STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

Ist Semester DIPLOMA in Agricultural Engg./ Chemical Engg./ Civil Engg./ Civil (Rural)/ Electronics Engg. / Textile Engg./Ceramics Engg./MOP/ Library& Informatio Science/ CDGM/Architectural Assistantship/Mechanical Engg.(Auto)/ Printing Tech./ Electro. &Comm. Engg./ Electrical & Electronics Engg./ Instrumentation & Control.

(Group-II)

(Effective from Session 2016-17)

THEORY

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME			EXAMINATION – SCHEME					Credits
			Periods per Week	Hours of Exam.	Teacher's Assessment (TA) Marks (A)	Class Test(CT) Marks (B)	End Semester Exam. (ESE) Marks (C)	Total Marks (A+B+C)	Pass Marks ESE	Pass Marks in the Subject	
1.	Communication Skills-II	02101	02	03	10	20	70	100	28	40	2
2.	Engg. Mathematics	02102	04	03	10	20	70	100	28	40	4
3.	Applied Science	02103	03	03	10	20	70	100	28	40	3
4.	Engg. Mechanics	02104	03	03	10	20	70	100	28	40	3
5.	Engg. Drawing	02105	02	03	10	20	70	100	28	40	2
			14			Total:-	350	500			

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME	EXAMINATION – SCHEME					Credits
			Periods per Week	Hours of Exam.	Practical (ESE)		Total Marks (A+B)	Pass Marks in the Subject	
					Internal	External			
6.	CommunicationSkills (Language Lab)	02106	01	03	25	00	25	10	1
7.	Applied Science	02107	04	03	20	30	50	20	2
8.	Engineering Mechanics	02108	02	03	07	18	25	10	1
			07			**Total:-**	**100**		

TERM WORK

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME	EXAMINATION – SCHEME				Credits
			Periods per week	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject	
9.	Engineering. Drawing	02109	04	15	35	50	20	2
10.	Workshop Practice	02110	04	15	35	50	20	2
11.	Development of Life	02111	02	07	18	25	10	1
12.	Professional Practice	02112	02	07	18	25	10	1
		Total:-	**12**			**150**		
Total Periods per week Each of duration one Hours 33						**Total Marks = 750**		**24**

COMMUNICATION SKILLS-II

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	2
01201/ 02101	L	T	P/S	ESE	:	70	
	-	-	-	TA	:	10	
	02	-	—	CT	:	20	

Contents (Theory)		Hrs/ week	Marks
	Name of the Topic		
Unit -1	**Introduction to communication:** 1.1 Definition , communication cycle/ process, 1.2 The elements of communication : sender- message – channel- Receiver –Feedback & Context. 1.3 Definition of communication process. 1.4 Stages in the process : defining the context, knowing the audience, designing the message, encoding , selecting proper channels, transmitting, receiving, decoding and giving feedback.	**02**	**06**
Unit -2	**Types of communication** Formal- Informal, Verbal- Nonverbal, Vertical- horizontal- diagonal	**02**	**06**
Unit – 3	**Principals of effective communication :** 3.1 Definition of effective communication 3.2 Communication barriers & how to overcome them. 3.3 Developing effective messages: Thinking about purpose, knowing the audience, structuring the message, selecting proper channels, minimizing barriers & facilitating feedback.	**02**	**06**
Unit – 4	**Non verbal- graphic communication**: 4.1 Non- verbal codes: A- Kinesecs , B- Proxemics , C – Haptics	**04**	**12**
	D-Vocalics , E- Physical appearance. F –Chronemics , G –Artifacts Aspects of body language Interpreting visuals & illustrating with visuals like tables, charts & graphs.		
Unit – 5	**Formal written skills :** 5.1 Office Drafting: Circular, Notice , and Memo. 5.2 Job Application with resume. 5.3 Business correspondence: Enquiry, Order letter, Complaint letter, and Adjustment letter. 5.4 Report writing: Accident report, fall in production, Progress / Investigative. 5.5 Defining & describing objects & giving Instructions.	**06**	**20**
	Total	**16**	**50**

	<u>पाठ्यक्रम</u>		
खंड–I	विषय	**02**	**05**
	संप्रेषण		
	1. परिचय एवं प्रक्रिया		
	2. संप्रेषण के तत्व –प्रेषक–संदेश–चैनल–ग्राहक फीडबैक एवं संदर्भ		

	3. संप्रेषण प्रक्रिया की परिभाषा	
	4. संप्रेषण प्रक्रिया के सोपान– संदर्भ श्रोता समुदाय, सदर्भ का स्वरूप, माध्यम का चयन	
	5. प्रस्तुति में दृश्य, चार्ट टेबुल आदि का प्रयोग	
खंड–II	**संप्रेषण के प्रकार**	**02 05**
	1. औपचारिक, अनौपचारिक	
	2. भाषिका एवं गैर भाषिक	
खंड–III	**प्रभावशाली संप्रेषण की परिभाषा प्रकार**	**02 05**
	1. परिभाषा	
	2. संप्रेषण	
	3. प्रभावशाली– संदेश की तैयारी एवं स्वरूप	
	4. फीडबैक	
खंड–IV	**मौखिक संप्रेषण एवं शारीरिक भाषा प्रकार**	**02 05**
	1. तौर तरीके एवं आधारभूत शिष्टाचार	
	2. शारीरिक भाषा द्वारा संप्रेषण	
	3. मुखाकृति द्वारा संप्रेषण	
	4. समूहिक परिचर्चा, विवाद, वक्तृत शैली का विकास	
	• **Assignments कार्य भार**	
	1. संप्रेषण प्रक्रिया से संबंधित डायग्राम	
	2. संप्रेषण के प्रकार एवं स्थिति	
	3. विषय के अनुसार कहानी लेखन एवं अनुच्छेद लेखन	
	4. तकनीकी एवं वैज्ञानिक शब्दावली	
	5. बैंक से संबंधित शब्दावली	
	6. व्यावसायिक पत्र	
		08 20

Total :- 24 70

ENGG MATHEMATICS

Subject Code	Theory			No of Period in one session :			Credits
01202/ 02102	No. of Periods Per Week			Full Marks	:	100	4
	L	T	P/S	ESE	:	70	
	-	-	-	TA	:	10	
	04	-	—	CT	:	20	

Contents (Theory)		Hrs/ week	Marks
Unit -1	**Function and Limit** **1.1 Function** 1.1.1 Definitions of variable, constant, intervals such as open, closed, semi-open etc. 1.1.2 Definition of Function, value of a function and types of functions, Simple Examples. **1.2 Limits** 1.2.1 Definition of neighborhood, concept and definition limit. 1.2.2 Limits of algebraic, trigonometric, exponential and logarithmic functions with simple examples.	**04** **08**	**06** **12**
Unit -2	**Derivatives** **2.1** Definition of Derivatives, notations. 2.2 Derivatives of Standard Functions 2.3 Rules of Differentiation. (Without proof). Such as Derivatives of Sum or difference, scalar multiplication, Product and quotient. 2.4 Derivatives of composite function (Chain rule)	**12**	**18**
	2.5 Derivatives of inverse and inverse trigonometric functions. 2.6 Derivatives of Implicit Function 2.7 Logarithmic differentiation 2.8 Derivatives of parametric Functions. 2.9 Derivatives of one function w.r.t another function 2.10 Second order Differentiation.		
Unit – 3	**Statistics And Probability** **3.1 Statistics** 3.1.1 Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. 3.1.2 Graphical representation (Histogram and Ogive Curves) to find mode and median 3.1.3 Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation. Comparison of two sets of observations. **3.2 Probability** 3.2.1 Definition of random experiment, sample space, event, Occurrence of event and types of events (impossible, mutually exclusive, exhaustive, equally likely). 3.2.2 Definition of Probability, addition and multiplication theorems of Probability	**10** **04**	**12** **06**

Unit – 4	**4.1 Applications Of Derivative** 4.1.1 Geometrical meaning of Derivative, Equation of tangent and Normal 4.1.2 Rates and Motion 4.1.3 Maxima and minima 4.1.4 Radius of Curvature **4.2 Complex number** 4.2.1 Definition of Complex number. Cartesian, polar, Exponential forms of Complex number. 4.2.2 Algebra of Complex number(Equality, addition, Subtraction, Multiplication and Division) 4.2.3 De-Moivre's theorem (without proof) and simple problems. Euler's form of Circular functions, hyperbolic functions and relations between circular &hyperbolic functions	**06** **04** 	**08** **08**
05	**5.1 Numerical Solution of Algebraic Equations** 5.1.1 Bisection method, Regula-Falsi method and Newton-Raphson method **5.2 Numerical Solution of Simultaneous Equations** 5.2.1 Gauss elimination method 5.2.2 Iterative methods-Gauss Seidal and Jacobi's method	**06** **04**	**08** **08**
	Total	**48**	**70**

APPLIED SCIENCE

Subject Code	Theory			No of Period in one session :			Credits
01203/ 02103	No. of Periods Per Week			Full Marks	:	100	3
	L	T	P/S	ESE	:	70	
	-	-	-	TA	:	10	
	03	—	—	CT	:	20	

Physics **Contents :** Theory (Name of The Topic)		Hrs/week	
Unit -1	**1. Kinematics** **1.1 Rectilinear Motion** Equations of Motions-v=u+ a t, s=ut+1/2at², V²=u²+2as(only equation), Distance traveled by particle in n^nt second, Velocity Time Diagrams-uniform velocity, uniform acceleration and uniform retardation, equations of motion for motion under gravity. **1.2 Angular Motion** Definition of angular displacement, angular velocity, angular acceleration, Relation between angular velocity and linear velocity, Three equations of circular motion (no derivation) angular distance traveled by particle in n^nt second (only equation), Definition of S.H.M.	**14**	**15**
Unit -2	and S.H.M. as projection of uniform circular motion on any one diameter, Equation of S.H.M. and Graphical representation of displacement ,velocity, acceleration of particle in S.H.M. for S.H.M. starting from mean position and from extreme position. **2. Kinetics** **2.1** Definitions of momentum, impulse, impulsive force, Statements of Newton's laws of motion and with equations, Applications of laws of motion—Recoil of gun, Motion of two connected bodies by light inextensible string passing over smooth pulley, Motion of lift. **2.2 Work ,power ,Energy** Definition of work, power and energy, equations for P.E. K.E., Work energy principle, Representation of work by using graph, Work done by a torque(no derivation)		
Unit -3	**3. Non –destructive testing of Materials.** **3.1 T**esting methods of materials -Destructive and Nondestructive, Advantages and Limitations of N.D.T., Names of N.D.T. Methods used in industries, Factors on Which selection of N.D.T. dependents, Study of Principle, Set up, Procedure, **3.2** Working, Advantages, limitations, Applications and Application code of following N.D.T. methods -Penetrant method, Magnetic particle method, Radiography, Ultrasonic, Thermography.	**05**	**10**

Unit -4	**Acoustics and Indoor Lighting of Buildings** **4.1 Acoustics** Weber and Fetcher's law, limit of intensity and loudness, echo, Reverberation and reverberation time (Sabine's formula) **,**Timbre (quality of sound), Pitch or Frequency of sound. Factors affecting Acoustical planning of auditorium-- echo, reverberation, creep, focusing, standing wave, coefficient of absorption, sound insulation, noise pollution and the different ways of controlling these factors. **4.2 Indoor lighting** Definition of luminous intensity, intensity of illumination with their SI units, Inverse square law and Photometric equation, Bunsen's photometer— ray diagram, working and applications, Need of indoor lighting ,Indoor lighting schemes and Factors Affecting Indoor Lighting.	**05**	**10**
	Total	**24**	**35**

Chemistry **Contents :** Theory (**Name of the Topic**)		Hrs/ week	**Marks**
01	**Electrochemistry** Definition of Electrolyte & Conductor, Difference between Metallic & Electrolytic Conduction, Ionisation, Degree of Ionisation & Factors Affecting Degree of Ionisation, Conductivity of Electrolytes. Definition of Electrochemical Cell, Battery, Charge, Discharge, Closed Circuit Voltage, Open Circuit Voltage, EMF, Internal Resistance, Separator, Classification of Batteries such as Primary, Secondary & Reserve with Examples. Industrial Application of Electrolysis – Metallic or Protective Factors for Selection of Method of Coating, Process of Electroplating, Electrorefining, Electrometallurgy (Applications of Electroplating), Impregnated Coating or Cementation on Base Metal Steel - Coating Metal Zn (Sheradizing),Cr (Chomozing), Al (Colorizing), Applications, Advantages & Disadvantages.	**05**	**07**
02	**Non Metallic Engineering Materials** (Plastic, Rubber, Insulators, Refractories, Composite Material, Ceramics) **1. Engineering Plastic:** Special Characteristics & Engineering Applications of Polyamides or Nylons, Polycarbonates (Like Lexan, Merlan), Polyurethanes (Like Perlon – U), Silicons, Polyacetals, Teflon, Laminated Plastic,	**05**	**05**
	Thermocole, Reinforced Plastic. **2. Ceramics:** Definition, Properties & Engineering Applications, Types – Structural Ceramics, Facing Material, Refractories, Fine Ceramics, Special Ceramics. **3. Refractories:** Definition, Properties, Applications & Uses of Fire Clay, Bricks, Silica Bricks. **4. Composite Materials:** Definition, Properties, Advantages, Applications & Examples.		

03	**Metals & Alloys** **Metals** – Metallurgy of Iron, Terms Involved in Metallurgy, Indian Resources of Fe, Imp Ores, Extraction, Smelting in Blast Furnace, Chemical Reactions in Blast Furnace, Products of Blast Furnace, their Composition, Application, Commercial Forms of Iron, (Pig Iron / Cast Iron, Wrought or Malleable Steel), their Composition, Properties & Applications, Types of Casting (Chilled Casting, Centrifugal Casting & Malleable Casting), Heat Treatment, Heat Treatment of Cast Iron & Steel. **Alloys** – Definition, Types, Ferrous Alloys – Steel, Composition, Properties & Applications of Plain Carbon Steel (Low Carbon, Medium Carbon, High Carbon & Very Hard Steel) & Alloy Steels, (Heat Resisting, Shock Resisting, Magnetic, Stainless, Tool Steel & HSS), Effect of Various Alloying Elements (Cr, W, V, Ni, Mn, Mo, Si) etc. on Steel. Non-Ferrous Alloys – Copper Alloy – Brass, Bronze, Nickel Silver or German Silver, their Composition, Properties & Applications, Aluminium Alloy – Duralumin, Bearing Alloy – Babbitt Metal, Solders – Soft Solder, Brazing Alloy, Tinamann's Solder, Nickel Alloy – Monel Metal, Low Melting Alloys – Woods Metal.	**08**	**10**
04	**Corrosion** Definition, Types, Atmospheric or Chemical Corrosion, Mechanism, Factors Affecting Atmospheric, Corrosion & Immersed Corrosion or Electrochemical Corrosion, Mechanism, Protection of Metals by Purification of Metals, Alloy Formation, Cathode Protection, Controlling the External Conditions & Application of Protective Coatings i.e. Galvanising, Tinning, Metal Spraying, Sherardizing, Electroplating, Metal Clodding, Cementation or Diffusion Method, their Definition, Procedure, Uses, Advantages & Disadvantages, Examples of Non Corrosive Materials, Protection of Corrosion by the Use of Organic Coating Like Paint, Lacquer, Enamels, Emulsion Paints, Special Paints, their Properties & Uses. Special Paints – Heat Resistant, Cellulose Paint, Coaltar Paint, Antifouling Paint their constituents & applications.	**06**	**08**
05	**Lubricant** Lubricant, Types, Lubrication Mechanism by Fluid Film, Baundary, Extreme Pressure, Physical Characteristics of Lubricants Such as Viscosity, Viscosity Index, Oilness, Volatility, Flash & Fire Point, Cloud &	**03**	**05**
	Pour Point, Chemical Characteristics such as Acid Value or Neutralization Number, Emulsification, Saponification Value, Selection of Lubricants for Various Types of Machineries.		
	Total	**27**	35

ENGG. MECHANICS

Subject Code	Theory			No of Period in one session :			Credits
01204/ 02104	No. of Periods Per Week			Full Marks	:	100	3
	L	T	P/S	ESE	:	70	
	-	-	-	TA	:	10	
	03	—	—	CT	:	20	

Contents (Theory)		Hrs/week	Marks
Unit -1	**Force** a. **Fundamentals: -** Definitions of mechanics, statics, dynamics. Engineering Mechanics, body, rigid body, mass, weight, length, time, scalar and vector, fundamental units, derived units, S.I. units. b. **Force**: - Definition of a force, unit force, Newton, S.I. unit of a force, representation of a force by vector and by Bow's notation method. Characteristics of a force, effects of a force, principle of transmissibility. c. **Resolution of a force:** Definition, Method of resolution, Types of component forces, Perpendicular components and Non-perpendicular components. d. **Moment of a force: -** Definition, measurement of moment of a force, S. I. unit, geometrical meaning of moment of a force, classification of moments according to direction of rotation, sign	**12**	**15**
	convention, law of moments Varignon's theorem of moment and it's use, couple – definition, S.I. unit, measurement of a couple, properties of couple. e. **Force system: -** Definition, classification of force system according to plane and line of action f. **Composition of Forces**: - Definition, Resultant force, methods of composition of forces, I – Analytical method – (i) Trigonometric method (law of parallelogram of forces) (ii) Algebraic method (method of resolution), II – Graphical method: - Introduction, space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent, non-concurrent and parallel force system by analytical and graphical method.		

Unit -2	**Equilibrium:** 2.1 Definition, conditions of equilibrium, analytical and graphical conditions of equilibrium for concurrent, non-concurrent and parallel force system, free body and free body diagram. 2.2 Lami's Theorem – statement and explanation, Application of Lami's theorem for solving various engineering problems. 2.3 Equilibrant – Definition, relation between resultant and equilibrant, equilibrant of concurrent and non-concurrent force system. 2.4 Beams – Definition, Types of beams (cantilever, simply supported, overhanging, fixed, continuous), Types of end supports (simple support, hinged , roller), classification of loads, point load, uniformly distributed load. Reactions of a simply supported and over hanging beam by analytical and graphical method.	**10**	**15**
Unit – 3	**Friction:** 3.1 Definition of friction, force of friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction angle of repose and coeff. Of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages of friction. 3.2 Equilibrium of bodies on level plane –external force applied horizontal and inclined up and down. 3.3 Equilibrium of bodies on inclined plane – external forces is applied parallel to the plane, horizontal and incline to inclined plane. 3.4 Ladder friction, Wedge and block.	**08**	**15**
Unit – 4	**Centroid and Centre Of Gravity:** 4.1 **Centroid:** Definition of centroid. Moment of an area about an axis. Centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle and quarter circle. Centroid of composite figure.	**08**	**10**
	4.2 **Center of gravity:** Definition, center of gravity. Of simple solids such as cylinder, sphere, hemisphere, cone, cube, and rectangular block. Centre of gravity of composite solids.		
Unit – 5	**Simple Machines:** 1) Definitions of simple machine, compound machine , load , effort , mechanical advantage , velocity ratio , input on a machine ,output of a machine ,efficiency of a machine , expression for mechanical advantage , velocity ratio and efficiency of a machine. Ideal machine, ideal effort and ideal load, friction in machines, effort lost in friction and frictional load. 5.2 Law of machine, maximum mechanical advantage and maximum efficiency of a machine, reversibility of a machine, condition for reversibility of a machine, self locking machine. 5.3 Study of simple machines : Simple axle and wheel, differential axle and wheel, Weston's differential pulley block, single purchase crab, double purchase crab, worm and worm wheel, geared pulley block, screw jack, pulleys : First, second and third system of pulleys, gear train, hoist mechanism.	**10**	**15**
	Total	**48**	**70**

ENGG. DRAWING

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	100	2
01205/ 02105	L	T	P/S	ESE	:	70	
	-	-	-	TA	:	10	
	02	—	—	CT	:	20	

Contents (Theory)		Hrs/weekS	Marks
Unit -1	**Sectional Views.** 1.1 Types of sections 1.2 Conversion of pictorial view into sectional orthographic views (First Angle Projection Method only)	**03**	**10**
Unit -2	**Missing Views.** 2.1 Draw missing view from the given Orthographic views - simple components (First Angle Projection Method only)	**01**	**05**
Unit – 3	**Isometric Projection** 3.1 Conversion of Orthographic Views into Isometric view/projection (Including rectangular, cylindrical objects, representation of slots on sloping as well as plane surfaces)	**03**	**15**
Unit – 4	**Projections of Solids.** 4.1 Projections of Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube with their axes inclined to one reference plane and parallel to other.	**02**	**10**
Unit – 5	**Sections of Solids.** 5.1 Solids: -Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube. 5.2 Cone, Pyramid and Tetrahedron resting on their base on Horizontal Plane. 5.3 Prism, Cylinder: -a)Axis parallel to both the reference plane b) Resting on their base on HP.	**03**	**10**
	5.4 Section plane inclined to one reference plane and perpendicular to other.		
Unit – 6	**Developments of Surfaces.** Developments of Lateral surfaces of cube, prisms, cylinder, pyramids, cone and their applications such as tray, funnel, Chimney, pipe bends etc.	**02**	**10**
Unit – 7	**Free Hand Sketches** 7.1 Free hand sketches of nuts, bolts, rivets, threads, split pin, foundation bolts, keys and couplings.	**02**	**10**
	Total	**16**	**70**

COMMUNICATION SKILLS (Language Lab)

Subject Code	Theory			No of Period in one session :			Credits
01206/ 02106	No. of Periods Per Week			Full Marks	:	25	1
	L	T	P/S	ESE	:	25	
	-	—	01	Internal Exam.	:	25	
				-	:	-	

Assignments:

1. Communication Cycle (With The Help Of Diagram)
2. Communication Situations (List Of 5 Communication situations stating the type of communication
3. Barriers That Hinder A Particular Communication Situation. (State the type of barrier, and how to overcome them)
4. Developing A Story Or A Paragraph For The Given Topic Sentence.(in a group of 5 – 6 students)
5. Describing Various Equipments.
6. Identifying The Various Sentences With Their Type Of Writing. (e.g. Scientific, legal, colloquial etc.)
7. Business Letters
8. Letters Of Suggestion
9. Comparative Time Table Of 2 Students
10. Description Of Two Different Persons.(seeing the picture)
11. Letter To The Librarian, Principal
12. Report Writing.

NOTE: The above assignments are suggested to be completed in the prescribed work-book.

APPLIED SCIENCE

Subject Code	Theory			No of Period in one session :			Credits
01207/ 02107	No. of Periods Per Week			Full Marks	:	50	2
	L	T	P/S	ESE	:	50	
	-	—	04	Internal Exam.	:	20	
				External Exam.	:	30	

List of Practical:(PHYSICS)

1. To represent simple harmonic motion with the help of vertical oscillation of spring and to determine spring constant (K) (Stiffness Constant)

2. To determine time period of oscillation of compound bar pendulum and calculate acceleration due to gravity.

3. To determine the velocity of sound by using resonance tube

4. To compare luminous intensities of two luminous bodies by using Bunsen's photometer.

5. To calculate coefficient of absorption for acoustical materials

6. To determine Joule's constant (J) by electric method

7. To determine wavelength of Sodium light by using Newton's rings

8. To Verify Ampere's rule using Oersted's Experiment and find variation of intensity of magnetic field with Current and Distance

9. To determine frequency of sound by using sonometer .

10. To calculate refractive index of material of prism using spectrometer device .

11. To determine the divergence of He-Ne laser beam.

List of Practical:(CHEMISTRY)

1 To determine neutralization point of weak acid and weak base by conductivity meter.

2 To determine end point of titration between dil. H_2SO_4 and $BaCl_2$ using conductivity meter.

3 To verify Faraday's second law of electrolysis.

4 To determine pH of given solution by using pH paper, universal indicator and pH meter.

5 To determine the strength of given hydrochloric acid solution by titrating it against sodium hydroxide solution using pH meter.

6 To determine percentage of copper from brass iodometrically.

7 To find the rate of corrosion of Al strip in acidic and basic medium graphically.

8 To determine thinner content in paint.

9 To determine acid value of given lubricant.

10 To determine viscosity of given oil by using Ostwald's viscometer.

11 To determine saponification value of given lubricant.

ENGG. MECHANICS

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	25	1
01208/ 02108	L	T	P/S	ESE	:	25	
	-	—	02	Internal Exam.	:	07	
				External Exam.	:	18	

Contents (Practical)	
Skills to be developed:	
1 Intellectual Skill:	A. Calculate the forces on given structure B. Interpret the results
2 Motor Skills:	A. Handle the equipment carefully B. Draw graph

The term work consist of any five experiments from Group A,B and graphical solution in Group C

Group A:

2) Verify law of polygon of forces
3) Verify law of moments
4) Verification of Lami's theorem
5) Forces in members of a jib crane.
6) Comparison of coefficient of friction of various pair of surfaces and
7) determination of angle of repose
8) Equilibrium of parallel forces – simply supported beam reactions.
9) Experimental location of center of gravity of plane plate of uniform thickness.

Group B: To find MA, VR, Efficiency, Ideal Effort, Effort lost in friction for various loads and establish law of machine and calculate maximum efficiency.

Also check the reversibility of a machine (Any five):

1) Differential axle and wheel
2) Weston's differential pulley block
3) Geared pulley block
4) Single purchase crab
5) Double purchase crab
6) Worm and worm wheel
7) Two sheave and three sheave pulley block
8) Screw jack.

Group C: A 2 Size drawing sheets containing graphical solutions for –

1) Concurrent force system : Two problems
2) Parallel force system : Two problems
3) Reactions of a beam : Two problems

ENGG. DRAWING

Subject Code	Theory			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	2
01209/ 02109	L	T	P/S	ESE	:	50	
	-	—	04	Internal Exam.	:	15	
				External Exam.	:	35	

Practical

List of Practical	Skills to be Developed	
	Intellectual skill	Motor Skill
1.Sectional View - (Total 2 Sheets) Two objects by First Angle Projection Method – (1 Sheet) Redraw the same sheet using CAD - (1 Sheet)	1)To interpret sectional views of given object.	Develop ability to draw sectional views Using computer.
2. Isometric projection - (Total 2 sheets) Two objects one by true scale and another by isometric scale - (1 sheet) Draw **one** sheet having two problems in each sheet using CAD – (Plot any one)	1) Develop ability to differentiate between isometric view and isometric projections. 2) To differentiate between Isometric scale and true scale.	Develop ability to draw isometric views and isometric projections from given orthographic views of an object using computer.
S. Missing Views Two problems by first angle projection method - (1 Sheet)	1) To interpret the missing view from given orthographic views.	1) To develop ability to draw missing view from given orthographic views.
S. Projection of solids Two problems on two different solids, one by axis of solid inclined to HP and parallel to VP and another problem by axis of solid inclined to VP and parallel to HP. – (1 Sheet)	1) To interpret the different positions of solids with reference planes. 2) To develop ability to differentiate between true length of axis and apparent length of axis. 3) To develop ability to differentiate between true shape and apparent shape of solids.	1) To draw projections of different solids when axis is inclined or perpendicular to one of the reference plane.
S. Section of solids Two problems on different solids. One problem, section plane inclined to HP and perpendicular to VP and in another problem, section plane inclined to VP and Perpendicular to HP. - (1 Sheet)	1) To differentiate between true shape and apparent shape of section. 2) To interpret the positions of section plane with reference planes.	1) To develop ability to draw sectional orthographic views of given solids, when it is cut by section plane in different position with reference planes. 2) Ability to draw true shape of section.
S. Development of surfaces Any two problems on development of surfaces of different objects. - (1 Sheet)	**S.** Able to interpret the development of surfaces of different solids.	**S.** Ability to draw the development of surfaces of different objects in different shapes.

S. Free Hand Sketches Any six figures on different topics. - (1 Sheet)	**S.** To differentiate between scale drawing and free hand drawing. 2) To differentiate between various parts of machine like nuts, bolts, screws, different threads, couplings etc.	1) Develop ability to draw orthographic views of different machine elements.

WORKSHOP PRACTICE

Subject Code	Theory			No of Period in one session :			Credits
01210/ 02110	No. of Periods Per Week			Full Marks	:	50	2
	L	T	P/S	ESE	:	50	
	-	—	04	Internal Exam.	:	15	
				External Exam.	:	35	

Details of Practical Contents		Hrs/week
Unit -1	**CARPENTERY SHOP:** • Any one composite job from the following involving different joint, turning and planning, surface finishing by emery paper, varnishing etc. like square stool, tea table, center table, chaurang, table lamp bed sofa-set, book rack. Cabinet, notice board, shows cases, tables chairs etc. Note:1] One job of standard size (Saleable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 6-8 hours of actual working 4] Student shall calculate the cost of material and labor cost for their job from the drawing.	
Unit -2	**WELDING SHOP** • Any one composite job from involving butt joint lap joint welding process, from the following like Grill, door, window frame, waste paper basket, Chappel stand, Corner flower stand chair , table frame (square pipe 25 mm) cooler frame (folding type) **Note:** 1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work . 3] Job allotted should comprise of 6-8 hours of actual working operations. 4] Student shall calculate the cost of material and labor required for their job from the drawing.	
Unit – 3	**SMITHY SHOP** • Demonstration of different forging tools and Power Hammer. • Demonstration of different forging processes, likes shaping, caulking fullering, setting down operations etc. • One job like hook peg, flat chisel or any hardware item. • **Note**: 1]One job of standard size (Saleable/marketable article shall be preferred) 2] Job allotted should comprise of 4-6 hours of actual working operations. 3] Student shall calculate the cost of material and labor required for their job from the drawing.	
Unit – 4	***PLUMBING SHOP*** • Demonstration of PVC pipe joint with various fittings. • Exercise for students on preparing actual pipeline layout for G.I. Pipe or PVC pipe. Preparing actual drawing and bill of material. Note:1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 6-8 hours of actual working 4] Student shall calculate the cost of material and labor cost for their job from the drawing.	

Unit – 5	***SHEET METAL SHOP*** • One composite job from the following: Letter box, Trunk, Grain Container, Water-heater Container, Bucket, Waste Paper Basket, Cooler Tray, Water-draining Channel, etc. (including soldering and riveting) Note: 1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 4-6 hours of actual working ions. 4] Student shall calculate the cost of material and labor cost required for their job from the drawing.	
Unit – 6	**Demonstration of power tools and practice of utility items.** • Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. • Making of electrical switchboard with 2 sockets and piano buttons and with electrical wiring. • Any other item as per the requirement of college/Deptt./	
	Total	64

DEVELOPMENT OF LIFE

Subject Code	Theory			No of Period in one session :			Credits
01211/ 02111	No. of Periods Per Week			Full Marks	:	25	1
	L	T	P/S	ESE	:	25	
	-	—	02	Internal Exam.	:	07	
				External Exam.	:	18	

S.No	The Term Work Will Consist Of Following Assignments.
1	Library search:- Visit your Institute's Library and enlist the books available on the topic given by your teacher. Prepare a bibliography consisting name of the author, title of the book, publication and place of publication.
2	Enlist the magazines, periodicals and journals being available in your library. Select any one of them and write down its content. **Choose a topic for presentation.**
3	Attend a seminar or a guest lecture, listen it carefully and note down the important points and prepare a report of the same.
4	Visit to any one place like historical/office/farms/development sites etc. and gather information through observation, print resources and interviewing the people.
5	Prepare your individual time table for a week – (b) List down your daily activities. (c) Decide priorities to be given according to the urgency and importance of the activities. (d) Find out your time wasters and mention the corrective measures.
6	Keep a diary for your individual indicating- planning of time, daily transactions, collection of good thoughts, important data, etc
7	Find out the causes of your stress that leads tension or frustration .Provide the ways to Avoid them or to reduce them.
8	Undergo the demonstration on yoga and meditation and practice it. Write your own views, feeling and experiences on it.
Note:- These are the **suggested assignment** for guide lines to the subject teacher. However the subject teachers can select, design any assignment relevant to the topic, keeping in mind the objectives of this subject.	

PROFESSIONAL PRACTICE

Subject Code	Theory			No of Period in one session :			Credits
01212/ 02112	No. of Periods Per Week			Full Marks	:	25	1
	L	T	P/S	ESE	:	25	
	-	—	02	Internal Exam.	:	07	
				External Exam.	:	18	

Sr. No.	Activities
01	**Industrial Visits:** Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form part of the term work. Visits to **any two** of the following : i) Nearby Petrol Pump.(fuel, oil, product specifications) ii) Automobile Service Station (Observation of Components / aggregates) iii) Engineering Workshop(Layout, Machines) iv) Dairy Plant / Water Treatment Plant
02	Lectures by Professional / Industrial Expert / Student Seminars based on information search to be organized from any THREE of the following areas : i) Pollution control. ii) Non destructive testing. iii) Acoustics. iv) Illumination / Lighting system. v) Fire Fighting / Safety Precautions and First aids. vi) Computer Networking and Security. vii) Topics related to Social Awareness such as – Traffic Control System, Career opportunities, Communication in Industry, Yoga Meditation, Aids awareness and health awareness.
03	<u>Group Discussion :</u> The students should discuss in a group of six to eight students and write a brief report on the same as a part of term work. Two topics for group discussions may be selected by the faculty members. Some of the suggested topics are – i) Sports ii) Current news items iii) Discipline and House Keeping iv) Current topics related to mechanical engineering field.
04	Student Activities: The students in a group of 3 to 4 will perform **any one** of the following activities (others similar activities may be considered Activity : i) Collect and study IS code for Engineering Drawing.. ii) Collecting information from Market: Nomenclatures and specifications of engineering materials. iii) Specifications of Lubricants. iv) Draw orthographic projections of a given simple machine element using and CAD software