : Illustrate manufacturing processes of Cement , Glass and Bricks.
C.O.5 : Justify the selection of lubricants for different types of machines.
C.O.6 : Describe processes for preparing different organic compounds ,plastic and polymers.

5. Teaching Scheme (in hours):

| Theory | | | Practical | Total |
|----------|----------|------------|-----------|-------|
| Lectures | Tutorial | Class Test | 30 | 85 |
| 42 | 10 | 3 | | |

6. Teaching scheme(in hours)/ week

| Lectures | Tutorial | practical | Credit point |
|----------|----------|-----------|--------------|
| 4 | 1 | 2 | 5 |

7. Examination Scheme:

| Theory | | | | Practical | | | | Total Marks |
|-------------|------------|------------|------------|----------------|------------|------------|------------|-------------|
| Examination | | Sessional | | Practical Viva | | Sessional | | 200 |
| Full Marks | Pass Marks | Full Marks | Pass Marks | Full Marks | Pass marks | Full Marks | Pass Marks | |
| 70 | 21 | 30 | 09 | 50 | 15 | 50 | 15 | |



8. Distribution of Marks:

| Chapter No | Chapter Title | Type of Question | | | | Total Marks |
|------------|-------------------------|-----------------------------|-----------------|-----------------------|---------------|-------------|
| | | Objective Type (Compulsory) | Short Questions | Descriptive Questions | Chapter Total | |
| 1 | Environmental Chemistry | 1x4=4 | 1x2=2 | 3 | 9 | 70 |
| 2 | Metallurgy | 1x4=4 | 2x1=2 | 4 | 10 | |
| 3 | Fuel | 1x3=3 | 2x1=2 | 4 | 9 | |
| 4 | Building material | 1x2=2 | 2x1=2 | 4 | 8 | |
| 5 | Lubricant | 1x3=3 | | 4 | 7 | |
| 6 | Corrosion | 1x2=2 | | 4 | 6 | |
| 7 | Plastic&polymers | 1x3=3 | 2x1=2 | 4 | 9 | |
| 8 | Organic Chemistry | 1x4=4 | 2x2=4 | 4 | 12 | |
| | Total | 25 | 14 | 31 | 70 | |

9. Detailed Course Content:

| Chapter | Chapter Title | Content | I.L.O | Duration in hours | Marks |
|---------|-------------------------|---|--|-------------------|-------|
| 1 | Environmental Chemistry | 1.1 Definition, Types of pollution, Pollutants 1.2 Water pollution- Causes, Effect and health hazards. 1.3 Water quality parameters-D.O, B.O.D, C.O.D, PH, Turbidity, hardness, T.D.S 1.4 Controlling of water pollution 1.5 Air Pollution-Sources, Effect and controlling 1.6 Green house effect, Acid rain, Ozone layer depletion, photochemical smoke 1.7 Soil Pollution- sources and controlling | Students will be able to 1. Identify sources of Air, water and Soil pollution. 2. Explain the effects of air, water and soil pollution. 3. Measure the level of water pollution. 4. Suggest the measure to control air, water and soil pollution. | 5 | 9 |



| | | | | | |
|---|---------------------------|--|---|---|----|
| 2 | Metallurgy | <p>2.1 General principles of metallurgy</p> <p>2.2 Explain the terms mineral, ore, gangue, slag, flux, roasting, calcinations etc</p> <p>2.3 Metallurgy of Iron and Aluminum</p> <p>2.4 Manufacture of steel by Bessemer, Open hearth and L-D process</p> <p>2.5 Ferrous and Non ferrous Alloys.</p> | <p>Students will be able to</p> <ol style="list-style-type: none"> 1. Explain general principles of metallurgy. 2. Explain the manufacturing processes of Cast iron, steel and aluminum. 3. Describe the composition, properties and uses of Alloys. | 7 | 10 |
| 3 | Fuel | <p>3.1 Definition and classification of fuel, Calorific value, Gross and Net calorific value</p> <p>3.2 Solid fuel- Origin of coal, classification of coal by rank, pulverized coal, principle of carbonization of coal, Distinguish between High temperature carbonization and Low temperature carbonization</p> <p>3.3 Liquid fuel-definition of Petroleum or crude oil. Classification of three varieties of crude oil, fractional distillation of petroleum. Important properties of liquid fuel-flash point, fire point, aniline point, smoke point, knocking and octane number, cetane number. Cracking of petroleum.</p> | <p>Students will be able to</p> <ol style="list-style-type: none"> 1. Classify fuels. 2. Differentiate Gross calorific and Net calorific value. 3. Explain the ranking of Coal. 4. Differentiate high temperature and low temperature carbonization. 5. Explain the refining process of petroleum and properties of liquid fuel. | 6 | 9 |
| 4 | Building Materials | <p>4.1 Portland Cement: Composition, raw materials. Types of manufacturing, setting and hardening of cement, special cements.</p> <p>4.2 Glass: Definition, Types, Raw materials and Manufacturing</p> <p>4.3 Bricks: Classification and preparation.</p> | <p>Students will be able to</p> <ol style="list-style-type: none"> 1. Explain the manufacturing process of cement, glass and bricks. 2. Explain the setting and hardening process of cement. 3. Suggest the use of special cements in different fields. | 5 | 8 |



| | | | | | |
|---|----------------------------|---|---|---|---|
| 5 | Lubricant | 5.1 Definition of Lubricant and lubrication 5.2 Classification of lubricants 5.3 Important Functions of Lubricants 5.4 Selection of lubricants | Students will be able to 1. Explain the need of lubricant. 2. Justify the selection of lubricants in different types of machines. | 3 | 7 |
| 6 | Metallic Corrosion | 6.1 Definition, causes of Corrosion 6.2 Different types of Corrosion and factors affecting corrosion rate 6.3 Explanation of rusting of iron 6.4 Methods of Corrosion Control | Students will be able to 1. Explain the causes of metallic corrosion. 2. Classify corrosion. 3. Identify the factors effecting corrosion. 4. Suggest methods for controlling corrosion. | 4 | 6 |
| 7 | Plastic and Polymer | 7.1 Definition, types of polymerization, classification of polymers 7.2 Distinguishing properties of Thermoplastic and Thermosetting resins 7.3 Important Plastic materials- Monomers, properties and uses of Polythene, Polypropylene, Polystyrene, PVC, Bakelite, Teflon, neoprene, Buna-s, Nylon, Terelene. | Students will be able to 1. Classify polymers and polymerization. 2. Distinguish thermoplastic and thermosetting plastics. 3. Identify the monomers of commercially important plastics. | 4 | 9 |



CHEMISTRY-II

Annexure-I

TABLE OF SPECIFICATIONS FOR THEORY

| Sr. No | Topic (a) | Time allotted in hours (b) | Percentage Weightage (c) | Modified Percentage Weightage (d) | K | C | A | HA |
|--------------|-------------------------|-------------------------------|-----------------------------|--------------------------------------|---|---|---|----|
| 1 | Environmental Chemistry | 5 | 17 | 12 | 2 | 7 | | |
| 2 | Metallurgy | 6 | 14 | 14 | 2 | 8 | | |
| 3 | Fuel | 6 | 17 | 14 | 2 | 7 | | |
| 4 | Building materials | 5 | 7 | 12 | 1 | 7 | | |
| 5 | Lubricant | 4 | 5 | 10 | 2 | 5 | | |
| 6 | Metallic Corrosion | 4 | 7 | 10 | 1 | 5 | | |
| 7 | Plastic and polymer | 5 | 10 | 12 | 2 | 7 | | |
| 8 | Organic Chemistry | 7 | 23 | 16 | 3 | 4 | 5 | |
| Total | | Σ b | 100 | 100 | | | | |

K = Knowledge C = Comprehension A = Application

HA = Higher Than Application (Analysis, Synthesis, Evaluation)

b

$$c = \frac{\text{-----}}{\Sigma b} \times 100$$

$$\Sigma b$$

DETAILED TABLE OF SPECIFICATIONS FOR THEORY

| Sr. No | Topic | OBJECTIVE TYPE | | | | SHORT ANSWER TYPE | | | | | ESSAY TYPE | | | | |
|--------|-------------------------|----------------|-----|---|---|-------------------|---|---|----|---|------------|---|---|----|---|
| | | K | C | A | T | K | C | A | HA | T | K | C | A | HA | T |
| 1 | Environmental Chemistry | 1+1 | 1+1 | | 4 | | 2 | | | 2 | | 3 | | | 3 |
| 2 | Metallurgy | 1+1 | 1+1 | | 4 | | 2 | | | 2 | | 4 | | | 4 |
| 3 | Fuel | 1+1 | 1 | | 3 | | 2 | | | 2 | | 4 | | | 4 |
| 4 | Building materials | 1 | 1 | | 2 | | 2 | | | 2 | | 4 | | | 4 |
| 5 | Lubricant | 1+1 | 1 | | 3 | | | | | | | 4 | | | 4 |
| 6 | Metallic Corrosion | 1 | 1 | | 2 | | | | | | | 4 | | | 4 |
| 7 | Plastic and polymer | 1+1 | 1 | | 3 | | 2 | | | 2 | | 4 | | | 4 |
| 8 | Organic Chemistry | 1+1 | 1+1 | | 4 | | 2 | 2 | | 4 | 1 | | 3 | | 4 |

K = Knowledge C = Comprehension A = Application

HA = Higher Than Application T = Total



3. Course Title : CHEMISTRY PRACTICAL-II

1. Course Code : Sc-203P
 2. Semester : 2nd Semester

3. Teaching Scheme (in hours):

| Course Duration | Practical Class Per Week | Duration of Class | Total Contact Hours |
|-----------------|--------------------------|-------------------|---------------------|
| 15 weeks | 1 | 2 hours | 30 hours |

4. Examination Scheme :

| Experiment | Marks | Viva-voce | Total Marks | Pass Marks |
|---------------|-------|-----------|-------------|------------|
| Salt Analysis | 40 | 10 | 50 | 25 |

5. List of Experiments:

- To identify the acid radicals by Dry and Wet Test-- CO_3^{2-} , Cl^- , Br^- , SO_4^{2-} , S^{2-} , NO_3^-
- To identify the basic radicals by Dry and Wet Test-- Ag^+ , Pb^{2+} , Fe^{3+} , Al^{3+} , Zn^{2+} , Co^{2+} , Ni^{2+} , Ba^{2+} , Ca^{2+} , Mg^{2+} , Na^+ , K^+ , NH_4^+ ,
- Determination of B.O.D and C.O.D in a sample of natural water.

6. Suggested Practical Books:

- Senior Secondary Practical Chemistry
 Dr. Kamalesh Choudhury & Dr. Satyendra Kumar Choudhury
 Bina Library
- Elements of Practical Chemistry
 Sudarsan Barua – S. Chand & Company Ltd.
- Experiments in Applied Chemistry
 Dr. Sunita Rattan – S.K Kataria & Sons

XXXXXXXXXXXXXXXXXXXXXXXXXXXX



4. Course Title: Mathematics – II

1. **Course Code : Sc – 202**

2. **Semester : Second Semester**

3. **Aim of the course:**

- To learn about the three dimensional co-ordinate geometry.
- To learn how to apply vectors to measure work done and moment of a force.
- To learn about relations and functions of variables and their derivatives.
- To learn about integration methods for measuring lengths and areas .

4. **Course Outcome:**

On completion of the course, students will be able to

- Recognize and differentiate between closed and open curves under different conditions.
- Locate an object in space and calculate its distance with reference to other objects.
- Calculate the amount of work done and the moment or torque on application of forces.
- Obtain derivative of a function as rate measure, velocity, acceleration etc.
- Apply properties of definite integral to solve problems.
- Determine areas under curves.

5. **Teaching scheme(in hours):**

| Teaching scheme(in hours) | | |
|---------------------------|----------|---------------------|
| Lectures | Tutorial | Total (per week) |
| 3 | 1 | 4 |

6. **Evaluation Scheme:**

| Theory | | | Total Marks |
|-------------------|-------------------------|-------------------------------|-------------|
| ESE Full Marks | Sessional Full Marks | Pass Marks (ESE+Sessional) | |
| 70 | 30 | 33 | 100 |



7. Detailed Course Content:

| Chapter No. | Chapter Title | Contents | Intended Learning outcomes | hours |
|-------------|--|--|---|-------|
| | | GROUP – A: CO-ORDINATE GEOMETRY (Two and Three Dimension) and VECTORS Hours: 11 Marks: 20 | | |
| A1 | Co - Ordinate Geometry of Two Dimensions | 1.1.Circle: Standard Equation, Equation of a Circle under different conditions. 1.2.Conic Section: Different forms of equation of a parabola and their components. Standard equation of Ellipse and Hyperbola. | Understand different types of Conic sections, their similarities and differences. | 4 |
| A2 | Co - Ordinate Geometry of Three Dimensions | 2.1. Three dimensional co – ordinate system. Distance formulae, section formulae, direction cosines, direction ratios. 2.2. Projection formula, angle between two lines. | Locate a point in space, find its locus, distance from other points, objects (linear as well as angular) | 3 |
| A3 | Vectors | 3.1. Definition, unit vector, parallel vectors, coplanar vectors, laws of addition, resolution of a vector, direction cosines, section formula, angle bisector. 3.2. Dot product, Cross product, condition of perpendicularity and parallelism. 3.3. Application: Work done, Moment or Torque. | 1. Understand the concept of directed line segment or vector and various laws related to it. 2. Product of vectors and application of the product. | 4 |
| | | GROUP – B: DIFFERENTIAL CALCULUS Hours: 20 Marks: 30 | | |
| B1 | Function | 1.1. Definition, types of function, odd and even, periodic, composite, explicit, implicit and parametric functions. 1.2. Domain and Range of a function. | Understand different types of functions and their Domain and Range. | 4 |
| B2 | Limit of a function | 2.1. Definition, Standard limits. 2.2. Evaluation of limits. | Limiting value of a function under different conditions. | 2 |



| | | | | |
|----|---|--|---|---|
| B3 | Continuity of a function | 3.1. Definition, testing of continuity problems. | Behaviour of continuous and discontinuous functions. | 2 |
| B4 | Differentiation or Derivative of a function | 4.1. First principle of differentiation, differentiation of some standard functions using first principle. | Understand the meaning of differentiation | 2 |
| | | 4.2. Derivative of function of a function, implicit function, parametric function. Engineering application problems | Learn to obtain derivatives of different types of functions. | 3 |
| | | 4.3. Geometrical interpretation of first derivative. Equation of tangent, normal. Angle of intersection of two curves. | Geometrical significance of derivatives with respect to tangent and normal. | 3 |
| | | 4.4. Second order derivative. Maxima, Minima, Engineering application of second order derivative | Derivatives of higher order and their application. | 3 |
| | | GROUP – C: INTEGRAL CALCULUS Hours: 14 Marks: 20 | | |
| C1 | Integration | 1.1. Integration as the inverse process of differentiation. List of Formulae. 1.2. Integration of standard functions. | Understand the meaning of Integration | 2 |
| C2 | Methods of Integration | 2.1. Integration by substitution. 2.2. Integration by parts. 2.3. Integration by algebraic fractions. | Learn to use different methods of Integration. | 5 |
| C3 | Definite Integral | 3.1. Definition as the limit of a sum. 3.2. Fundamental Theorems on Definite Integral. Properties of Definite Integral. 3.3. Evaluation of Definite Integrals using fundamental laws and properties. | Learn and apply different properties of definite integral to solve problems . | 5 |
| C4 | Application of Integration | 4.1. Area under curve, Area between two curves. | Application of definite integral in calculation of area. | 2 |



8. Distribution of Marks:

| Chapter No. | Chapter Title | Type of Question | | | Total Marks | |
|-------------|--|-----------------------------|-----------------|-----------------------|-------------|----|
| | | Objective Type (compulsory) | Short questions | Descriptive questions | | |
| A1 | Co-ordinate geometry of two dimensions | 1+1+1=3 | 2 | 3 | 70 | |
| A2 | Co-ordinate geometry of three dimensions | 1+1+1=3 | 2+2=4 | | | |
| A3 | Vectors | 1+1=2 | | 3 | | |
| B1 | Function | 1+1+1=3 | 2 | | | |
| B2 | Limit | 1+1+1=3 | | 3 | | |
| B3 | Continuity | 1+1=2 | | 3 | | |
| B4 | Differentiation | 1+1=2 | 2+2+2=6 | 3+3 | | |
| C1 | Integration | 1+1=2 | 2 | | | |
| C2 | Methods of Integration | 1+1=2 | | 3 | | |
| C3 | Definite Integral | 1+1=2 | 2 | 3 | | |
| C4 | Application of Integration | 1 | | 3 | | |
| | | 25 | 18 | 27 | | 70 |

9. Suggested implementation strategies: The syllabus can be completed by taking regular classes along with tutorial classes. Audio-Visual aids also can be used.

10. Suggested Learning Resources:

1. Applied Mathematics (vol. I&II) by R . D. Sharma
2. Engineering Mathematics by H .K. Das
3. Calculus for beginners by R.K.Chakravorty.
4. An Introduction to polytechnic mathematics Vol-II by Geetali Das ,Ajanta Choudhury, Parbin Ahmed.

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Annexure-I

TABLE OF SPECIFICATIONS FOR THEORY

| Sr. No | Topic (a) | Time allotted in hours (b) | Percentage Weightage (c) | K | C | A | HA |
|--------------|--|-------------------------------|-----------------------------|---|----|----|----|
| 1 | CO-ORDINATE GEOMETRY (Two and Three Dimension) and VECTORS | 11 | 24.4 | 6 | 11 | 3 | |
| 2 | DIFFERENTIAL CALCULUS | 20 | 44.5 | 8 | 9 | 13 | |
| 3 | INTEGRAL CALCULUS | 14 | 31.1 | 3 | 7 | 10 | |
| Total | | $\Sigma b = 45$ | 100 | | | | |

K = Knowledge

C = Comprehension

A = Application

HA = Higher Than Application (Analysis, Synthesis, Evaluation)

$$c = \frac{b}{\Sigma b} \times 100$$

DETAILED TABLE OF SPECIFICATIONS FOR THEORY

| Sr. No | Topic | OBJECTIVE TYPE | | | | SHORT ANSWER TYPE | | | | | ESSAY TYPE | | | | |
|--------|--|----------------|---|---|----|-------------------|---|---|----|---|------------|---|---|----|----|
| | | K | C | A | T | K | C | A | HA | T | K | C | A | HA | T |
| 1 | CO-ORDINATE GEOMETRY (Two and Three Dimension) and VECTORS | 4 | 4 | | 8 | 2 | 4 | | | 6 | | 3 | 3 | | 6 |
| 2 | DIFFERENTIAL CALCULUS | 4 | 4 | 2 | 10 | 4 | 2 | 2 | | 8 | | 3 | 9 | | 12 |
| 3 | INTEGRAL CALCULUS | 3 | 2 | 2 | 7 | | 2 | 2 | | 4 | | 3 | 6 | | 9 |

K = Knowledge, C= Comprehension, A = Application, HA = Higher Than Application, T=Total



5. Course Title: ENGINEERING MECHANICS

Subject Code: Me-201

2nd SEMESTER (All Branches)

Total Marks-100

Total Contact Hrs- 48 (Including 3 hrs Class test)

Prerequisite: None

Aim of the subject: The aim of the subject is to let the students know about the basics of Engineering Mechanics and its applications in the engineering field. It mainly deals with forces, its different types and applications; Friction and its effect on machine components, how work is being converted to machine through its elements, relation between work power and energy.

CO—Outcome based objective

After studying the subject the students will be able to

1. Calculate the resultant of coplanar concurrent forces using analytical and graphical methods
2. Calculate the moments of forces
3. Determine the Centre of Gravity & Moment of Inertia of a lamina or sections
4. Apply the principle of simple friction in solving problems
5. Apply the principle of linear and circular motion in solving basic problems
6. Explain the Law of Machine
7. Solve problems on lifting machine

TOPIC WISE Marks Distribution

| SL.No | Major Topics | Hours Allotted | Weightage of Marks | No of marks | | |
|--------------------|------------------------------------|-------------------|-----------------------|-------------|-----------|-----------|
| | | | | O | S | L |
| 1 | Objective of Engineering Mechanics | 1 | 2 | 2 | 0 | 0 |
| 2 | Coplanar Concurrent Forces | 9 | 18 | 5 | 5 | 8 |
| 3 | Moments | 6 | 13 | 3 | 4 | 6 |
| 4 | Coplanar Non-Concurrent Forces | 3 | 6 | 1 | 2 | 3 |
| 5 | Centre of Gravity | 4 | 10 | 2 | 3 | 5 |
| 6 | Moment of Inertia | 4 | 10 | 2 | 2 | 6 |
| 7 | Friction | 5 | 11 | 2 | 2 | 7 |
| 8 | Motion | 5 | 10 | 2 | 2 | 6 |
| 9 | Work , Power and Energy | 3 | 7 | 2 | 2 | 3 |
| 10 | Simple Lifting Machines | 5 | 10 | 2 | 2 | 6 |
| Total Hours | | 45 | 97 | 25 | 25 | 47 |

Note- O means Objective, S means Short and L means Long Type

Details of Syllabus:

- 1.0 Objective of Engineering Mechanics. (1 hr)
- 2.0 COPLANAR CONCURRENT FORCES (9 hrs.)
 - 2.1 Force, Units, Types, Effect of a force on a body. 1 hr.
 - 2.2 Scalar and Vector Quantities, Representation of a force as a Vector addition and subtraction of Vectors 2 hrs.
 - 2.3 Coplanar, Concurrent and Non-concurrent forces , Composition and Resolution of forces. Problems 2 hrs.
 - 2.4 Resultant for system of forces. Triangle Laws of forces, parallelogram and Polygon Law of Forces. Condition of equilibrium of coplanar current forces.

| | |
|--|--------|
| Bow's Notation, Lami's theorem, Analytical and graphical methods of problem solution | 4 |
| hrs | |
| 3.0 MOMENTS | 6 hrs |
| 3.1 Moments of forces, Units, Clockwise-Anticlockwise moments, Varignon's theorem. Problems | 2hrs |
| 3.02 Couples: Its moments. | 1hr |
| 3.03 Load support reactions of a simply supported beam and overhanging beam. | 2hr |
| 4.00 COPLANAR NON-CONCURRENT FORCES: | 3hrs |
| 4.01 Condition of equilibrium of non concurrent coplanar forces, Resultant of funicular or Link polygon. Problems | |
| 5.00 CENTER OF GRAVITY: | 4hrs |
| 5.01 Centre of gravity and control, Definition of C.G. of a Plain triangular, rectangular lamina and Sections, Problems. | |
| 2hrs | |
| 5.2 C.G. of Symmetrical and Asymmetrical figures. | 2 hr. |
| 6.00 MOMENT OF INERTIA: | 4 hrs. |
| 6.01 Moments of inertia, Definition, Mathematical forces Unit. | 1hr. |
| 6.02 M.I. of Plane figures like triangle, rectangles and circles problems. | 3 hrs. |
| 7.00 FRICTION: | |
| 5hrs | |
| 7.01 Friction, Definition, Useful and harmful effects of friction. | 1 hr. |
| 7.02 Co-efficient of friction, angles of frictions and repose. | 1 hr. |
| 7.03 Equilibrium of a body on a rough horizontal and inclined plane, simple problem. | 2 |
| hrs. | |
| 7.04 Ladder friction, simple problems | 1hr |

- 8.0 MOTION: (5 hrs)
- 8.1 Linear and circular motion, Linear and angular velocities and acceleration,
Units relation in between centrifugal force, Its uses in Engineering problems. 2hrs
- 8.2 Angle of banking super elevation problems. 2 hrs.
- 8.3 Bodies moving on a level circular path, skidding, overturning. 1 hr.
- 9.0 WORK, POWER ANR ENERGY: (3hrs)
- 9.1 Work, power and Energy definition and application 1 hr.
- 9.2 Potential and kinetic energy-definition and Units and their Engineering
problems.
2 hr
10. SIMPLE LIFTING MACHINES (5 hrs).
- 10.1 Definition and importance of Simple Machines. 1 hr.
- 10.2 Law of Machine, problems. 1 hr.
- 10.3 Simple lifting Machines –simple Wheel and axle, differential wheel and axle and
screw jack(simple) problems. 2 hrs.
- 10.4 Definition M.A, V.R and efficiency and their relationship. Simple problems 1 hr.
- 11.0 Three class tests
3 hrs

5 .Engineering Mechanics Laboratory

All experiments have to be performed

Total 48 hrs including sessional viva

CO----- Outcome based Course Objectives

After performing the experiment, the students will be able to

- i) Explain the Laws of coplanar concurrent forces
- ii) Draw the vector diagrams of equilibrium of coplanar concurrent forces
- iii) Verify the principle of moment
- iv) Determine the coefficient of friction over a smooth sliding surface
- v) Explain the function of pulley
- vi) Determine power of a shaft with the help of Prony brake Dynamometer
- vii) Determine the MA, VR and efficiency of a screw jack(Simple machine)

Syllabus:

1. Coplanar concurrent and non-concurrent forces
 - i) Triangle Law of Forces vertical plane
 - ii) Polygon Law of Forces using (a) vertical plane, (b) universal force table
2. Moment
 - i) Bell Crank Lever
 - ii) Simply supported beam
3. Friction
 - i) Determination of coefficient of friction by sliding block over a smooth surface
 - ii) Determination of coefficient of friction by sliding block over a smooth inclined surface

4. Pulley
 - i) Study of Simple pulleys
 - ii) Demo of Differential pulleys
 - iii) Study of Screw Jack
5. Power
 - i) Rope Brake or Prony Brake dynamometer
6. Study of simple screw jack & find out the following
 - i) Mechanical Advantage
 - ii) Velocity Ratio
 - iii) Efficiency of the machine
 - iv) Effect of friction
7. Viva voce

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

6. Course Title: Basic Workshop Practice-II

1st and 2nd semester for all branches Course code Ws -101, Ws- 201

There are 12 nos of shop out of which 6 shops are to be completed in each semester.

Total Marks 150 in each semester (Viva includes 100 , Sessional 50 in each semester)

Total Contact hours 90 in each semester

Course Objectives (CO) for Basic Workshop (I &II)

After studying the course the students will be able to

1. Identify the tools in the shop
2. Explain the principle of the tools in the respective shops
3. Handle the tools properly
4. Explain the principle of the measuring instruments
5. Apply the proper measuring procedure and safety precautions.
6. Execute the steps involved in completing an assigned job

Course Content

1. Carpentry shop (15hrs) (Theory and Practice)

- 1.1 Introduction with the shop
- 1.2 Various structure of wood and types of wood
- 1.3 Different types of tools , machine and accessories used in Carpentry shop
- 1.4 Safety Precautions in workshop

Details of Practical Contents(3+6 hrs)

Demo of different wood working tools and machines

Demo of different wood working processes

Simple joints like T joints



One simple utility job so that it helps the institution also like name plate, switch boards etc.

2. Fitting Shop(15hrs) (Theory and Practice)

- 2.1 Introduction with the fitting shop
- 2.2 Various marking . measuring, cutting, holding and striking tools
- 2.3 Different Operations like chipping, filing, marking drilling etc.
- 2.4 Working principle of drilling machine, lapping dies etc

Details of Practical Contents(3+6 hrs)

Demo of different fitting tools and machines and power tools

Demo of different processes in fitting shop

Squaring of a rectangular metal piece

One simple utility job so that it helps the institution

3. Plumbing Shop (15hrs) (Theory and Practice)

- 3.1 Introduction
- 3.2 Various marking , measuring ,cutting, holding and striking tools
- 3.3 Different G.I. Pipes, PVC pipes, flexible pipes used in practice
- 3.4 GI pipes, PVC pipes fittings and accessories adhesive solvents, pipe layout

Details of Practical Contents (3+6 hrs)

Demo of Different Plumbing tools

Demo of Different operations

Cutting thread , using socket , elbow and tee etc.

Prepare a nipple of 6 inch or a 12 inch

Advised to prepare utility job

4. RCC shop (15hrs)(Theory and Practice)

- 4.1 Common Materials used in RCC shop
- 4.2 Various tools and equipment used in RCC shop
- 4.3 Different types of bonds and their details
- 4.4 Bending and binding of MS rods in RCC structures(cap., hook, crank up bar)
- 4.5 Lay out of Building Plinth

Details of Practical Contents(3+6 hrs)



Demo on binding of the RCC structure

Demo of reinforced cement concrete beam or slab with given proportion, curing process for floor, wall on RCC castings

Tiles fitting with special surface made in floors, modern bathrooms

5. Painting Shop (15hrs)(Theory and Practice)

5.1 Introduction

5.2 Various tools and equipment, machines used in Painting shop

5.3 Preparation of Ingratiation of paint

5.4 Types of Resin and its uses

5.5 Preparation of Varnishes and uses

5.6 Safety and precautions to be taken

Details of Practical Contents(3+6 hrs)

To prepare a wooden surface for painting , apply wooden surface and polish the other side

To prepare metal surface for painting , apply primer and paint the same

To prepare a metal surface for spray painting, 1st spray primer and paint the same by spray painting gun and compressor system

6. Welding Shop (15hrs) (Theory and Practice)

6.1 Introduction

6.2 Types of Welding, Arc Welding, Gas Welding, Gas Cutting

6.3 Welding of dissimilar materials, selection of welding rod material, size of rod and work piece

6.4 Different types of flames

6.5 Elementary symbolic Representation

6.6 Safety and precautions

Details of Practical Contents (3+6 hrs)

Demo of different welding tools and machines

Demo of Arc Welding, Gas Welding, Gas Cutter and rebuilding of broken parts with welding

Any one Composite job involving lap joint welding process from the following utility job like grill, door, window frame, supporting frames etc.



7. Machine Shop(15hrs)(Theory and Practice)

7.1 Introduction

7.2 Study of Different types of Lathe machine , grinding Machine, shaping machine, Drilling machine,

7.3 Study of Different types of hand tools and machine tools and parts

7.4 Safety & precautions

Details of Practical Contents(3+6 hrs)

Demo of different machines and their operations

Slot cutting by shaping machine (Horizontal and vertical)

The Preferably prepare a utility job

8. Turning shop(15 hrs)(Theory and Practice)

8.1 Introduction

8.2 Various marking, measuring, cutting, holding, and string tools

8.3 Working principle of Drilling machine, tapping, dies, its uses

8.4 Safety precautions

Details of Practical Contents (3+6 hrs)

Demo of lathe machine, drilling machine

One job related to plane and taper turning , threading and knurling

One job related to drilling and tapping

9. Blacksmithy shop(15hrs)(Theory and Practice)

9.1 Introduction

9.2 Study of different processes involved inblacksmithy shop

9.3 Study of forging, hammering tools and their uses

9.4 Study of anvils its parts

9.5 Safety precautions

Details of Practical Contents(3+6 hrs)

Demo of different processes in black smithy

One job related to forging

One job related to cold working process

Preferably utility jobs to be prepared



10. Electrical Shop(15hrs)(Theory and Practice)

10.1 Introduction

10.2 Various terms and instruments used in electrical wiring

10.3 Study of different tools used in simple house wiring

10.4 Difference between ac and dc line

10.5 Safety precautions

Details of Practical Contents(3+6 hrs)

Demo of simple house wiring and use of tools

One job related to simple house wiring

Fittings of cut outs, fuses and other simple fittings etc.

Difference between Single phase wiring and three phase wiring

11. Pattern making shop(15hrs)(Theory and Practice)

11.1 Introduction

11.2 Tools used in Pattern making shop

11.3 Various Processes performed in the shop

11.4 Material used in the shop

11.5 Process of Casting

11.6 Study of pattern, its types

11.7 Cope, drag, risers etc

11.8 Green sand moulding etc

Details of Practical Contents(3+6 hrs)

Demo of pattern making

Different types of allowances provided

One job for pattern making from wood(so that students can practically prepare in moulding shop)

12. Moulding Shop(15hrs)(Theory and Practice)

12.1 Introduction

12.2 Materials used in moulding process

12.3 Tools used in moulding shop

12.4 Terms related with cope and drag, Green sand moulding etc.

12.5 Different types of moulding

12.6 Moulding sand composition and its properties

12.7 Safety precaution

Details of Practical Contents(3+6 hrs)

Demo of various moulding process like in moulding machine, casting

One job related to moulding preferably which is prepared in pattern making

With low melting point materials like wax, lead etc. so that student can practically understand the moulding process.

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

7. Course Title: DEVELOPMENT OF LIFE SKILL II

L T P
1 0 2

Curri. Ref. No.: LS-210

Total Contact hrs : 45

Total marks: 50

Theory: 0

Theory:

End Term Exam: 0

Practical:

P.A.:

Pre requisite:

Practical: 50

Credit:2

End Term Exam: 0

P.A :

Aim :-This subject is kept to

- Conduct different session to develop students interpersonal skills
- Conduct different session to improve problem solving skills
- Conduct different session to improve communication and presentation skills

Objective: - This course will enable the students to:

- Develop interpersonal skill
- Develop problem solving skill.
- Develop presentation skill
- Enhance creativity skills.
- Develop communication skills.
- Prepare for interviews

DETAILED COURSE CONTENT

THEORY:

| UNITS | CONTENTS | Hours |
|--------|---|-------|
| Unit1 | Inter personal Relation Importance, Interpersonal conflicts, Resolution of conflicts, Developing effective interpersonal skills communication and conversational skills, Human Relation Skills (People Skills) | 1 |
| Unit 2 | Problem Solving I)Steps in Problem Solving(Who?What?Where?When?Why?How?How much?) 1. Identify, understand and clarify the problem 2. Information gathering related to problem 3. Evaluate the evidence 4. Consider feasible options and their implications 5. Choose and implement the best alternative 6. Review II)Problem Solving Technique | 2 |

| | | |
|---------------|---|-----------|
| | 1.Trial and Error,2.Brain Storming3.Thinking outside the Box | |
| Unit 3 | <p>Presentation Skills Concept ,Purpose of effective presentations,</p> <p><i>Components of Effective Presentations:</i> Understanding the topic, selecting the right information, organizing the process interestingly, Good attractive beginning, Summarising and concluding, adding impact to the ending,</p> <p><i>Use of audio visual aids</i> OHP, LCD projector, White board,</p> <p><i>Non verbal communication:</i> Posture, Gestures ,Eye contact and facial expression, Voice and Language Volume, pitch, Inflection, Speed, Pause, Pronunciation, Articulation, Language Handling questions Respond, Answer, Check, Encourage, Return to presentation</p> <p><i>Evaluating the presentation</i> Before the presentation, During the presentation, After the presentation</p> | 4 |
| Unit 4 | <p>Looking for a Job Identifying different sources announcing Job vacancies, Skim, scan and read advertisements in detail, write efficacious CVs, write covering letters to a company CVs, write Job Application Letters in response to advertisements and self-applications</p> | 2 |
| Unit 5 | <p>Job Interviews <i>Prepare for Interviews:</i> Intelligently anticipating possible questions and framing appropriate answers, Do's and don'ts of an interview(both verbal and non verbal),</p> <p><i>Group Discussion:</i> Use of Non verbalbehavior in Group Discussion, Appropriate use of language in group interaction, Do's and don'ts for a successful Group Discussion</p> | 4 |
| Unit 6 | <p>Non verbal graphic communication Nonverbal codes: A .Kinesics ,.B .Proxemics, .C.Haptics, .D.Vocalics, .E.Physical appearance, .F..Chronemics, .G. Artifacts Aspects of Body Language</p> | 1 |
| Unit 7 | <p>Formal Written Skills:Memos, Emails, Netiquettes,Business correspondence Letter of enquiry, Letter of Placing Orders, Letter of Complaint</p> | 1 |
| | Total | 15 |

| | | |
|---|--|----|
| Practical | | |
| Total Periods : 30 | | |
| Periods : 2 P/W | | |
| Unit 1 Interpersonal Relation | Case Studies: 1.from books 2.from real life situations 3.from students' experiences Group discussions on the above and step by step write of any one or more of these in the sessional copies | 2 |
| Unit II Problem Solving | Case Studies: 1.from books 2.from real life situations 3.from students' experiences Group discussions on the above and step by step write of any one or more of these in the sessional copies | 4 |
| Unit III Presentation Skills | Prepare a Presentation (with the help of a Power point) on a Particular topic. The students may refer to the Sessional activity (sl.No.8) of the Computer Fundamental syllabus of Semester1. For engineering subject oriented technical topics the cooperation of a subject teacher may be sought. Attach hand out of PPT in the sessional copy | 8 |
| Unit IV Looking for a job | Write an effective CV and covering letter for it. Write a Job Application letter in response to an advertisement and a Self-Application Letter for a job. | 4 |
| Unit V Job Interviews &Group Discussions | Write down the anticipated possible questions for personal interview (HR)along with their appropriate responses Face mock interviews.The cooperation of HR personnels of industries may be sought if possible Videos of Mock Group Discussions and Interviews may be shown | 8 |
| Unit VII Formal Written Skills | Write a memo, Write an effective official e-mail, write a letter of enquiry, letter of placing orders, letter of complaint | 4 |
| | Total | 30 |