Subject code	Name of subject (Theory/Practical)		
FIRST SEMESTER			
CM – 102	English and Communication Skills – 1	BS – 112	Applied Mathematics –I
BS – 214	Applied Chemistry		
ES - 120	Applied Mechanics		
ES – 121	Engineering Drawing		

STUDY AND EVALUATION SCHEME: CIVIL ENGG. / CIVIL (CONST) / CIVIL(PHEE)

FIRST SEMESTER

CODE NO.	SUBJECT	STUDY SCHEME PERIOD / WEEK			EVALUATION SCHEME INTERNAL ASSESSMENT THEORY PRACTICALS		EXTERNAL ASSESSMENT (EXAM) WRITTEN PRAC TICALS				TOTAL MARKS
		L	T	P	MAX. MARKS	MAX MARKS	MAX MARKS	HRS.	MAX MARKS	HRS	
CM-102	*English and Communication Skills I	4	1	2	50	50	100	3	100	-	300
BS-112	*Applied Mathematics-I	4	2	-	50	-	100	3	-	-	150
BS-214	* Applied Chemistry	4	-	2	50	50	100	3	100	3	300
ES-121	*Engineering Drawing	2	-	6	-	50	100	3	-	-	150
CE-230	*Workshop Practice I	-	-	8	-	50	-	-	100	3	150
** Student Centered Activities		-	-	5							
TOTAL		14	3	23							1200

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* Common with Mechanical, Production, Mechanical Maintenance and Automobile Engineering Civil (Construction) and Civil(PHE).

** Student Centered activities will include: extension lectures, field visits, soft skills, seminars, debates, hobby clubs, library studies, awareness regarding ecology and environment, conservation of energy (Petroleum products, electricity etc), social service

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	L	T	P
	4	1	2

CM102 ENGLISH AND COMMUNICATION SKILLS –I

The curriculum aims to develop the use of English for three major purposes social interaction, academic achievement and professional use. Listening, speaking, reading, and writing skills can not be thought of as independent skills. They are generally perceived as interdependent where one skill often activates the other skills as well as the paralinguistic skills required for the achievement of effective communication. It is believed that the most effective way to achieve these purposes is through the adoption of a thematic, integrated, content-based approach to teaching and learning.

DETAILED CONTENTS

1. INTRODUCTION (10%)

Theory:

- § Definition, Introduction and Process of Communication
- § Objectives of Communication
- § Essentials of Communication
- § Media and Modes of Communication
- § Channels of Communication
- § Barriers to Communication
- § Body language
- § Humour in Communication
- § Silence in Communication

Note: Teachers are expected to give practical examples, while teaching above topics

2. LISTENING (10%)

Theory: Significance, essentials, barriers and effectiveness of Listening.
Practicals: The following exercises to be conducted in practical sessions:

- § Using pre-recorded CDs/DVDs with pre-listening exercise to prepare students about what they are going to hear and comprehension based on the audio
- § Note-taking
- § Listening for the main ideas
- § Assessing listening proficiency

3. SPEAKING (20%)

Theory:

Significance, essentials, barriers and effectiveness of Speaking

§ Introduction to phonetics (Dictionary: meaning and pronunciation of words as given in the standard dictionary using symbols of phonetics)

Practicals: The following exercises to be conducted in practical sessions:

- § Exercises on pronunciation of common words as given in the standard dictionary using symbols of phonetics
- § Greetings for different occasions
- § Introducing oneself, others and leave taking(talking about yourself)
- § Just a minute (JAM) sessions: Speaking extempore for one minute on given topics
- § Paper reading before an audience (reading unseen passages)
- § Situational Conversation/role-playing with feedback, preferably through video recording
- § Reading aloud of Newspaper headlines and important articles
- § Improving pronunciation through tongue twisters

4. READING (10%)

Theory:

- § Techniques of reading: Skimming, Scanning, Intensive and Extensive Reading
- § Comprehension, Vocabulary enrichment and grammar exercises based on the following selective readings:

Section-I

- § Homecoming – R.N. Tagore
- § The Selfish Giant - Oscar Wilde
- § The Stick – Justice Surinder Singh

Section-II

- § I Have A Dream – Martin Luther King
- § My struggle for An Education- Booker T Washington
- § Life Sketch of Sir Mokshagundam Visvesvarayya

Section-III

- § Ozymandias – P.B. Shelley
- § Daffodils – William Wordsworth
- § Stopping by Woods on a Snowy Evening – Robert Frost

- § Comprehension exercises on unseen passages
- § Exercises on interpretation of tables, charts, graphs, signs and pictures etc.

Practicals:

- § Paper reading
- § Poetry recitation
- § Reading newspaper headlines

5. WRITING (15%)

Theory:

- § Significance, essentials and effectiveness of writing
- § Paragraph of 100-120 words

Practicals:

- § Exercises on spellings
- § Group exercises on writing paragraphs on given topics

6. VOCABULARY (15%)

Theory:

- § Vocabulary of commonly used words
- § Pair of words (Words commonly confused and misused)

Practicals:

- § To look up words in a Dictionary: meaning and pronunciation of words as given in the standard dictionary using symbols of phonetics
- § To seek information from an Encyclopedia

7. GRAMMAR (20%)

Theory:

- § Identification of parts of speech
- § Using a word as different parts of speech
- § Correction of in-correct sentences
- § Tenses
- § Voice

Note: Teachers are expected to give practical examples, while teaching above topics

RECOMMENDED BOOKS

1. Text Book of English and Communication Skills Vol – 1, By Alvinder Dhillon and Parmod Kumar Singla; Published by: M/S Abhishek Publications, Chandigarh
2. Spoken English (2nd Edition) by V Sasikumar & PV Dhamija; Published by Tata MC Graw Hills, New Delhi.
3. Spoken English by MC Sreevalsan; Published by M/S Vikas Publishing House Pvt. Ltd; New Delhi.
4. Spoken English –A foundation course (Part-I & Part-II) By Kamlesh Sdanand & Susheela Punitha; Published by Orient BlackSwan, Hyderabad
5. Practical Course in English Pronunciation by J Sethi, Kamlesh Sadanand & DV Jindal; Published by PHI Learning Pvt. Ltd; New Delhi.
6. A Practical Course in Spoken English by JK Gangal; Published by PHI Learning

Pvt. Ltd; New Delhi.
7. English Grammar, Composition and Usage by NK Aggarwal and FT Wood; Published by Macmillan Publishers India Ltd; New Delhi.
8. Business Correspondence & Report writing (4th Edition) by RC Sharma and Krishna Mohan; Published by Tata MC Graw Hills, New Delhi.
9. Business Communication by Urmila Rani & SM Rai; Published by Himalaya Publishing House, Mumbai.
10. Business Communication Skills by Varinder Kumar, Bodh Raj & NP Manocha; Published by Kalyani Publisher, New Delhi.
11. Professional Communication by Kavita Tyagi & Padma Misra; Published by PHI Learning Pvt. Ltd; New Delhi.
12. Business Communication and Personality Development by Bsiwajit Das and Ipseeta Satpathy; Published by Excel Books, Delhi
13. Succeeding Through Communication by Subhash Jagota; Published by Excel Books, Delhi
14. Communication Skills for professionals by Nira Konar; Published by PHI Learning Pvt. Ltd; New Delhi.
15. Developing Communication Skills (2nd Edition) by Krishna Mohan & Meera Banerji; Published by Macmillan Publishers India Ltd; New Delhi.
16. Effective Technical Communication By M .Ashraf Rizwi; Published by Tata MC Graw Hills, New Delhi.
17. Basic Communication Skills for Technology by Andrea J Rutherfoord; Published by Pearson Education, New Delhi
18. English & Communication Skills for students of Science & Engineering by SP Dhanavel; Published by Orient BlackSwan, Hyderabad.
19. Technical Communication- Principles & Practices by Meenakshi Raman & Sangeetha Sharma; Published by Oxford University Press, New Delhi.
20. Technical English by S. Devaki Reddy & Shreesh Chaudhary; Published by Macmillan Publishers India Ltd; New Delhi.
21. Advanced Technical Communication, by Kavita Tyagi & Padma Misra; Published by PHI Learning Pvt. Ltd; New Delhi.
22. Communication Skills for Engineer & Scientist by Sangeeta Sharma & Binod Mishra; Published by PHI Learning Pvt. Ltd; New Delhi.

BS-112 *APPLIED MATHEMATICS – I

	L	T	P
Pds/week	4	2	-

RATIONALE

The course aims at developing analytical abilities in basics of applied mathematics such as: vector algebra, matrices, elementary numerical analysis, coordinate geometry, differential and integral calculus and solution of first order differential equations. Besides application of above the elements in engineering, the course of study will also provide continuing education base to them.

NOTE: Weightage of each topic for external examination is given in the brackets

DETAILED CONTENTS

1. ALGEBRA (15%)
   - (i) Arithmetic Progression (A.P.) – its n^{th} term, sum to n terms. Geometric Progression (G.P.) - its n^{th} term, sum to n terms. And infinite Geometric series. Partial Fractions.
   - (ii) Binomial theorem for positive integral index (without proof), Binomial theorem for any index, Expansions.

2. TRIGONOMETRY. (15%)
   - (i) Sum and difference formulas for trigonometric ratios of angles and their application (without proof). Formula from product to sum, difference and vice-versa. Ratio of multiple angles, sub multiple angles (like 2A, 3A, A/2).
   - (ii) In a triangle sine formulas, cosine formulas, Napier's analogy. Solution of triangle.
   - (iii) Simple problems on height and distance.
   - (iv) Plotting of curves y = f(x), f(x), trigonometric functions (Sine, Cosine, Tangent).
3. COORDINATE GEOMETRY. (40%)
   - (i) Equation of straight line in various standard forms. Intersection of two straight lines and angle between them. Concurrent lines, perpendicular distance formula.
   - (ii) General equation of a circle and its characteristics. Equation of a circle given center and radius, three point form and diametrical form.
   - (iii) Definition of a conic section, standard equation of a parabola equation of parabola given its focus and Directrix. Given the equation of parabola finding its focus axis, vertex, Directrix and latus section.
   - (iv) Ellipse and hyperbola (standard equation, without derivation) determining the equation of ellipse and hyperbola given the Directrix, focus and eccentricity. Given the equation of the ellipse and hyperbola finding the focii, Directrixes, axes, latus rectum, vertex and eccentricity.

4. VECTOR ALGEBRA. (10%)
   - (i) Concept of a vector, Position vector of a point. Addition and subtraction of vectors.
   - (ii) Multiplication of a vector by a scalar product and vector product of two

vectors. Application to problems on work done and moment (torque)

5. DETERMINANT AND MATRIX. (20%)

(i) Definitions Evaluation of a determinant of order two and three. Minor and cofactors. Properties of determinants. Solving simultaneous equations by Cramer's rule.

(ii) Concept of a matrix, definitions, Transpose of a matrix, Symmetric and Skew Symmetric matrix, Diagonal matrix, Unit matrix, Addition and Multiplication of matrices, Adjoint and Inverse of a matrix, solving simultaneous equations by matrix methods.

BS-214 * APPLIED CHEMISTRY

	L	T	P
Pds/week	4	-	2

RATIONALE

Applied Chemistry has been considered as one of the core subject for diploma holders in engineering and technology to develop in them scientific temper, appreciation of chemical properties of materials and to develop learning to learn skills in the students. This course will deal with metallurgy, corrosion, and fuels. This will equip them to perform various activities effectively. Hence the course.

NOTE: Weightage of each topic for external examination is given in the brackets

DETAILED CONTENTS

1. Structure of Atom (10%)
   Rutherford model of the structure of atom, Boher's theory of H atom and equation deduced. Quantum numbers and their significance, De-Broglie equation and uncertainity principle. Electronic configuration of 1 to 30 elements ,effect of temperature on conductivity of germanium and silicon.

2. Periodic Properties of Elements (10%)
   Periodic law, periodic table, periodicity in properties like atomic radii and volume, ionic radii, ionization energy and electron affinity. Division of elements into s.p.d. and f block.

3. Chemical Bonds (10%)
   Electrovalent,, covalent and coordinate bond and their properties. Metallic bonding (electron cloud model) and properties (like texture, conductance, lusture, ductility and malleability). Orbital concept of covalence, hybridization (simple treatment).

4. Fuel and their Classification (12%)
   Definition, characteristics, Classification, into solid, liquid and gaseous fuel, Petroleum and brief idea of its refining into various fraction and their characteristics and uses.

5. Water (12%)
   Impurities in water, method of their removal, hardness of water, its types, causes and removal, Disadvantage of Hard water in boilers pH value and its determination by calorimetric method.

6. Metals (12%)
   Cast iron and its properties, effect of sulphur, silicon and phosphorous as impurities in cast iron. Elementary knowledge of heat treatment of steels-hardening, tempering, annealing, normalizing and case hardening.

7. Alloys (12%)
   Definition, classification and necessity for making alloys. Composition, properties

and uses of following alloys: Brass, Bronze, Gun-metal and Duralumin. Effect of carbon, nickel, chromium, manganese on steel.

8. Corrosion (12%)

Its meaning, theory of corrosion, prevention of corrosion by various methods using metallic and non-metallic coatings.

9. Plastics and Polymers (10%)

Plastics-thermo-plastic and thermo setting. Introduction of Polythene, P.V.C., Nylon, synthetic rubber and phenol-formaldehyde resin. Their application in industry.

LIST OF PRACTICALS

1. To find the strength in grams per litre of the given solution of sodium hydroxide with the help of standard oxalic acid solution.
2. Find the strength in grams per litre of given sodium hydroxide solution with the help of standard sodium-carbonate solution and intermediate solution of an acid.
3. Determine the total alkalinity in ppm in the given sample of water using standard sulphuric acid.
4. To find the amount of chloride irons present in water using silver nitrate solution (potassium chromate as indicator)
5. Determine the type of alkalining in ppm present in a given sample of H_2O using standard sulphuric acid.

ES-120 *APPLIED MECHANICS

	L	T	P
Pds/week	4	2	2

RATIONALE

The subject Applied Mechanics deals with basic concepts of mechanics like laws of forces, moments, friction, centre of gravity, laws of motion and simple machines which are required to the students for further understanding of other applied subjects. Hence this course.

NOTE: Weightage of each topic for external examination is given in the brackets

DETAILED CONTENTS

1. Introduction (5%)
   Concept of mechanics and applied mechanics – Explanation of mechanics and applied Mechanics, its importance and necessity, giving suitable examples on bodies at rest and in motion, explanation of branches of this subject.

2. Laws of Forces (15%)
   Force and its effects. Units and measurement of force. Characteristics of force vector representation. Bow's notation. Types of forces, action and reaction, tension & thrust. Force systems: Coplanar and space force systems. Coplanar, concurrent and non -concurrent forces. Free body diagrams. Resultant and components of forces, concept of equilibrium; parallelogram law of forces. Equilibrium of two forces, super-position and transmissibility of forces, Newton's third law, triangle law of forces, different cases of concurrent coplanar, two forces systems, extension of parallelogram law and triangle law to many forces acting at one point-polygon law of forces, method of resolution into orthogonal components for finding the resultant, graphical methods, special case of three concurrent, coplanar forces, Lami's theorem.

3. Moments (15%)
   Concept of moment, Varignon's theorem – statement only. Principle of moments – application of moments to simple mechanism. Parallel forces, like and unlike parallel forces, calculation of their resultant, concept of couple, moving a force parallel to its line of action, general cases of coplanar force system, general conditions of equilibrium of bodies under coplanar parallel forces.

3. Friction (10%)
   Concept of friction, laws of friction, limiting friction and coefficient of friction, sliding friction and rolling friction, inclined plane.

5. Centre of Gravity and Centroid (15%)
   Concept of gravity, gravitational force, centroid and centre of gravity. Centroid for regular lamina and center of gravity for regular solids. Position of centre of gravity of compound bodies and centroid of composite area. CG of bodies and areas with portions removed.

6. Moment of Inertia of Plane Areas (15%)
Concept of Moment of Inertia and second moment of area and Radius of gyration, theorems of parallel and perpendicular axes, second moment of area of common geometrical sections: rectangle, triangle, circle (without derivations). Second moment of area for L, T and I sections. Section modulus without derivation.

7. Laws of Motion (15%)
Concept of momentum, Newton's laws of motion, their application, derivation of force equation from second law of motion, numerical problems on second law of motion, piles, lifts, bodies tied with string, Newton's third law of motion numerical problems, conservation of momentum, impulse and impulsive force (definition only).

8. Simple Lifting Machines (10%)
Concept of machine, mechanical advantage, velocity ratio and efficiency of a machine, their relationship, law of machine, simple machines (lever, wheel and axle, pulleys, jacks winch crabs only).

LIST OF PRACTICALS

1. Verification of the laws of polygon of forces.
2. To verify the forces in the different members of a jib crane.
3. To verify the reaction at the supports of a simply supported beam.
4. To find the mechanical advantage, velocity ratio and efficiency in the case of inclined planes
5. To find the mechanical advantage, velocity ratio and efficiency in the case of Screw Jack
6. To find the mechanical advantage, velocity ratio and efficiency in the case of worm and worm wheel
7. To find the mechanical advantage, velocity ratio and efficiency in the case of single winch Crab.
8. To find out centre of gravity of regular and irregular laminas.

ES– 121 ENGINEERING DRAWING

	L	T	P
Pds/week	2	-	6

RATIONALE

Drawing is the language of engineers & technicians. Reading & interpreting engineering drawing is their day to day responsibility. The course is aimed at in developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings their reading & interpretation. The emphasis while imparting instruction should be to develop conceptual skills in the students.

NOTE:-1. Weightage of each topic for external examination is given in the brackets.

2. First angle projection to be followed.

3. Minimum of 12 sheets to be prepared by each student.

4. BIS SP 46 – 1988 should be followed.

DETAILED CONTENTS

1. INTRODUCTION (5%)

- § Drawing instruments &their uses.
- § Lines, lettering & dimensioning.
- §

2. SCALES (10%)

Types of scales, plain scale, diagonal scale, vernier scale.

3. PROJECTION OF POINTS AND LINES (20%)

First angle and Third angle projections

Projection of Points : Introduction, Points situated in Ist, 2^{nd}, 3^{rd} and 4^{th} quadrants.

Projection of Lines: Introduction, Line parallel to one or both the planes, Line contained by one or both the planes, line parallel to one of the plane. Line inclined to one plane and parallel to others, Line inclined to both the planes.

4. THEORY OF PROJECTIONS (elaborate theoretical instruction) (15%)

- § Introduction to first angle projections
- § Drawing 3 views of given objects (at least 2 objects)
- § Drawing 6 views of given objects (Non symmetrical objects may be selected for this exercise)
- § Identification of surfaces on drawn views & objects drawn.
- § Exercises on missing surfaces & views
- § Sketching practice of pictorial view from objects

5. SECTION (20 %)

Section planes, true shape of a section

Section of prism

a). Section plane parallel to VP

b). Section plane parallel to HP

Section of pyramids

a). Section plane parallel to base of pyramid

b). Section plane parallel to VP

Section of cylinder

a). Section plane parallel to the base

b). Section plane parallel to the axis

Importance & salient features, methods of representing sections, classification of section, conventions in sectioning.

Drawing of full section, half section, partial or broken out section, offset sections, revolved sections & removed sections. Exercises on sectional views of different objects.

Drawing of different conventions for materials in sections.

Conventional breaks for shafts, pipes: Rectangular /square/circular, angle, channel and Rolled sections.

6. ISOMETRIC VIEWS
(15%)
- § Fundamentals of isometric projections (theoretical instructions)
- § Isometric views from 2 or 3 given orthographic views

7. Symbols, Conventions and simple drawing
(10%)
- (a) Civil Engineering: Sanitary fitting symbols
- (b) Electrical fittings: Symbols for domestic interior installations
- (c) Building plan drawing with Electrical and Civil Engineering symbols.

REFERENCES

1. Engg. Drawing A Text Book of Engineering Drawing By Surjit Singh Dhanpat Rai & co.
2. Engineering drawing –planes & solid geometry ND Bhatt, V.M. Panchal Charotar publisher home