

PART – I
2nd Semester
FINAL
CURRICULAR STRUCTURE
AND
SYLLABI OF
FULL-TIME DIPLOMA COURSES IN
ENGINEERING & TECHNOLOGY
W.E.F. 2013-14



WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION

(A Statutory Body under West Bengal Act XXI of 1995)

“Kolkata Karigori Bhavan”, 2nd Floor, 110 S. N. Banerjee Road, Kolkata – 700013

**CURRICULAR STRUCTURE FOR PART – I (1st YEAR) OF THE
FULL-TIME DIPLOMA COURSES IN ENGINEERING & TECHNOLOGY**

WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION											
TEACHING AND EXAMINATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES											
COURSE NAME: All Branches except Architecture, Photography, Multi media and Printing Technology											
DURATION OF COURSE: 6SEMESTERS											
SEMESTER: FIRST											
BRANCH: Common for all branches except Architecture, Photography, Multi media and Printing Technology											
SR. NO.	SUBJECT	CREDITS	PERIODS			EVALUATION SCHEME					
			L	TU	PR	INTERNAL SCHEME			ESE	PR	Total Marks
						TA	CT	Total			
1	Communication Skill	3	2	2	-	10	20	30	70		100
2	Basic Physics	3	2	-	2	10	20	30	70	50	150
3	Basic Chemistry	3	2	-	2	10	20	30	70	50	150
4	Mathematics	5	4	1	-	10	20	30	70	-	100
5	Engineering Mechanics	4	3	1	-	10	20	30	70	-	100
6	Technical Drawing	4	2	-	3	5	10	15	35	50	100
7	Computer Fundamentals	2	1	-	3	-	-	-	-	50	50
8	Workshop Practice-I	2	-	-	3	-	-	-	-	50	50
Total:		26	16	4	13	55	110	165	385	250	800
STUDENT CONTACT HOURS PER WEEK:33 hrs Theory and Practical Period of 60 Minutes each. L- Lecture, TU- Tutorials, PR- Practical, TA- Teachers Assessment, CT- Class Test, ESE- End Semester Exam.											

WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION											
TEACHING AND EXAMINATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES											
COURSE NAME: All Branches except Architecture, Photography, Multi media and Printing Technology											
DURATION OF COURSE: 6 SEMESTERS											
SEMESTER: SECOND											
BRANCH: Common for all branches except Architecture, Photography, Multi Media and Printing Technology											
SR. NO.	SUBJECT	CREDIT S	PERIODS			EVALUATION SCHEME					
			L	TU	PR	INTERNAL SCHEME			ESE	PR	Total Marks
						TA	CT	Total			
1	Business Economics & Accountancy	3	4	-	-	10	20	30	70	-	100
2	Applied Physics	3	2	-	2	5	10	15	35	50	100
3	Applied Chemistry	3	2	-	2	5	10	15	35	50	100
4	Engineering Mathematics	4	3	1	-	10	20	30	70	-	100
5	Strength of Materials	2	2	1	-	5	10	15	35	-	50
6	Electrical Technology	2	2	1	-	5	10	15	35	-	50
7	Engineering Drawing	3	1	-	3	5	10	15	35	100	150
8	Workshop Practice-II	2	-	-	3	-	-	-	-	100	100
9	Development of Life Skill -I	3	1	-	3	-	-	-	-	50	50
Total:		25	17	3	13	45	90	135	315	350	800
STUDENT CONTACT HOURS PER WEEK:33 hrs Theory and Practical Period of 60 Minutes each. L- Lecture, TU- Tutorials, PR- Practical, TA- Teachers Assessment, CT- Class Test, ESE- End Semester Exam.											

2nd Semester

Syllabus for: Business Economics & Accountancy

Name of the Course: Business Economics & Accountancy	
Course Code:	Semester: Second
Duration: : Seventeen weeks	Maximum Marks: 100
Teaching Scheme	Examination Scheme
Theory: 4 hrs./week	Mid Semester Exam.:20 Marks
Tutorial: Nil hrs./week	Attendance & Teacher's Assessment : 10 Marks
Practical: Nil hrs./week	End Semester Exam.:70 Marks
Credit: 3	
Aim:	
Sl. No.	The Students will be able to:
1.	Understand some basic economic principles applied in business
2.	Analyze logically the interrelationships among economic ideas
3.	Solve economic problems using mathematics as a tool
4.	Derive results using mathematical formula
5.	Apply decision rules to select best alternative
6.	Relate theory to real life observations
7.	Make judgment in case of choice problems
8.	Understand basic concepts of Accounts
9.	Apply Golden Rules in Journal & Ledger
10.	Maintain Cash Book
11.	Prepare Trial Balance
12.	Prepare Final Account
Objective:	
Sl. No.	The students are likely to acquire the following skills at the end of the course:
1.	Critical thinking skill
2.	Mathematical problem solving skill
3.	Theorizing skill
4.	Decision making skill
5.	Accounting skill
6.	Computing skill
Pre-Requisite:	
Sl. No.	

	<p>(a) Payback Period Method (b) Net Present Value Method (c) Internal Rate of Return Method Application : Solving numerical problems</p> <p>3.2 Economic Concepts and issues in the Context of Indian Economy</p> <p>Mixed Economy and relevance of planning; Globalization; Gross Domestic Product and its growth; Inflation; Business Cycle and real estate business in India; Foreign Direct Investment;</p>	Period: 6	
Total Periods :		30	
GROUP – B	ACCOUNTANCY	TOTAL PERIODS: 30	
<p>Unit: 4 Name of the Topics: Fundamentals of Accountancy <u>Periods: 12</u></p>	<p>4.1 <u>Introduction to Accountancy</u></p> <p>4.1.1 Accountancy: Definition & objectives 4.1.2 Book Keeping & Accountancy 4.1.3 Accountancy & Accounting Evolution 4.1.4 Single & Double Entry System</p> <p>4.2 <u>Double Entry System</u></p> <p>4.2.1. Transaction Concepts: Accounts & Classification of Accounts ☐ Transaction- Two fold aspects ☐ Events ☐ Golden Rules 4.2.2 Journal as a book of prime entry : subdivisions of Journal ☐ Recording of Transaction Narration 4.2.3 Ledger : Rules for writing Ledger ☐ Balancing of Ledger Accounts—Concepts of b/d and c/d</p>	Periods: 2	
		Periods:10	
<p>Unit: 5 Name of the Topics: Cash Book and Trial Balance <u>Periods: 9</u></p>	<p>5.1 <u>Cash Book</u></p> <p>5.1.1. Single Columns and Double Column including Contra Entry 5.1.2. Concept of Petty Cash Book</p> <p>5.2 <u>Trial Balance</u></p> <p>5.2.1 Preparation of Trial Balance 5.2.2 Rectification of Wrong Trial Balance 5.2.3 Errors detected in Trial Balance 5.2.4 Errors not detected in Trial Balance</p>	Periods: 3	
		Periods: 6	

	each of the 3 units. A total of 6(six) questions have to be set, 2(two) from each Unit. From Unit 4, 1(one) numerical problem & 1(one) theoretical question carrying 8(eight) marks. From Unit 5, 1(one) numerical problem & 1(one) theoretical question carrying 7(seven) marks. From Unit 6, 1(one) numerical problem & 1(one) theoretical question carrying 10(ten) marks. Theoretical questions may have more than 1(one) part questions.
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Syllabus on Applied Physics

Name of the Course:	
Subject : APPLIED PHYSICS	
Course Code:	Semester: SECOND
Duration: 6 months	Maximum Marks: 50
Teaching Scheme	Examination Scheme
Theory: 2 hrs./week	Mid Semester Exam.: 10 Marks
Tutorial: -- hrs./week	Attendance, Assignment & interaction: 5 Marks
Practical: 2 hrs./week	End Semester Exam.: 35 Marks
Credit: 3	
Aim:	
Sl. No.	
1.	To make the students of Engineering & Technology aware of the basic laws and principles of Physics and their applications in the field of Engineering & Technology.
2.	The goal of physics is to formulate comprehensive principles that bring together and explain the world around us.
3.	To establish the awareness about the power of Physics as a tool in the practicality of the life.
Objective:	
Sl. No.	Students will be able to
1.	<ul style="list-style-type: none"> • Analyze and solve problems of mechanics with engineering aspects. • Acquire basic knowledge on rotational mechanics for engineering applications. • Acquire knowledge on superconductivity • Differentiate galvanometer, ammeter and voltmeter. • Learn the applications of Wheatstone bridge principle. • Learn thermoelectric effects.
2.	<ul style="list-style-type: none"> • Analyze magnetic effect of electric current and its application. • Learn the applications of electromagnetic induction.
3.	<ul style="list-style-type: none"> • Acquire basic knowledge on semiconductor and applications of p-n junction diode. • Learn the applications of X-ray and LASER. • Enhance analytical approach in formulating and solving problems related to different physical situations.
Pre-Requisite:	

Sl. No.							
1.	Basic Mathematics knowledge to solve the problems.						
2.	Knowledge of basic concepts sciences such as physics, chemistry and mathematics						
3.	Visualization and analytical approach towards the subject is necessary						
End Semester Examinations Scheme. Maximum Marks – 35. Time allotted – 2 hrs.							
Group	Unit	Objective Questions (MCQ only with one correct answer)		Subjective Questions			
		No. of questions to be set	Total marks	No. of questions to be set	To answer	Marks per question	Total marks
A	1, 2, 3	6	10	5	3	5	25
B	4, 5	4		4	2		
<ul style="list-style-type: none"> Only multiple choice type questions (MCQ) with one correct answer are to be set in the objective part. Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper. 							

	Content (Theory)	Hrs/Unit	Marks/Unit
Unit – 1 PARTICLE DYNAMICS	<p>1.1 Rectilinear Motion: Kinematical equations in one dimension: $v=u+ a t$, $s=ut+(1/2)at^2$, $V^2=u^2+2as$ (only equation), Distance travelled by particle in n^{th} second, Velocity- Time Diagrams:- uniform velocity, uniform acceleration and uniform retardation. Kinematical equations for motion under gravity.</p> <p>1.2 Laws of Motion: Newton's laws of motion, definition of force from second law. Momentum and impulse of force (definition and SI unit) and their relation. Conservation of linear momentum (statement only). Applications to – Recoil of gun, Motion of lift, Motion of two bodies connected by light inextensible string passing over smooth pulley. (Simple problems).</p> <p>1.3 Rotational Motion: Angular displacement, angular velocity and angular acceleration (definition and SI unit only). Relation between linear velocity & angular velocity and between linear acceleration & angular acceleration. Centripetal acceleration and centripetal force (definition and formula only, no derivation). Centrifugal force (formula & concept only). Moment of a force or torque (definition & SI unit). Moment of inertia (definition & SI unit).</p>	8	10

	Angular momentum (definition & SI unit). Relation between torque and angular momentum (no derivation). Principle of conservation of angular momentum (Statement only).		
Unit – 2 WORK, POWER AND ENERGY	Concept and explanation of work, power and energy with their SI units. Importance of force – displacement curve (concept of work). Mechanical energy: kinetic energy (derivation) and potential energy. Work – energy principle. Law of conservation of mechanical energy. (Simple numerical problems).	3	4
Unit – 3 CURRENT ELECTRICITY	<p>3.1 ELECTRIC CURRENT: Ohm's law — Resistance and its unit, specific resistance — Various factors affecting the resistance. Concept of super conductivity, Equivalent resistance for Series and Parallel arrangements of resistances (No deduction), (Simple numerical problems) Concept of conversion of Galvanometer to Ammeter and Voltmeter and related simple problems. Wheatstone Bridge Principle for balanced condition, its applications in Meter Bridge and P.O. Box.</p> <p>3.2 HEATING EFFECTS OF CURRENT: Joule's law — Electrical work, energy and power with practical units (Simple numerical problems).</p> <p>3.3 THERMOELECTRICITY: Thermocouple. Seebeck effect, thermo-emf (expression only), emf-temperature curve, neutral temperature & inversion temperature, thermoelectric power(definition only) Peltier effect (statement only). Differences between Peltier effect with Joule's effect.</p>	6	7
Unit – 4 ELECTROMAGNETISM	<p>4.1 MAGNETIC EFFECT OF ELECTRIC CURRENT: Bio-Savart's law. Magnetic field: (i) for infinitely long straight current conductor, (ii) at the centre of a current carrying circular coil, (iii) for infinitely long current solenoid (no deduction, only concept and mathematical expression in S.I. units). Force on a current carrying conductor placed in a magnetic field (formula only), Fleming's left hand rule. Application of Magnetic effect of electric current – Galvanometer (concept only)</p> <p>4.2 ELECTROMAGNETIC INDUCTION: Magnetic flux, Magnetic flux density with SI units, Faraday's laws, Lenz's law, Motional emf (qualitative discussion with formula only). Fleming's right hand rule. Self induction, mutual induction and their coefficients (definition and SI unit). Principles of generation of AC.</p>	5	5
Unit – 5	5.1 SEMI – CONDUCTOR: Energy band in solids (Idea	8	9

MODERN PHYSICS	<p>only). Distinction between conductor, insulators & semi-conductors in terms of energy band diagram, Intrinsic and extrinsic (P-type; N-type) semiconductor, P – N junction diode, depletion region, potential barrier. Forward and reverse biasing; Forward and reverse bias characteristic curve. Application of P – N junction diode as – (i) half wave rectifier, (ii) full wave rectifier (Bridge circuit only) (only circuits and explanation with input and output curves).</p> <p>5.2 X – rays: Production of X- rays by Coolidge X- ray tube. X-ray spectra – continuous and characteristic X- rays (Graphical plot only), minimum wavelength (simple problems). Properties of X- rays. Application of X- rays.</p> <p>5.3 LASER: Light amplification by stimulated emission of radiation. Properties of laser. Spontaneous and stimulated emission, population inversion, pumping. He - Ne laser (Principle only). Hologram and its use (mention only).</p>		
TOTAL		30	35
Recommended that Units – 3 & 4 be taught at the beginning to provide back up to ELECTRICAL TECHNOLOGY.			
Practicals:			
Sl. No.	Skills to be developed		
1.	<p>1) Intellectual skills-</p> <ul style="list-style-type: none"> • Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement. • Analyze properties of matter & their use for the selection of material. • To verify the principles, laws, using given instruments under different conditions. • To read and interpret the graph. • To interpret the results from observations and calculations. 		
2.	<p>2) Motor skills-</p> <ul style="list-style-type: none"> • Proper handling of instruments. • Measuring physical quantities accurately. • To observe the phenomenon and to list the observations in proper tabular form. • To adopt proper procedure and precautions while performing the experiment. • To plot the graphs. 		
Examination scheme:			
<ul style="list-style-type: none"> • Continuous Internal Assessment: 25 marks. • External Assessment: Marks – 25. Time allotted – 2 hrs. External teacher will assess the students. Each student will have to perform one experiment allotted on lottery basis. <p>Distribution of marks: Theory – 5. Table, units & data taking – 10. Viva – Voce – 10.</p>			

Laboratory Experiments :			
Sl. No.	At least six experiments to be performed		
1.	• Verification of series law of resistances by P.O. Box (Values of resistances to be supplied).		
2.	• Determination of specific resistance of the material of a wire by metre bridge (length and diameter of the wire to be supplied).		
3.	• Verification of parallel law of resistances by ammeter – Voltmeter method.		
4.	• Drawing of the forward bias characteristic curve (I-V curve) of a P – N junction diode.		
5.	• Determination of the velocity of sound in air at NTP by resonance air column method.		
6.	• Determination of the frequency of an unknown tuning fork by resonance air column method / preferably by sonometer.		
7.	• Determination of acceleration due to gravity by simple pendulum.		
8.	• Determination of the resistance of a table galvanometer by half deflection method.		
Text and reference books:			
Sl. No.	Title of the Book	Name of Authors	Publisher
1.	Physics – I & II	Resnik & Halliday	Wily Eastern Ltd.
2.	Physics. Part – I & II		NCERT
3.	Applied Physics	Arthur Beiser	Tata McGraw- Hill
4.	Physics - I	V. Rajendram	Tata McGraw- Hill Pub.
5.	Engineering Physics	Avadhanulu, Kshirsagar	S. Chand Publication
6.	Concept of Physics. Vol.- I & II	H. C. Verma	Bharati Bhavan Pub. & Distribution
7.	B. Sc. Physics. Vol.- I & II	C. L. Arora	S. Chand & Co. Ltd.
8.	Engineering Physics	R. K. Gaur & S. L. Gupta	Dhanpat Rai Pub.
9.	University Physics	Young	
10.	ABC of Physics	S. K. Gupta	Modern Publisher, New Delhi
11.	General Properties of matter	D. S. Mathur	S. Chand & Co. Ltd.
12.	Text Book of ISC Physics	Bhatnagar	Selina Publication
13.	A Text Book of Light	B. Ghosh & K. G. Majumder	Sreedhar Pub.
14.	Elements of H. S. Physics-I & II	Dutta & Pal	Publishing Syndicate
15.	H. S. Physics. Vol.- I & II	Duari, Maity & Majumder	Chhaya Prakashani
16.	H. S. Physics – I & II	C. R. Dasgupta	Pub.Book Syndicate
18.	Senior Practical Physics	A.S. Vasudeva	S. K. Kataria & Sons
19.	Elements of Physics-2	Dr. Subrata Kamilya	Knowledge Group Publications
20.	Physics 2	Basak (WBSCTE Series)	Tata McGraw- Hill
List of equipments / apparatus for laboratory experiments :			
Sl. No.	Name of major equipment / apparatus		
1	P. O. Box		
2	Metre bridge		
3	Table galvanometer		
4	Resistance box		
5	Standard resistance coil		

6	Variable DC power supply (Eliminator)	
7	Sliding rheostat	
8	Commutator	
9	Sonometer	

Syllabus for: Applied Chemistry

Name of the Course: Applied Chemistry (All Branches of Diploma in Engineering And Technology)				
Course Code:		Semester: first		
Duration: : 6 months		Maximum Marks: 50		
Teaching Scheme		Examination Scheme		
Theory: 2 hrs./week		Internal Examination: 10Marks		
Tutorial: Nil hrs./week		Attendance+Assignment + interaction :05 Marks		
Practical: 2 hrs./week		Final Examination: 35Marks		
Credit:				
Aim:				
Sl. No.	The Students will be able to:			
1.	It is intended to teach students the appropriate use of engineering materials, their protection & lubrication processes in different working conditions of machines.			
Objective:				
Sl. No.	The students are likely to acquire the following skills at the end of the course:			
1.	Suggest the appropriate use of metals, alloys & non metallic materials in engineering.			
2.	Applying the Knowledge to Protect Metallic & Non Metallic Surfaces			
3.	Select Lubricants for Smooth Running of Machines.			
Pre-Requisite:				
Sl. No.				
<u>Detailed Course Content</u>			Hrs./Unit	Marks
GROUP: A				
Unit: 1 Name of the Topics: Cement	Portland cement: Raw materials, Composition and Manufacture, Setting and Hardening of cement, function of gypsum, Cement Mortar, Cement concrete, Lime mortar, plaster of paris.	3		4
Unit: 2 Name of the Topics: lubricant	Definition, purpose and types of lubrication, names of common lubricants and uses, Flash point, Fire point, Pour point, Cloud point, selection of lubricant.	2		4
Unit: 3 (For printing Technology only)	Aliphatic compounds: Chemical test to identify & uses- Alcohol: Ethanol, 2-propanol, 1- butanol. Ketone: Acetone, butanone. Acid: Acetic acid, propanoic acid. Ester: Ethyl acetate, amylacetate.	3		4

	Aromatic compounds : Benzene: chlorination, Nitration, Friedel-Crafts alkylation; Aniline: Diazolisation, Coupling reaction with phenol aniline & N, N-dimethyl aniline.		
Unit: 4 Name of the Topics: Fuel	Defination and classification, calorific value (Dulong formula), Determination of calorific value by Bomb calorimeter. Solid Fuels : Composition , properties and uses of wood, peat, lignite, Proximate andU A Liquid fuels : Fractional distillation of petroleum (product and uses), Cracking, Knocking, Octane number, Cetane number, antiknock compounds. Gaseous Fuels : Composition and uses of Coal gas, Water gas, Producer gas, Gobar gas, Natural gas, LPG, CNG, LNG.	6	7
GROUP – B			
Unit: 5 Name of the Topics: Corrosion	Definition, Causes of Corrosion and methods of prevention, Refractories --- properties and use of Boron Carbide and Carborandirm , Asbestors, Glass, Ceramics, Cork (preliminary idea only).	4	4
Unit: 6 Name of the Topics: Protective Coating	Paints : Composition , types (Snowchem, distemper) Varnishes : Definition , types , difference from paint, uses, characteristics. Metallic coating : Galvanisation, Electroplating, Tin plating. Lacquers.	4	4
Unit: 7 Name of the Topics: Polymers	Definition & classification of Synthetic polymers Synthetic plastic : Thermoplastic plastic and Thermosetting plastic --- their differences with examples, preparation and uses of Polythene, PVC, Polypropylene, Polystyrene, Teflon, Bakelite, Orlon, Saran. Synthetic rubber : Buna –S, Buna –N, Neoprene, Butyl, rubber, silicone, Vulcanization of rubber. Synthetic Fibres : Nylon , Terylene , Rayon.	5	6
GROUP – C			
Unit: 8 Name of the Topics:	Introduction , Definition , Causes of pollution, Types of pollution.	6	6

Environmental Pollution	<p><u>Air pollution</u> : Definition, sources of Air pollution, causes of Air pollution, Different types of Air pollutants and their effects, Green House Effect, Acid Rain, Ozone Layer Depletion, Air pollution control methods.</p> <p><u>Water Pollution</u> : Definition, causes of water pollution, sources of water pollution, Methods of preventing water pollution, Domestic wastes, Industrial wastes, their physical and Biological characteristics, BOD, COD, Effects of water pollution.</p>		
<p>a) Internal Examination Marks</p> <p>b) Final Examination Marks</p> <p>c) Attendance + Assignment + interaction.</p>	<p>: 10</p> <p>: 35</p> <p>: 5</p>	<p>} Full Marks = 50</p>	
Laboratory Experiments :			
Sl. No.			
1	Estimation of total hardness of a sample of water by standard EDTA method.		
2	Qualitative detection of Arsenic content of a given sample of water [5 ppm soln of sod. Arsenite] [2 lit Arsenic containing water to 20ml by evaporation]		
3	To determine pH value of an unknown solution by pH meter.		
4	To apply Thin Layer Chromatography for separation of mixture of compounds.		
5	Preparation of phenol formaldehyde resin.		
6	Determination of dissolve O ₂ in a sample of water.		
7.	To determine neutralization point of weak acid and		

	weak base by conductivity meter.		
8.	1. To determine end point of titration between dilute H ₂ SO ₄ and BaCl ₂ using conductivity meter.		
Text Books:			
Name of Authors	Title of the Book	Name of the Publisher	
S. S. Dara	Environmental chem. & pollution control	S. Chand Publication	
Dr. Aloka Debi	A Text Book of Env. Engg.	Dhanpat Rai Publishing Co.	
Jain & Jain	Engg. Chem.	Dhanpat Rai Publishing Co.	
Madhusudan Chowdhury	Chem I & II	Naba Prakashani	
Dr. Kaberi Bhattacharya	Chem I & II	Lakshmi Prakasani	
Dr. Aloka Debi	Chem I & II	Bhagabati Prakasani	
Reference Books:			
Name of Authors	Title of the Book	Name of the Publisher	
Jain & Jain	Engg. Chem.	Dhanpat Rai Publishing Co.	
Dr. Aloka Debi	A Text Book of Env. Engg.	Dhanpat Rai Publishing Co.	
Shrieve Atkins	Industrial Chem		
Bahl & Bahl	A Text Book of Organic Chemistry	S. Chand Publication	
M. M. Uppal	Engg. Chemistry		
S. N. Poddar & S. Ghosh	General & Inorganic. Chemistry	Book Syndicate Pvt. Ltd.	
Harish Kr. Chopra Anupama Parkar	Engg. Chemistry A Text Book	Narosha Publishing House	
B. K. Sharma	Industrial Chemistry	Goel Publishing House	
B. Hazra	Applied Chemistry	Knowledge Kit Pub.	

Syllabus for Engineering Mathematics

Name of the Course : ENGINEERING MATHEMATICS (Second Semester all branches)			
Course Code :		Semester : Second	
Duration : 15 weeks		Maximum Marks : 100	
Teaching Scheme :		Examination Scheme :	
Theory : 3 contact hours/week.		Internal Examination : 20 Marks	
Tutorial : 1 contact hour/week		Class Attendance : 05 Marks	
Practical : NA		End Semester Examination : 70 Marks	
Credit : 4		Teacher's Assessment : 05 Marks	
Aim :			
1.	To make the student efficient in mathematical calculations.		
2.	To make the student aware about the topics in mathematics having application to engineering.		
3.			
Objectives – The student will be able to			
1.	Develop the ability to apply mathematics for solving engineering & practical problems.		
2.	Gather concepts, principles & different methods of mathematics.		
3.	Realize the importance of mathematics in the study of engineering.		
Pre-Requisite -			
1.	Concepts of mathematics taught in the subject Mathematics in Sem-1.		
Content (Name of Topic)			Periods
Group – A			
Unit 1	DETERMINANTS & MATRICES		12
	1.1 Determinant		
	1.1.1 Definition & expansion of determinants of order 2 and 3.		
	1.1.2 Properties of determinants (statement only)		
	1.1.3 Minors and cofactors.		
	1.1.4 Evaluation of determinants of order 4 by Chio's method.		
	1.2 Matrix Algebra		
	1.2.1 Definition of a matrix of order $m \times n$, leading element, principal diagonal.		
	1.2.2 Types of matrices – null matrix, square matrix, diagonal matrix, identity matrix etc.		
	1.2.3 Symmetric and Skew symmetric matrices.		
	1.2.4 Matrix algebra – addition, subtraction, scalar multiplication and multiplication of matrices.		
	1.2.5 Matrix inversion by adjoint method.		
Unit 2	NUMERICAL METHODS		7
	2.1 Concept of Interpolation with Newton forward interpolation formula (Statement only). Simple Problems.		
	2.2 Numerical solution of simultaneous linear equations by Gaussian elimination method only (without proof).		
	2.3 Numerical Solutions of non-linear equations by Newton-Raphson method (without proof).		
	2.4 Numerical integration by trapezoidal rule & Simpson's 1/3 rule (without proof).		
GROUP - B			

Unit 3	INTEGRATION	17	
	3.1 Definition of Integration as inverse process of differentiation. 3.2 Integration of standard functions. 3.3 Rules for integration (sum, difference, scalar multiple). 3.4 Methods for Integration 3.4.1 Integration by substitution. 3.4.2. Integration by trigonometric substitution. 3.4.3 Integration by parts. 3.4.4 Integration by partial fraction. 3.5 Definite Integral 3.5.1 Definition of Definite Integral. 3.5.2 Properties of definite integrals with simple problems. 3.6 Applications of Definite Integral 3.6.1 Area under plain curves. 3.6.2 Area bounded by two curves. 3.6.3 Volume of revolution. Simple examples.		
	GROUP - C		
Unit 4	ORDINARY DIFFERENTIAL EQUATIONS	10	
	4.1 Definition of ordinary differential equation, order & degree. 4.2 Solution of differential equations of 1 st order & 1 st degree of 4.2.1 variable separable type 4.2.2 Homogeneous type 4.2.3 Reducible to homogeneous type 4.2.4 Exact type 4.2.5 Linear type 4.2.6 Reducible to linear type (Bernoulli's Equation). .4.3 Solution of 2nd order linear ordinary differential equations with constant coefficients – 4.3.1 Evaluation of Complementary functions (C.F.) 4.3.2 Evaluation of Particular Integral (P.I.) for exponential function, polynomial function, sine and cosine function & functions of the form $e^{ax}V$ where V is any one of the above.		
	GROUP - D		
Unit 5	PARTIAL DIFFERENTIATION	4	
	5.1 Definition & meaning of partial derivative. 5.2 Evaluation of partial derivatives. 5.3 Definition & examples of homogeneous functions. 5.3 Euler's theorem (1 st order) on Homogeneous functions for 2 & 3 variables (without proof). Simple problems.		
Unit 6	STATISTICS & PROBABILITY	10	
	6.1 Statistics		
	6.1.1 Definition & examples of frequency distribution. 6.1.2 Measures of central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. 6.1.3 Measures of dispersion – Standard deviation, Simple problems.		
	6.2 Probability		
	6.2.1 Definition of random experiment, sample space, event, occurrence of events & types of events (eg. Impossible, mutually exclusive, exhaustive, equally likely)		

	6.2.2 Classical & axiomatic definition of probability 6.2.3 Addition & multiplication theorems of probability (statement only). Simple problems.		
	Total	60	

EXAMINATION SCHEME

Internal Examination : Marks – 20

Marks on Attendance : 05

Final Examination : Marks – 70

Teacher's Assessment : 05

Group	Unit	Objective Questions			Total Marks
		To be Set	To be Answered	Marks per Question	
A	1,2	10	Any Twenty	1	20 x 1 = 20
B	3	6			
C	4	6			
D	5,6	6			

Group	Unit	Subjective Questions			Total Marks
		To be Set	To be Answered	Marks per Question	
A	1,2	3	Any Five Taking At Least One From Each Group	10	5 x 10 = 50
B	3	3			
C	4	2			
D	5,6	2			

Note 1 : Teacher's assessment will be based on performance on given assignments & quizzes.

Note 2 : Assignments may be given on all the topics covered on the syllabus.

Text Books		
Name of Authors	Title of the Book	Publisher
B.K. Paul	Diploma Engineering Mathematics (Vol-2)	U.N. Dhar & Sons
A. Sarkar	Engineering Mathematics	Naba Prakashani
G.P. Samanta	A Text Book of Diploma Engineering Mathematics, Volume-2	Learning Press
Konch & Dey	Engineering Mathematics	Bhagabati Publication
B.S. Grewal	Higher Engineering Mathematics	Khanna Publishers, New Delhi
Babu Ram	Engineering Mathematics	Pearson
H.K. Dass	Advanced Engineering Mathematics	S. Chand & Co.
Erwin Kreyszig	Advanced Engineering Mathematics	Wiley
Nurul Islam	Numerical Analysis	Academic Press
B.C. Das & B.N. Mukherjee	Integral Calculus - Differential Equations	U.N. Dhar & Sons
Srimanta Pal	Engineering Mathematics	Oxford University Press
Reference Books		
Name of Authors	Title of the Book	Publisher
Fatunla S O	Numerical Methods for initial value problems in ordinary differential equations.	Academic Press Inc. (London) Ltd
Kendall E A	An Introduction to numerical analysis (Second edition)	John Wiley and Sons, 1989

Burden, Richard L and Douglas	Numerical Analysis	Thomson, 9 th Edition, 2011
Braun M, Golubitsky M, Marsden J, Sirovich L, Jager W,	Differential Equations and their applications	New York, Springer-Verlag LLC, 1992

Syllabus of Strength of Materials

Name of the Course: Strength of Materials			
Course Code:		Semester: Second	
Duration: 17 Weeks		Maximum Marks: 50	
Teaching Scheme		Examination Scheme	
Theory: 2 hrs/week	Internal Examination: 10		
Tutorial: 1 hrs/week	Assignment & Quiz: 5		
Practical: Nil hrs/week	End Semester Exam:35		
Credit: 2			
Aim:			
<ol style="list-style-type: none"> 1. To study and realize the effect of deformable body under various loading conditions. 2. To study the concept of Moment of Inertia of various cross section. 3. To study the various mechanical properties and stress – strain diagram of different materials. 4. To prepare the students for further understanding of other allied subjects (e.g. TOS, MOM, TOM, machine design, and Design of structure). 			
Objective: The students will be able to			
<ol style="list-style-type: none"> 1. Define mechanical properties of materials and understand and analyze stress-strain diagram of engineering materials 2. Determine normal stress, shear stress, thermal stress, hoop stress, buckling stress, linear deformation, lateral deformation and angular deformation of deformable body. 3. Calculate moment of inertia of different cross sections of various engineering body. 			
Pre-Requisite: Students should know			
<ol style="list-style-type: none"> 1. Elementary knowledge on engineering mechanics 2. Differential and integral calculus 			
Contents:			
		Hrs/unit	Marks
Unit 1	Mechanical Properties of Materials, Simple stresses & Strain:		
	Definition of Elasticity, plasticity, ductility, malleability, hardness, fatigue, creep, brittleness. Types of loads, Types of stress – normal stress (tensile stress & compressive stress) & shear stress, Strain – longitudinal & lateral strain, Poisson ratio, Hooke’s law, Young’s modulus, Stress- strain curves for ductile material (MS) and brittle material (CI)- discussion on salient points on the stress – strain diagram, working stress, Factor of safety.(simple problems on normal stresses and longitudinal strain, no discussion on composite section). Direct shear stress, Single shear, double shear, shear strain, modulus of rigidity. (simple Problems on direct shear in riveted joint, punching press, cotter pin, lap welded joint) Thermal stress & strain of uniform section (no discussion on composite section) simple problem. Thin cylindrical shell subjected to internal pressure - hoop stress – longitudinal stress. Simple problem.	15	10
Unit 2	Shear Force & Bending Moment		
20	Definition of Shear force & bending moment, sign convention, Relation between shear force & bending moment, Shear force and bending moment diagrams for simply supported beam, overhanging beam and cantilever subjected to point loads &	12	8

	uniformly distributed load, location of point of contraflexure. (Problems to be based on simply supported beam, overhanging beam & cantilever beam)		
Unit 3	Moment of Inertia		
	Definition of area and mass moment of inertia, Parallel and perpendicular axes theorem (no derivation), Moment of inertia about centroidal axis of solid sections – Square, rectangular, circular, semicircular, Triangular section, Hollow sections – square, rectangular and circular cross section only. Moment of Inertia of angle section, channel, Tee, I section about centroidal axis and any other axis parallel to centroidal axis. Polar moment of inertia of circular solid and hollow section. Problems on concerned cross sections	9	7
Unit 4	Deflection of Beam		
	Concepts of deflection, Maximum deflection and slope of simple supported beam subjected to point load at mid span and / or uniformly distributed load on entire span and cantilever beam subjected to point load at free end and / or uniformly distributed load on entire length. (no deduction). Simple problem on maximum deflection and slope of beam.	3	5
Unit 5	Columns & Struts		
	Definitions of column & strut – Buckling of column, Concept of equivalent length as per different end conditions, Critical load/ buckling load, safe load, Euler's & Rankine's formulae for critical/ buckling load for columns. Simple problem	6	5
Total:		45(Lecture + Tutorial)	35
Internal assessment examination and preparation for semester examination		2 weeks i.e. 6 lecturer hour	
Totat:		51 lecturer hour(17 weeks)	
Text Books:			
Name of Author	Title of the Book	Name of the Publisher	
R.S.Khurmi	Strength of Materials	S. Chand & Co	
S.S.Bhavikatti	Strength of Materials	Vikas publishing House Pvt. Ltd.	
S. Ramamrutham & R. Narayanan	Strength of Materials	Dhanpat Rai & Publication	
R.K. Rajput	Strength of Materials	S. Chand & Co	
B.K.Sarkar	Strength of Materials	Tata McGraw Hill	
R.K.Bansal	Strength of Materials	Laxmi Publication Pvt. Ltd.	
M. Chakraborty	Strength of Materials	S.K. kataria	

Reference Books:			
S.P. Timoshenko, D.H. Young	Elements of Strength of materials	West Press Pvt. Ltd.	
D. S. Prakash Rao	Strength of Materials – A Practical Approach	Universities Press	
Egor P Popov	Engineering Mechanics of Solid	Prentice Hall of India	
R. Subramanian	Strength of Materials	Oxford Press	
Pranab Majumdar	Learning Strength of Materials	Knowledge Kit publication	
Suggested List of Laboratory Experiment: Nil (As decided in the meeting of subject coordinators)			
Suggested list of Assignments / Tutorial:			
Group A			
1.	One problem on normal stress, longitudinal strain & lateral strain		
2.	Stress – strain diagram of MS & CI and label the salient points		
3	One problem on shear stress, shear strain and modulus of rigidity		
4.	One problem on thermal stress and strain		
5.	One problem on hoop stress		
6.	One problem on area moment of inertia		
7.	One problem on column		
8.	One problem on deflection of beam		
Group B			
1.	One problem of Shear force & Bending moment diagram for simple supported beam use graphical method		
2.	One problem of Shear force & Bending moment diagram for cantilever beam use graphical method		
3.	One problem of Shear force & Bending moment diagram for overhanging beam use graphical method and locate point of contraflexure		
Note:			
Total students have to be divided into 10 groups. Each group shall be allotted three different numerical from group A and two different problems from group B. problems shall be submitted by each student in separate note book. All problems have to be solved in the tutorial classes.			
Sl. No.			
1.	Examination Scheme: (End semester examination)		
Unit:	Marks of each question	Question to be Set	Question to be answered
1	5	3	2
2,3	5	4	2
4,5	5	2	1
1	1	4	4
2	1	2	2
3	1	2	2
4	1	1	1
5	1	1	1
Total			5×5+10×1 = 35

Syllabus for Electrical Technology

Name of the Course:		ELECTRICAL TECHNOLOGY	
Course Code:		Semester: 2ND	
Duration: 51 hrs (34L+17T)		Maximum Marks: 50	
Teaching Scheme		Examination Scheme	
Theory: 02 hrs./week		Mid Semester Exam.: 10	Marks
Tutorial: 01 hr./week		Assignment & Quiz: 05	Marks
Practical: 00 hrs./week		End Semester Exam.: 35	Marks
Credit: 2			
Aim:			
Sl. No.			
1.	To understand the working principle, field of application of various electrical machines, equipments and instruments.		
2.	To study basic rules and laws of electric (dc & ac) and magnetic circuits		
3.	To understand the basics of electric power supply both general and domestic		
Objective:			
Sl. No.			
1.	State definitions of Basic electrical quantities used in electricity, magnetism and electromagnetic induction and application of different laws to analyze dc and ac circuits.		
2.	Impart Knowledge of basic principles and field of application of electrical machines and storage cells		
3.	To give Basic knowledge of electrical power supply system and testing equipments necessary for a diploma engineer.		
Pre-Requisite:			
Sl. No.			
1.	knowledge of basics of physics and mathematics at 10 th std.		
Contents (Theory)		Hrs./Unit	Max Marks
UNIT-I			7+5x4 =27
Module 1 : Different sources of Energy	1.1 Conventional & Non- conventional sources of energy 1.2 Advantages of Electrical Energy 1.3 Uses of Electrical Energy	2L	
Module 2: Basic concepts of Electrical quantities	2.1 Basic concept of charge, current, voltage, resistance, inductance, Capacitance, power, energy and their units. 2.2 Basic concept about supply source- D.C. & A.C. (names only)	2L	

Module 3: D.C. Circuits	3.1 Statement & explanation of (a) Ohm's law, resistances in series and parallel (b) Kirchoff's Current & Voltage laws 3.2 Simple problems on D.C. Circuits	3L+1T	
Module 4: A.C. Circuits	4.1 Principle of generation of sinusoidal voltage and its waveform representation 4.2 Difference between a.c. & d.c. 4.3 Idea about- (i) instantaneous value(ii) Cycles (iii) Frequency (iv) Time Period (v) Amplitude (vi) Phase (vii) Phase difference (viii) average value & R.M.S. value of Sinusoidal quantity (ix) Form factor & peak factor 4.4 Representation of sinusoidal quantities in (i) Exponential form (ii) Complex form (iii) Polar form 4.5 Expressions of voltage and current for sinusoidal sources through Pure Resistance, Inductance, and Capacitance 4.6 Simple R –L, Simple R – C and Simple R– L – C circuits 4.7 Concept of impedance , impedance triangle , power factor, active, reactive and apparent power and power triangle. 4.8 Simple problems on A.C. circuit.	5L+2T	
UNIT-II			4+5x3 =19
Module 1: Electromagnetism	1.1 Introduction to electromagnetism : magnetic field around a straight current carrying conductor and a solenoid and methods to find its direction (concept only) 1.2 Force between two parallel current carrying conductors (concept only) 1.3 Force on a conductor placed in the magnetic field (concept only) 1.4 Definitions and units of : Magnetising force, Magnetic intensity, Magnetomotive force, Magnetic flux, Permeability, Permeance, Reluctance 1.5 Concept of magnetic circuit and comparison with electric circuit 1.6 Concept of hysteresis, loop and hysteresis loss 1.7 Simple problems	4L	
Module 2: Electromagnetic induction	2.1 Faraday's Laws of electromagnetic induction 2.2 Lenz's law 2.3 Fleming's right and left hand rule 2.4 Principle of self and mutual induction 2.5 Energy stored in a magnetic field 2.6 concept of eddy current, eddy current loss	3L	

Module 3: Electrical Machines	3.1 Classification of electrical machines 3.2 Basic working principles of generator , motor and transformer (no deductions) 3.3 Field of applications 3.4 Storage cells- working principle, charging method, care and maintenance of storage cells.	4L+4T	
UNIT-III			4+5x2 =14
Module 1: Electrical power supply systems	1.1 Comparison between D.C. and A.C. system 1.2 Block diagram of a typical A.C. power supply system 1.3 Concept of single phase and three phase system 1.4 Star and delta connections- relation between phase and line voltage and current (no deductions)	4L+3T	
Module 2: Domestic power supply	2.1 Simple idea of house wiring starting from commencement of supply 2.2 Types of electric wiring used for domestic purpose and name of materials 2.3 Role of fuses/ MCB/RCCB/ELCB 2.4 Concept and necessity of earthing	4L+3T	
Module 3: Measuring and Testing Instruments	3.1 Name and Types of instruments used in measurement of Voltage, Current, Power and Energy (Moving iron, Moving coil & Digital Meters 3.2 Use of Meggar with connection diagram, measurement of earth resistance 3.3 Connection diagram of energy meter and basic principle of energy measurement 3.4 Digital & Analog multimeters-applications	3L+4T	
Total		34L+17T	35
Text Books:			
Name of Authors	Title of the Book	Edition	Name of the Publisher
1.B.L. Thereja	A text book of Electrical Technology Vol-I & II		S.Chand Publication
2.Nagrath& Kothari	Basic Electrical Engineering		Tata McGraw hill Publication
3.J.B.Gupta	Basic Electrical Engineering/		S K Kataria & Sons

4.Surjit Singh	Electrical Estimating & Costing		Dhanpat Rai Publication					
5.K.Murugesh Kumar	Basic Electrical Science & Technology/		Vikas Publication					
Reference Books								
T. K. Nagsarkar & M. S. Sukhija	Basic Electrical Engineering	2 nd	Oxford University Press					
Dr. J Pal	Electrical Technology		Knowledge Kit Publication					
Note: During Tutorial classes Teachers will take students to the laboratory for demonstration and make them familiar with electrical apparatus, machineries and instruments.								
Assignments & Question paper setting tips:								
1. Maximum 5 questions are to be given in each tutorial, in which two 2 marks questions (based on basic concept and formulae with one/two step calculations) and three 4 marks questions are expected.								
2. Question Paper setting tips								
GROUP	OBJECTIVE QUESTIONS				SUBJECTIVE QUESTIONS			
	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS
A	7	10	1	10 X 1 = 10	4	FIVE QUESTIONS, TAKING AT LEAST ONE FROM EACH GROUP	5	5 X 5 = 25
B	4				3			
C	4				2			

Syllabus for Engineering Drawing

Name of the Course: ENGINEERING DRAWING(For ETCE,MLT,FPT,EE,CSWT,CST,DP,PHO,CHE,EIE,IT, MET, ME,MEP,CE, AE, ARCH, MIN, MS, SE, PT, LGT, and FWT.)	
Course Code:	Semester: Second
Duration: 17 weeks	Maximum Marks: 150
Teaching Scheme	Examination Scheme
Theory: 1 hrs./week	Internal Examination: Marks: 10 Marks on attd.:05
Tutorial: hrs./week	Continuous Internal Assessment : 50 External Assessment: 50
Practical: 3 hrs./week	End Semester Exam.: Marks 35
Credit: 3	
Aim:	
Sl.No.	
1.	The Course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings.
2.	Understand the fundamentals of Engineering Drawing
3.	Read and interpret object drawings.
Objective:-	The student should be able to:-
Sl.No.	

1.	Draw different engineering curves and know their applications.		
2.	Draw orthographic projections of different objects.		
3.	Visualize three dimensional objects and draw Isometric Projections.		
4.	Use the techniques and able to interpret the drawing in Engineering field		
5.	Use computer aided drafting		
Pre-Requisite:			
Sl.No.			
1.	Unambiguous and clear visualization.		
2.	Sound Pictorial Intelligence		
Contents (Theory)		Hrs./Unit	Marks
Unit: 1 Name of the Topics: Projections of Solids	1.1 Projections of Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube with their axes perpendicular /inclined to one reference plane and parallel to other.	02	05
Unit: 2 Name of the Topics: Sectional Views	2.1 Types of sections 2.2 Conversion of pictorial view into sectional orthographic views (First Angle Projection Method only)	02	05
Unit: 3 Name of the Topics: Missing Views[Not for ARCH] Perspective Projection [For ARCH]	3.1 Draw missing view from the given orthographic views-simple components (First Angle Projection Method only) [Not for ARCH] Introduction to the Principals of perspective projection (one point and two points) Ground Plane-Picture Plane-Station Point-Horizontal Plane-Central Plane-Ground Line-Horizontal Line-Axis of Vision-Centre of Vision-Visual Ray Method- Vanishing Point Method. [For ARCH]	02	05
Unit: 4 Name of the Topics: Sections of Solids	4.1 Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube resting on their base on Horizontal plane. 4.2 Prism, Cylinder : Axis parallel to both the reference plane 4.3 Section plane inclined to one reference plane and perpendicular to other	03	05
Unit: 5 Name of the Topics: Isometric Projection	5.1 Conversion of orthographic views into Isometric view / projection (Including rectangular, cylindrical objects, representation of slots on sloping as well as plane surfaces)	03	05
Unit: 6 Name of the Topics: Developments of Surfaces	6.1 Developments of Lateral surfaces of cube, prism, pyramids, cylinder, cone and their applications such as tray, funnel, chimney, pipe bends etc.	02	05
Unit: 7 Name of the Topics: Free Hand Sketches[Not For ARCH] Axonometric Projections[For ARCH]	7.1 Free hand sketches of nuts, bolts, rivets, threads, split pin, foundation bolts, keys and couplings.[Not for ARCH] Introduction to Axonometric Projections [For ARCH]	02	05
Total		16	35
Contents (Practical)			
List of Practical	Intellectual skill	Motor skill	
1.Projection of solids Three problems on three different solids, one by axis of solid inclined to H.P and parallel to V.P. and one problem by axis inclined to V.P. and parallel to H.P. and one problem by axis inclined to both planes. (1 sheet)	To interpret the different positions of solids with reference planes. To develop ability to differentiate between true length of axis and apparent length of axis.	To draw projections of different solids when axis is inclined or perpendicular to one of the reference plane.	
2.Sectional Views & Isometric Projections Two objects by First Angle Projection Method with section Two objects one by true scale and another by Isometric scale (1 sheet)	To interpret sectional views of given object Develop ability to differentiate between Isometric view and isometric projections	Develop ability to draw sectional views , Isometric views and Isometric projections from given objects and orthographic views of an object	
3.Missing Views Two problems by first angle projection	To interpret the missing view from given orthographic views.[Not for	To develop ability to draw missing view from given orthographic views.	

method [Not for ARCH] Two simple problems on Perspective Projection [For ARCH] (1 sheet)	ARCH] To generate the perspective views from given orthographic views [For ARCH]	To develop ability to draw perspective view from given orthographic views.
4. Section of solids Three problems on different solids, one problem, section plane inclined to H.P. and perpendicular to V.P. one problem, section plane inclined to V.P. and perpendicular to H.P. And one problem, section plane perpendicular to one reference plane and parallel to other plane. (1 sheet)	To differentiate between true shape and apparent shape of section. To Interpret the positions of section plane with reference planes.	To develop ability to draw the sectional orthographic views of given solids, when it is cut by section plane in different position with reference planes. Ability to draw true shape of section.
5. Development of surfaces Three problems on development of surfaces of different objects (1 sheet)	Able to interpret the development of surfaces of different solids.	Ability to draw the development of surfaces of different objects in different shapes.
6. Free hand sketches [Not for ARCH] Any six figures on different topics Axonometric Projections [For ARCH] Axonometric Projection of exterior interiors (Bed Room-Kitchen-Toilet etc.) of any house. (1 sheet)	To differentiate between scale drawing and free hand drawing. To differentiate between various parts of machine. [Not for ARCH] To express exterior or interior views of any house through Axonometric views [For ARCH]	Develop ability to draw orthographic views of different machine elements. [Not for ARCH] Develop ability to draw axonometric views of exterior or interiors of any house [For ARCH]
7. Drawing with CAD One object by first angle projection method with section and one Isometric figure.	To differentiate between two dimensional figure and three dimensional figure.	Develop ability to draw orthographic and Isometric figure with computer

Text Books:			
Name of Authors	Titles of the Book	Edition	Name of the publisher
N.D.Bhatt	Engineering Drawing		Charotkar Publishing House
R.K.Dhawan	Engineering Drawing		S.Chand & Co.
K.Venugopal	Engineering Drawing and Graphics +AutoCAD		New Age publication
Basant Agrawal C M Agrawal	Engineering Drawing		Tata McGraw Hill Education Private Ltd.
N D Bhatt	Machine Drawing		Charotkar Publishing House
R K Dhawan	Machine Drawing		S.Chand & Co.
Pal & Bhattacharya	Engineering Drawing	6th	Viva Books
D. Sen	Engineering Drawing		Knowledge Kit Pub.
Reference Books:			
Name of Authors	Titles of the Book	Edition	Name of the publisher
P S Gill	Engineering Drawing		SK Kataria and sons
Dhananjay A Jolhe	Engineering Drawing		Tata McGraw Hill Education Private Ltd.
Pal & Bhattacharya	Computer Aided Engineering Drawing	7th	Viva Books
B. Bhattacharyya	Machine Drawing		Oxford University Press
Suggested list of laboratory experiments:			
	Not Applicable		
Suggested list of Assignments/ Tutorial:			
	Not Applicable		
Note :			
1.Students should use two separate A3 Size sketch books ,One for class work practice and another for assignment.			
2.Students should solve assignment on each topic.			
3.Use approximately 570mm x 380mm size Drawing Sheet for sessional work			

Syllabus for : Workshop Practice

Name of the Course: <u>Workshop Practice</u> (For Diploma in Mechanical/ Electrical/ Electronics/ Electronics & Instrumentation/ Civil/ Computer/ Chemical Engg. Groups/Mechanical (Production)/Automobile/Computer Software/Footwear/Leather Goods/Food Processing/Packaging/Medical Lab. Tech/Mine Survey/ Mining/ Metallurgical Engg. & Technology/IT/ Agricultural Engg)/ Survey Engg.				
Course Code:	Semester: Remaining two unit (except the unit completed in 1 st semester) should be completed in 2 nd semester. Evaluation may be done by continuous assessment process and by External Examiner in end semester.			
Duration: : Seventeen weeks/Semester	Maximum Marks: 100 (2nd semester)			
Teaching Scheme	Examination Scheme: Continuous Evaluation- 50 (Internal), External practical exam-50 (at the end of 2nd semester)			
Theory: Nil hrs./week	Mid Semester Exam.: Nil			
Tutorial: Nil hrs./week	Attendance & Teacher's Assessment:-50 Marks(2 nd)			
Practical: 3 hrs./week	End Semester Exam.: 50 Marks(2 nd)			
Credit: 2				
Aim: To impart practical knowledge in Work Shop related with course of study.				
Objective: Student will able to				
Sl. No.				
1.	Know basic Work Shop Processes.			
2.	Read and interpret job drawings.			
3.	Identify, select, & use of various marking, measuring, holding, striking & cutting tools & equipments.			
4.	Operate, control different machines & equipments.			
5.	Inspect the job for specified dimensions.			
6.	Produce jobs as per specified dimensions.			
7.	Adopt safety practices (tools, jobs& personal) while working on various machines.			
8.	Acquaint with the chronological operational processes involving in the jobs.			
9.	Care & maintenance of the tools & machines.			
Pre-Requisite: Nil				
Sl. No.				
Contents :		TOTAL PERIODS: 45 (15 Weeks) + 6 (2 Weeks) = 51 (17 Weeks)	Hrs./Unit	Mark s
Unit: 1 is compulsory(1st sem) and any two units (2nd sem) from the rest as deemed fit for the branches.				
Unit: 1	Electrical Shop (Compulsory) 1. General Shop Talk 1.1 General safety & precautions taken in Electrical Workshop 1.2 Electric shock, methods of shock treatment 1.3 Fuse and safety measure 1.4 Earthing as safety measure — I.E. Rule – 61 — Different types of Earthing 1.5 Different types of wire-gauge & strands, applications 1.6 Different tools used Electrical wiring installations —		6 periods	

	<p>chisels including sharpening of chisel</p> <p>(d) Making of different types of wooden pin & Fixing methods.</p> <p>(e) Marking, measuring and inspection of jobs.</p> <p>2.2 PREPARATION OF JOINTS IN A SINGLE PIECE OF JOB (ANY ONE)</p> <p>(a) Half-lap joint ("I" Cross or "L" or 'T').</p> <p>(b) Mortise & Tenon Joint (including drilling and fixing using wooden pins) — T-joint</p> <p>(c) Dovetail joint (Lap & Bridle Dovetail)</p> <p>2.3 PRACTICE ON WOOD WORKING LATHE</p> <p>(a) Safety precaution on Wood working machines.</p> <p>(b) Study of wood working lathe; (c) Sharpening of lathe tools; (d) Setting of jobs and tools;</p> <p>(e) Different type of wood turning practice</p> <p>2.4 * PRODUCTION OF UTILITY ARTICLES (GROUP WORK)</p> <p>(a) Making Handles of chisels / files /screw drivers etc.</p> <p>(b) Making Legs of cabinets: Straight, Tapered and Ornamental</p> <p>2.5 Study on and practice of the following machines: (a) Surface Planer (b) Band Saw (c) Circular Saw</p> <p>* May be done in group work if possible</p>		
<p>Unit: 3</p>	<p>SMITHY/ FORGING SHOP</p> <p>1. GENERAL SHOP TALK</p> <p>1.1 Purpose of Smithy / Forging Shop</p> <p>1.2 Different types of Hearths used in Smithy / Forging shop</p> <p>1.3 Purpose specifications uses, care and maintenance of various tools and equipments used in hand forging by segregating as cutting tools, supporting tools, holding tools, measuring tools etc.</p> <p>1.4 Types of fuel used and maximum temperature obtained</p> <p>1.5 Types of raw materials used in Smithy / Forging shop</p> <p>1.6 Uses of Fire Bricks & Clays in Forging Work Shop.</p>	<p>6 PERIODS</p>	

	<p>2. PRACTICES</p> <p>2.1 Practice of firing of hearth / Furnace, Cleaning of Clinkers and Temperature Control of Fire.</p> <p>2.2 Practice on different basic Smithy / Forging operations such as Cutting, Upsetting, Drawing down, Setting down, Necking, Bending, Fullering, Swaging, Punching and Drifting</p> <p>(A) <u>Demonstration</u> — Making cube, hexagonal cube, hexagonal bar from round bar</p> <p>(B) <u>Job Preparation (Any one)</u></p> <p>Job 1 Making a cold / hot, hexagonal / octagonal flat chisel including tempering of edges</p> <p>Job 2 Making a chain-link or Door Ring by bending and forge-welding</p> <p>Job 3 Production of utility goods e.g. hexagonal bolt / square shank boring tool, fan hook (long S-type) [Two jobs are to be done by the students]</p> <p>2.3 Practice of Simple Heat treatment processes like Tempering, Normalizing Hardening etc.</p>	<p>24 PERIODS</p>	
<p>Unit: 4</p>	<p>WELDING SHOP</p> <p>1. GENERAL SHOP TALK</p> <p>1.1 Purpose of Welding, Brazing and Soldering.</p> <p>1.2 Purpose, specifications, uses, care and maintenance of various Welding machines, Cables, tools and equipments used for welding, brazing and soldering (soft and hard)</p> <p>1.3 Purpose of fluxes, electrodes, filler rods</p> <p>1.4 Safety equipments used in Welding Shop</p> <p>1.5 Various method of Welding (Fusion and Resistance) and its use.</p> <p>1.6 Selection of Electrods</p> <p>2.0 PRACTICES</p> <p>2.1 Study of Welding Transformers and Generators used in Arc-Welding</p> <p>2.2 Demonstration of Gas-Cutting and Gas-Welding processes</p> <p>2.3 Practice of Edge Preparation, Simple run, Tag Welding on arc-welding.</p> <p>2.4 PRACTICE OF WELDING: (a) Lap welding, (b) Different methods of Butt Welding (c) T' Fillet & Groove Welding, (d) Edge & Corner Welding in</p>	<p>6 Periods</p> <p>24 PERIODS</p>	

	<p>different position like Down hand Flat, Horizontal and Vertical (e) Stress relieving method.</p> <p>(A) <u>Job Preparation (Any One)</u></p> <p>JOB - 1 JOINING of M.S. plates — Two jobs on Lap-Joint and Butt-Joint (single/double plates), thickness of plates varying from 6 mm to 12 mm with proper edge preparation</p> <p>JOB - 2 SPOT-WELDING on M.S. /G.I. Sheets</p> <p>JOB - 3 SOLDERING: use of soft / hard solders and brazing on dissimilar materials</p> <p>JOB - 4 Study of TIG / MIG welding sets</p> <p>(B) <u>Testing</u></p> <p>Defects in welding and testing of welding joints by Dry Penetration method & by Mechanical Method.</p>		
Unit: 5	<p>BENCH WORK & FITTING SHOP</p> <p>1. GENERAL SHOP TALK</p> <p>Purpose of Bench Work and Fitting Shop:</p> <p>(a) Study of different types of hand tools & their uses, care and maintenance of tools e.g. Files, Chisels, Hammers, Hack-saw with frames, Fitting Bench Vice, Different other Vices, Divider, Try-square, Drill-taps, Dies, V-blocks, Bevel protector, Scribes, Surface plates, Types of Callipers Types of Drill bits etc.</p> <p>(b) Study of measuring instruments by direct and indirect methods: Micrometer – Vernier callipers – Bevel protectors – Steel Rule.</p> <p>(c) Dismantling & Assembling of Fitting Bench Vice.</p> <p>(d) Study of Drilling Machine.</p> <p>2.0 BASIC FITTING SHOP PRACTICES*</p> <p>2.1 Chipping and chiselling practice</p> <p>2.2 Filing practice</p> <p>2.3 Marking and measuring practice</p> <p>2.4 Drilling and tapping practice</p> <p>2.5 Making Stud Bolt by Die.</p> <p>2.6 Making Male- Female Joint.</p> <p>* N.B. AT LEAST ONE JOB COVERING THE ABOVE MENTIONED ARE TO BE PREPARED INCLUDING PROCESSES.</p>	<p>6 PERIODS</p> <p>24 PERIODS</p>	
Unit: 6	<p>MACHINE SHOP</p> <p>1. SHOP TALK ON MACHINE SHOP</p>	6PERIODS	

	<p>1.1 Safety Precautions. 1.2 Demonstration of drilling machine, Lathe machine, Shaping, Slotting machine. 1.3 Demonstration of drill bits, Single Point & Multi point Cutting tools</p> <p>2. PRACTICE ON MACHINE SHOP</p> <p>2.1 Use of Drill Machine and drilling practice 2.2 Preparation of one job in Lathe machine involving the operation like Plane Turning, Step Turning, Grooving, Chamfering, Knurling etc.</p>	24 PERIODS	
Unit :7	<p>ELCTRONICS WORKSHOP</p> <p>1. SHOP THEORY</p> <p>1.1 Common Assembly tools. 1.2 Identification of Basic Components; both active & passive 1.3 Use of Multimeter (both Analog and digital). 1.4 Rules for soldering & de-soldering. 1.5 Rules of component mounting and harnessing. 1.6 Artwork Materials in PCB design, General artwork rules, taping guidelines.</p> <p>2. PRACTICES</p> <p>2.1 Identification of basic components: Passive-resistors, Capacitors, Inductors/Coils, Transformers, relays, switches, connectors; Active- Batteries/cells, diode, transistors (BJT, FET) SCR, diac, Triac, LED, LCD, Photo-diode, Photo-transistors. 2.2 Use of Multimeters to test components and measurement of circuits, Voltage, resistance etc. 2.3 Soldering and de-soldering practice 2.4 Component mounting practice 2.5 Wire harnessing practice 2.6 General artwork practice on graph sheets and taping practice on mylar sheet.</p>	6 PERIODS 24 PERIODS	
Unit :8	<p>COMPUTER WORKSHOP</p> <p>1. SHOP THEORY</p> <p>1.1 Different types of Key Boards. 1.2 Different types of Mouse. 1.3 Different types of Scanners.</p>	6 PERIODS	

	<p>1.4 Different types of Modems. 1.5 Different types of Printers. 1.6 Different types of CD Writers, Speakers, CD Read/ Write Drive. 1.7 Different types of Microphones, LCD Projectors, Pen Drive, DVD Drives. 1.8 Different types of Monitors. 1.9 Different makes of Hard Disks. 1.10 Different types of Net Work Interface Cards. 1.11 Different types of Cables Such as Data Cables, Printers Cables Net Work Cables, Power Cables etc. 1.12 Different types of Floppy Disk. 1.13 Mother Board connection. 1.14 Graphics Card connection. 1.15 Net Work Interface card connection.</p> <p style="text-align: center;">2. PRACTICES</p> <p>2.1 Connection of Mouse in different ports. 2.2 Connection of Key Boards in different ports. 2.3 Connection of Monitors. 2.4 Connection of Printers. 2.5 Different Switch settings of Printers. 2.6 Printer's self test. 2.7 Jumper setting of Hard Disks. 2.8 Attaching FDD, HDD and CD Drives. 2.9 Attaching Pen Drives and DVDs. 2.10 Attaching Scanner.</p>	24 PERIODS	
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Text Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
S. K. Hazra Chaudhury	Work Shop Technology Volume I & II	Latest	Media promoters, Mumbai
Raghuwanshi	Work Shop Technology Volume I & II	Latest	Dhanpath Rai & Sons
Gupta	Production Technology		Sayta Prakasani
Bawa	Manufacturing Processes		Tata McGraw-Hill
Ali Hasan & R. A. Khan	Manufacturing Processes		Scitech Pub.Chennai

Reference Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher

Sl. No.	Question Paper setting tips
A	D. S. Kumar, Mechanical Engineering
B	

Syllabus of Development of Life Skill-1

Name of the Course: All Branches of Diploma in Engineering and Technology (Development of Life Skill-1)		
Course Code:	Semester: Second	
Duration: : Seventeen weeks	Maximum Marks: 50	
Teaching Scheme	Examination Scheme	
Theory: 1hrs./week		
Tutorial: Nil hrs./week	Internal Teacher's Assessment :25	
Practical: 3 hrs./week	External Teacher's Assessment :25	
Credit: 3		
Aim:		
Sl. No.		
1.	Conduct different session to improve students memory Power	
2.	Conduct different session to improve time management skills	
3.	Developing the team work culture	
4.	Personality development and problem solving ability	
Objective:		
Sl. No.		
1.	Develop reading skills	
2.	Use techniques of acquisition of information from various sources	
3.	Draw the notes from the text for better learning.	
4.	Apply the techniques of enhancing the memory power.	
5.	Develop assertive skills.	
6.	Apply techniques of effective time management.	
7.	Set the goal for personal development.	
8.	Enhance creativity skills.	
9.	Develop good habits to overcome stress.	
10.	Face problems with confidence	
11.	Apply problem solving skills for a given situation	
12.	Survive self in today's competitive world	
Pre-Requisite:		
Sl. No.		
1.	Basic Of Self Analysis methods.	
2.	Basic knowledge of stress and time management concepts.	
3	Basic knowledge of presentation skills.	
4.	Desire to gain comparable knowledge and skills of various activities in various streams of engineering.	
Contents :	Development of Life Skill TOTAL PERIODS: 48	Hours
Unit: 1	Importance of Development of Life Skill(DLS), Introduction to subject, importance in present context, application	03

Unit: 2	Information Search Information source –Primary, secondary, tertiary Print and non – print, documentary, Electronic Information center, Library , exhibition, Government Departments. Internet Information search – Process of searching, collection of data –questionnaire , taking Interview , observation method. Information analysis and processing.	06
Unit: 3	Self Analysis Understanding self— Attitude, aptitude, assertiveness, self esteem, Confidence buildings. SWOT Analysis – concept, how to make use of SWOT Concept of motivation.	09
Unit: 4	Self Development Stress Management –Concept, causes, effects and remedies to Avoid / minimize stress. Health Management – Importance, dietary guidelines and exercises. Time management- Importance, Process of time planning, Urgent Vs importance, Factors leading to time loss and ways to handle it, Tips for effective time management. EMOTION-CONCEPT, TYPES, CONTROLLING, EMOTIONAL INTELLIGENCE. CREATIVITY-CONCEPT, FACTORS ENHANCING CREATIVITY. THINKING – ANALYTICAL & LOGICAL THINKING, HIGHER ORDER THINKING GOAL SETTING – CONCEPT, SETTING SMART GOAL.	20
Unit: 5	Study habits Ways to enhance memory and concentration. Developing reading skill. Organisation of knowledge, Model and methods of learning.	10
Total		48

Text Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
Personality Development & Soft Skills	B. K. Mitra		Oxford University Press
E.H. Mc Grath , S.J.	Basic Managerial Skills for All		Prentice Hall of India, Pvt Ltd
Allen Pease	Body Language		Sudha Publications Pvt. Ltd.
Lowe and Phil	Creativity and problem solving		Kogan Page (I) P Ltd
Adair, J	Decision making & Problem Solving		Orient Longman
Bishop , Sue	Develop Your Assertiveness		Kogan Page India
Marion E	Make Every Minute Count		Kogan page India

Haynes			
Pearson Education Asia	Organizational Behavior	Tata McGraw Hill	
Michael Hatton (Canada – India Project)	Presentation Skills	ISTE New Delhi	
-- --	Stress Management Through Yoga and Meditation	Sterling Publisher Pt Ltd.	
Richard Hale, Peter Whilom	Target setting and Goal Achievement	Kogan page India	
Chakravarty, Ajanta	Time management	Rupa and Company	
Marshall Cooks	Adams Time management	Viva Books	
Internet Assistance:			
1.	http://www.mindtools.com		
2.	http://www.stress.org		
3.	http://www.ethics.com		
4.	http://www.coopcomm.org/workbook.htm		
5.	http://www.mapfornonprofits.org/		
6.	http://www.learningmeditation.com		
7.	http://bbc.co.uk/learning/courses/		
8.	http://eqi.org/		
9.	http://www.abacon.com/commstudies/interpersonal/indisclosure.html		
10.	http://www.mapnp.org/library/ethics/ethxgde.htm		
11.	http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm		
12.	11) http://members.aol.com/nonverbal2/diction1.htm		
13.	http://www.thomasarmstron.com/multiple_intelligences.htm		
14.	http://snow.utoronto.ca/Learn2/modules.html		
15.	http://www.quickmba.com/strategy/swot/		
Reference Books:			
Name of Authors	Title of the Book	Edition	Name of the Publisher
Darlene	Life Skills Activities for	5th	Kindle Edition

Mannix	Secondary Students with Special Needs		
Autism or Asperger's,	1001 Great Ideas for Teaching and Raising Children with Autism or Asperger's,	2 nd	Kindle Edition
How to Become Smarter	Nikolai Shevchuk		Kindle Edition
Suggested List of Laboratory Experiments :			
1.	Conduct Guest Lectures.		
2.	Conduct industrial visit		
3.	Conduct Seminar/Group Discussions.		
Suggested List of Assignments/Tutorial :			
S. No	The Term Work Will Consist Of Following Assignments.		
	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.		
	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		
	Attend a seminar or a guest lecture, listen it carefully and note down the important points and prepare a report of the same.		
	Visit to any one place like historical/office/farms/development sites etc. and gather information through observation, print resources and interviewing the people.		
	Prepare your individual time table for a week – (a) List down your daily activities. (b) Decide priorities to be given according to the urgency and importance of the activities. (c) Find out your time wasters and mention the corrective measures.		
	Keep a diary for your individual indicating- planning of time, daily transactions, collection of good thoughts, important data, etc		
	Find out the causes of your stress that leads tension or frustration .Provide the ways to Avoid them or to reduce them.		
	Undergo the demonstration on yoga and meditation and practice it. Write your own views, feeling and experiences on it.		
	MINI PROJECT on Task management. Form different teams from taking 5-8 students in a group. Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in a task management.		
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.			