WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION
(A Statutory Body under West Bengal Act XXI of 1995)

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Memo no.3551-SC(T)E Date:22th March, 2013

Notice

This is for information to all concern that, Council has taken an initiative to revamp the syllabi of Diploma courses offered through different Polytechnics affiliated to the Council. Various syllabus sub-committees have put in a laudable effort to make the syllabi more industry-relevant and in compliance with the model syllabus uploaded on "http://www.aicte-india.org/mdiploma.htm" of AICTE. As a first step, the draft syllabi for only the first years of the Diploma in Engineering disciplines have been prepared and placed in the following pages. Suggestions and comments are invited from the respective subject teacher(s) belonging to different Polytechnics and from other stake-holders regarding the proposed draft syllabi so as to reach those to this email address "syllabus.wbscte.2013@gmail.com" within 7th April 2013 to enable this council to implement new revised syllabi from the next academic session i.e. 2013-2014. The suggestion should contain the subject name and relevant title mentioning the reference of respective section/subsection and his/her name and phone number. Subject name should also be mentioned in the subject of the email. The proposals will be actively considered by the syllabus committees for finalization of new syllabi essential for the enhancement of the quality of Diploma education in the state subject to its industry-relevance and compatibility with the model syllabus of AICTE.

SECRETARY

PROPOSED DRAFT SYLLABI OF THE

DIFFERENT SUBJECTS OFFERED

AT THE PART – I

DIPLOMA IN ENGINEERING

Syllabus of Communication Skills I

Name of the Course: Communication Skills I

Course Code: **Semester**: First

Duration: 15 weeks **Maximum Marks**: 100

Teaching Scheme: Theory - 2 lectures/week Tutorial: 2 lectures /week

Examination Scheme Internal Assessment 20 marks; Teachers Assessment (based on performance in the tutorial classes and attendance) 10 marks; End Semester Exam 70marks.

Credit: 3

Aim:

i) Primarily to develop verbal communication skills in English among students.

ii) Developing reading & writing skills in students, especially among students who lack confidence in communicating in English.

iii) Developing listening and speaking skills.

Objectives:

i) To increase power of comprehending a written text.

ii) Training to isolate important information from a written text and represent the same in note form.

iii) Increase ability to write short paragraphs

iv) To write technical reports.

v) To improve speaking skill of students through active listening & speaking practice.

	Contents	Hrs./ Lect.	Marks
Unit 1	i) Identifying important information & keywords using SQ3R technique and linking words. ii) Comprehension –Responding to multiple choice questions from the text; making sentences with marked words from the text to bring out the meaning of the words, filling up gaps to	8	20

	complete information structure, Identifying central idea of the text		
Unit 2	i) Communication using symbols & abbreviations. ii) Communication using diagrams & charts. iii) Using mind-mapping to establish relationship among information iii) Using SQ3R technique , mind mapping , symbols, abbreviations, diagrams & charts to represent important information from written text in note form	6	15
Unit 3	Developing notes into paragraph (that is, from given information in diagrams, pictures, charts & so on). Concept of Topic Sentence and Supporting sentences. The paragraph types are: i) Description of process and route ii) Problem-Solution type iii) Cause & Effect type iv) Comparing & Contrasting type	8	15
Unit 4	Technical Reporting Writing The reports should contain a Front Cover and Covering Letter i) Progress Reports ii)Industrial Accident Report iii) Feasibility Report	8	20

Suggested Activities in the Tutorial Classes (preferably in the Communication Lab.) to develop listening & speaking skills and revise important topics in English grammar		
1	A brief introduction to the process of communication (sender-encoding-message-decoding-receiver-encoding- feedback/response-decoding) and classification of skills in communication.	30 lectures
2	How to introduce oneself, introducing friends, how to greet, how to bid goodbye	
3	Listening and viewing video clips to improve pronunciation and vocabulary (use of English language software is recommended)	
4	Analysing and commenting on situations shown in short video clippings/pictures	
5	Teaching etiquettes and interactions- wishing, drawing attention, seeking apologies, seeking permission and so on.	
6	Remedial grammar / Revision of English grammar (as required) in paragraph and report writing with special emphasis on voices, tenses, reported speech and preposition.	

References		
Author/s	Name of Book	Publisher
WBSCTE & The British Council	English Skills for Technical Students	Orient Black Swan
P.C. Wren & H. Martin	High School English Grammar & Composition	S. Chand & Co. Ltd.

Syllabus of Basic Physics

Name of the Course: All Branches of Diploma in Engineering except Modern Office Practice & Management. **Subject : BASIC PHYSICS**	
Course Code:	**Semester: FIRST**
Duration: 6 months	**Maximum Marks: 100**
Teaching Scheme	**Examination Scheme**
Theory: 2 hrs./week	Mid Semester Exam.: 20 Marks
Tutorial: -- hrs./week	Attendance, Assignment & interaction: 10 Marks
Practical: 2 hrs./week	End Semester Exam.: 70 Marks
Credit:	

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.	• Learn the use of Dimensional analysis in Physics and in engineering fields. • Estimate errors in measurement. • Select proper material for intended purpose by studying properties of materials. • Analyze surface tension property and properties of fluid.
2.	• Identify good & bad conductors of heat. • Analyze laws of thermodynamics and to distinguish different thermodynamic processes.
3.	• Learn about measurement of light energy and the illumination produced by it. • Analyze the phenomenon of refraction and its consequences. • Identify the effect of interference between light waves. • Identify photo electric effect for engineering applications. • 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 – 70. Time allotted – 3 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**	**12**	**20**	**5**	**3**	**10**	**50**
B	**4, 5**	**8**		**4**	**2**		

- 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 UNITS, DIMENSIONS & MEASUREMENTS	**1.1 System of units** – Need of measurement in engineering and science. CGS, MKS and SI. Fundamental and derived units (SI). **1.2 Dimensions:** Dimensions of physical quantity. Principle of dimensional homogeneity (explanation with examples). Applications of dimensional analysis. Limitations of dimensional analysis. **1.3 Estimation of errors**: Concept of significant figure. Absolute error, Relative or Proportional error and percentage error (concept only). Accuracy & precession of instruments (concept only, examples only with slide calipers and screw gauge).	4	10
Unit – 2 GENERAL PROPERTIES OF MATTER	**2.1 Elasticity**: Deforming force and restoring force. Elastic and plastic body. Stress and strain. Hooke's law. Stress – strain diagram. Young's modulus, Bulk modulus, Rigidity modulus and Poisson's ratio (definition and formula) and relation between them (no derivation). (Simple numerical problems). **2.2 Surface tension**: Cohesive and adhesive forces. Definition, dimension and SI unit of surface tension. Surface energy (concept only). Angle of contact (definition only). Capillarity, shape of liquid meniscus in a capillary tube, rise of liquid in a capillary tube (no derivation, simple numerical problems). Effect of impurity and temperature on surface tension. Some natural examples of surface tension.	8	20

	2.3 Fluid Mechanics: Pascal's law. Multiplication of force. Buoyancy. Conditions of equilibrium of floating body. Archimedes' principle. [Simple numerical problems]. Streamline flow and turbulent flow of a fluid (concept), critical velocity (definition only). Equation of continuity and Bernoulli's theorem (statement and equation only, simple problems). Viscosity, Newton's formula for viscous force, co-efficient of viscosity (definition, dimension and SI unit). Stokes law (dimensional derivation) and terminal velocity (concept and formula only).Effect of temperature on viscosity.		
Unit – 3 HEAT AND THERMODYNAMICS	**3.1 Thermal expansion of solid**: Linear, areal and cubical expansion and their coefficients (definition and formula) and their relation (no derivation). Change of density with temperature (formula only). (Simple numerical problems). **3.2 Transmission of heat**: Conduction, convection and radiation (differences). Thermal conductivity (formula, definition, dimensions and SI unit). (Simple formula based numerical problems including composite slab). Examples & use of good and bad conductor of heat. **3.3 Thermodynamics**: Zeroth law of thermodynamics. Temperature and internal energy (concept only). First law of thermodynamics (statement and equation only). Specific heats of gas, their relation (no derivation) and their ratio. Isothermal, isobaric, isochoric and adiabatic process (definition only).	5	12
Unit – 4 LIGHT	**4.1 PHOTOMETRY:** Luminous flux, luminous intensity, illumination and their S.I. units — Principle of Photometry (statement only). **4.2 REFRACTION OF LIGHT:** Refraction of light through plane surface. Laws of refraction. Refractive index -- Relative & Absolute, its relation with the velocity of light in different media. Total internal reflection and critical angle. Optical fibre (Principle & applications – mention only). **4.3 OPTICAL LENS:** Lens and definition of related terms (Recapitulation). Cartesian sign convention. Lens maker's formula (no derivation). Relation between u, v, f (usual symbols) (no derivation). Principle of magnifying glass. Power of a lens and its unit. Equivalent focal length & power of two thin lenses in contact (formula only). (Simple numerical problems). **4.4 WAVE THEORY OF LIGHT & INTERFERENCE**: Huygen's wave theory, wave front – spherical, cylindrical and	11	24

	plane wave front (Idea only). Huygen's principle of propagation of wave front. Analytical expression for 1D plane light wave. Principle of superposition of waves. Coherent sources (Idea only). Interference of light waves, constructive and destructive interference. Young's double slit experiment – analytical treatment.		
Unit – 5 MODERN PHYSICS	**PHOTOELECTRIC EFFECT:** Photoemission, Work function. Photoelectric current, its variation with intensity and frequency of incident radiation. Stopping potential, Threshold frequency. Concept of photon. Einstein's photoelectric equation. Principle of solar photo-voltaic cell and its uses.	2	4
	TOTAL	30	70

Practicals:

Sl. No.	Skills to be developed
1.	**1) Intellectual skills-** • 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 an
2.	**2) Motor skills-** • 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

Laboratory Experiments :

Sl. No.	At least six experiments to be performed
1.	• Determination of volume of the material of a hollow cylinder by using slide calipers.
2.	• Determination of area of cross-section of a wire / thin solid rod by using a screw gauge .Estimate the maximum proportional error in the measurement.
3.	• Determination of the specific gravity of a solid, insoluble in water and heavier than water, by hydrostatic balance.
4.	• Determination of the specific gravity of sand by specific gravity bottle.
5.	• Verification of Boyle's law by Boyle's law apparatus.
6.	• Verification of laws of refraction of light and determination of refractive index of glass
7.	• Determine of focal length of a convex lens by U-V method.
8.	• Determination of the Young's modulus of steel by Searl's method.
9.	• Determination of the surface tension of water by capillary rise method (Capillary tube & radii to be supplied).
10.	• Determination of coefficient of viscosity of given highly viscous liquid by Stoke's

	method (Radii & density of the balls and density of the liquid to be supplied).		
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

List of equipments / apparatus for laboratory experiments :		
Sl. No.	Name of equipment / apparatus	
1	Vernier calipers	
2	Screw gauge	
3	Physical balance	
4	Boyle's law apparatus	
5	Glass slab	
6	Optical bench	
7	Searl's apparatus for Young's modulus	
8	Travelling microscope	
9	Stoke's law apparatus	

Syllabus for: Basic Chemistry

Name of the Course: All Branches of Diploma in Engineering And Technology (Basic Chemistry)			
Course Code:		**Semester:** first	
Duration: : Seventeen weeks		**Maximum Marks: 100**	
Teaching Scheme		**Examination Scheme**	
Theory: 2 hrs./week		Internal Examination: 20Marks	
Tutorial: Nil hrs./week		Attendance+Assignment + interaction :10 Marks	
Practical: 2 hrs./week		Final Examination: 70Marks	
Credit:			
Aim:			
Sl. No.	The Students will be able to:		
1.	To apply the knowledge of chemical and physical properties and processes in engineering field.		
2.	The content of this subject provides knowledge of engineering materials.		
Objective:			
Sl. No.	The students are likely to acquire the following skills at the end of the course:		
1.	• To draw the atomic structure of different elements. • To represent the formation of molecules schematically.		
2.	• To describe the mechanism of electrolysis. • Ti identify the properties of metals & alloys related to engineering applications.		
3.	• To identify the properties of non metallic materials related to engineering applications.		
4.	• To acquire the knowledge of softening treatment of water in industry. • To know basic organic compounds applicable to industry.		
Pre-Requisite:			
Sl. No.			
1.			
2.			
GROUP: A		Hrs./Unit	Marks
Unit: 1 Name of the Topics: Atomic Structure and Chemical Bonding	**Atomic Structure** : Bohr model of atom [Radius and Energy of H – atom is excluded] , De Broglie modification, Quantum numbers, Orbits and Orbitals, Aufbau principal, Pauli's Exclusion principle, Hunds rule of maximum multiplicity, Electronic configaration of elements upto atomic number 36. Definition of Atomic number, Mass number, Isotopes, Isotones and Isobars with suitable examples. **Chemical Bonding**: Electrovalent, Covalent and coordinate bonds, H-bond in HF, water and ice. Classification of solids – crystalline and amorphous. Relationship between structure and properties of the following crystalline solids- (i) Ionic solid i,e. Sodium chloride (ii) Covalent solid i,e. diamond and graphite	**6**	12

	(iii) Molecular solids i,e. metallic bonds and related properties. Properties and uses of Carbon, Silicon and Germanium.		
Unit: 2 Name of the Topics: Avogadro Concept , Acids , Bases & Salts	Avogadro number, Mole concept, Simple numerical problems involving Weight and volume. Acids, Bases and Salts (Arrhenius and Lewis concept) Basicity of acids and Acidity of bases, Neutralization reaction, Hydrolysis of Salts,. Equivalent Weight of acids, bases, & salts of Strength of Solution ---- normality, molarity, molality, formality and percentage strength, standard solution primary and secondary standards, concept of pH, and pH scale, Indicators and choice of indicator, principles of acidimetry and alkalimetry (simple numerical problems) Buffer solution (excluding numerical problems) Solubility product principle (excluding numerical problems), common ion effect with relation to group analysis.	**4**	12
	Total		
GROUP – B			
Unit: 3	**3.1 Oxidation, Reduction, Electrochemistry** Oxidation and Reduction by electronic concept, balancing chemical equations by Ion-electron method, Redox Titration, Electrolysis, Arrhenius theory, Faraday's Laws, Electrolysis of $CuSO_4$ solution using Pt-electrode and Cu-electrode, simple numerical problems on electrolysis, Application of electrolysis such as Electroplating, Electrorefinings and Electrotyping, Electrochemical Cells, Primary Cell- Dry Cell, Secondary Cell --- Lead storage cell, Electrochemical series. **3.2 Chemical Equilibrium** Reversible and irreversible reactions, Exothermic and Endothermic reactions, concept of chemical equilibrium, Lechatelier's principle, Industrial preparation of Ammonia by Haber's Process, Nitric acid by Ostwald's process and Sulphuric acid by Contact Process (Physico chemical principles only), catalyst and calalysis.	**4** **3**	**8** **8**
Unit: 4 Name of the Topics: **Metallurgy**	Minerals, Ores, Gangue, Flux, Slag, General method of extraction of metals with reference to Iron, copper and Aluminium (detailed method of	**5**	**12**

	extraction is excluded) Definition of Alloy, purposes of making Alloy, Composition and uses of alloys (Brass, Bronze German Silver, Deuralumin, Nichrome, Bell metal, Gun metal, Monel metal, Alnico, Dutch metal, Babbit metal, stainless steel), Amalgams, properties and uses of cast iron, wrought iron, steel and sponge iron , Manufacture of steel by L-D process, composition and uses of different alloy steels.		
Unit: 5 Name of the Topics: **Water**	Soft and Hard water, Action of soap on water, Types of Hardness, causes of hardness, Units of hardness, Disadvantages of using hard water, Estimation of total hardness by EDTA method, Removal of hardness --- Permulit process, Ion-exchange process, phosphate conditioning and calgon treatment. Distilled water and Deionised water.	**3**	**8**
Unit: 6 Name of the Topics: **Organic Chemistry**	Organic compounds, their differences from inorganic compounds, Classification, Homologous series, Functional groups, Isomerism, Nomenclature up to C5 , properties and preparation of Methane, Ethylene and Acetylene, Methylated spirit, Rectified spirit, Power alchohol, Proof spirit, uses of Benzene, Naphthalene and phenol, Chromatographic techniques of separation of organic compounds (Thin-Layer Chromatography).	**5**	**10**

a) Internal Examination Marks : 20

b) Final Examination Marks : 70

c) Attendance + Assignment + interaction. : 10

} Full Marks = 100

Laboratory Experiments :			
Sl. No.			
1	To identify the following Basic Radicals by dry and wet tests – Pb^{+2} , Cu^{+2} , Al^{+3}, Fe^{+3}, Zn^{+2} , Ni^{+2} , Ca^{+2} , Mg^{+2} , Na^{+} , K^{+} , NH_4^{+}		
2	To identify the following Acid Radicals by dry and wet tests – Cl- , CO3-2 , SO4-2, S-2 , NO3-		
3	To identify an unknown water soluble salt containing one basic and one acid radical as mentioned above.		
4	To perform titration of (N/10) approximate solution of an alkali with an unknown solution of an acid supplied.		
5	To determine Iron content in Mohr's salt by standard K2Cr2O7 solution.		
6	Preparation of Potash Alum.		

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

Syllabus of Mathematics

Name of the Course : **MATHEMATICS** (First Semester all branches)	
Course Code : */1/T4/MTHS	Semester : First
Duration : 15 weeks	**Maximum Marks : 100**
Teaching Scheme :	**Examination Scheme :**
Theory : 4 contact hours/week.	Internal Examination : 20 Marks
Tutorial : 1 contact hour /week	Class Attendance : 5 Marks
Practical : NA	End Semester Examination : 70 Marks
Credit : 5	Teacher's Assessment : 5 Marks

Aim :	
1.	To develop logical & precise thinking ability.
2.	To make the student aware about the utility of mathematics as a tool for solving scientific & engineering problems.
3.	
Objectives – The student will be able to	
1.	Develop an analytical & systematic approach towards solving any problem.
2.	Appreciate the power of mathematics in inter-disciplinary applications.
3.	Visualize various abstract concepts using mathematics as a tool.
Pre-Requisite -	
1.	Basic mathematical terms & formulae should be known.
2.	Knowledge of basic mathematical concepts are also necessary.
3.	

Content (Name of Topic)		Periods	
Group - A			
Unit 1	**ALGEBRA**	**21**	
	1.1 Logarithm 1.1.1 Definition of natural and common Logarithm 1.1.2 Laws of Logarithm. Simple Problems.	3	
	1.2 Complex Numbers 1.2.1 Definition of Complex numbers, Cartesian and polar. Exponential forms of complex numbers. 1.2.2 Modulus, amplitude & conjugate of a complex number 1.2.3 Algebra of Complex numbers (Equality, Addition, Subtraction, Multiplication). 1.2.4 Cube roots of unity & its properties. 1.2.5 De Moivre's theorem (statement only) and simple problems.	6	
	1.3 Quadratic Equations 1.3.1 Definition of Quadratic Equations 1.3.2 Analysing the nature of roots using discriminant 1.3.3 Relation between roots & coefficients 1.3.4 Conjugate roots	4	

	1.4 Binomial Theorem 1.4.1 Definition of factorial notation, definition of permutation and combination with formula 1.4.2 Binomial theorem for positive index (statement only) 1.4.3 General term and middle term. 1.4.4 Binomial theorem for negative index (statement only).	4	
	1.5 Partial Fraction 1.5.1 Definition of polynomial fraction, proper & improper fractions and definition of partial fractions 1.5.2 Resolving proper fractions into partial fractions with denominator containing non repeated linear factors, repeated linear factors and irreducible non repeated quadratic factors.	4	
Unit 2	**Vector Algebra**	**10**	
	2.1 Definition of a vector quantity. 2.2 Concept of Position vector and Ratio formula. 2.3 Rectangular resolution of a vector. 2.4 Algebra of vectors – equality, addition, subtraction & scalar multiplication. 2.5 Scalar (Dot) product of two vectors with properties. 2.6 Vector (cross) product of two vectors with properties. **2.7 Applications** 2.7.1 Application of dot product in work done by a force and projection of one vector upon another. 2.7.2 Application of cross product in finding vector area and moment of a force.		
Group - B			
Unit 3	**TRIGONOMETRY**	**10**	
	3.1 Trigonometric Ratios of associated, compound, multiple and sub-multiple angles. 3.2 Inverse trigonometric functions – Definition, formulae and simple problems. 3.3 Properties of Triangle – sine, cosine and tangent formulae - Simple Problems.		
Unit 4	**COORDINATE GEOMETRY & MENSURATION**	**13**	
	4.1 Co-ordinate System 4.1.1 Cartesian & Polar co-ordinate system 4.1.2 Distance formula and section formula 4.1.3 Area of a triangle and condition for collinearity.	2	
	4.2 Straight Line 4.2.1 Equation of straight line in slope point form, intercept form, two-point form, two-intercept form, normal form. 4.2.2 General equation of a straight line. 4.2.3 Angle between two straight lines – Condition for parallelism and perpendicularity. 4.2.4 Length of perpendicular from a point on a line. Perpendicular distance between two parallel lines.	3	

	4.3 CIRCLE 4.3.1 Equation of circle in standard form, centre-radius form, diameter form, two-intercept form. 4.3.2 General equation of circle with a given centre and radius. Simple Problems.	3	
	4.4 Conic Section 4.4.1 Standard equations of parabola, ellipse & hyperbola. 4.4.2 Definition of focus, vertex, directrix, axes, eccentricity. Simple problems.	2	
	4.5 MENSURATION 4.5.1 Regular Polygon of n sides – Formula for area and perimeter. 4.5.2 Prism and Pyramid – Formula for volume & Surface area. Simple Problems.	3	
Group - C			
Unit 5	**FUNCTION, LIMIT & CONTINUITY**		
	5.1 Function	3	
	5.1.1 Definitions of variables, constants, open & closed intervals.		
	5.1.2 Definition & types of functions – Simple Examples		
	5.2 Limits	4	
	5.2.1 Concept & definition of Limit.		
	5.2.2 Standard limits of algebraic, trigonometric, exponential and logarithmic functions.		
	5.2.3 Evaluation of limits.		
	5.3 Continuity	2	
	5.3.1 Definition and simple problems of continuity.		
Unit 6	**DERIVATIVE**	**12**	
	6.1 Definition of Derivatives, notations.		
	6.2 Derivative of standard functions.		
	6.3 Rules for differentiation in case of sum, difference, product and quotient of functions.		
	6.4 Derivative of composite functions (Chain rule).		
	6.5 Derivatives of inverse trigonometric functions.		
	6.6 Derivatives of implicit functions.		
	6.7 Logarithmic derivatives.		
	6.8 Derivatives of parametric functions.		
	6.9 Derivative of one function with respect to another function		
	6.10 Second order derivatives.		
	6.11 Applications of Derivatives.		
	6.11.1 Geometric meaning of derivative.		
	6.11.2 Rate measurement		
	6.11.3 Maxima & Minima (one variable)		
	Total	**75**	

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	12	Any Twenty	1	20 x 1 = 20
B	3,4	7			
C	5,6	6			

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

	Text Books		
	Name of Authors	Title of the Book	Publisher
	B.K. Paul	Diploma Engineering Mathematics (Vol-1)	U.N. Dhar & Sons
	A. Sarkar	Mathematics (First Semester)	Naba Prakashani
	G.P. Samanta	A Text Book of Diploma Engineering Mathematics, Volume-1	Learning Press
	Dr. S. Bose & S. Saha	A Complete Text Book of Mathematics	Lakhsmi Prakasan
	Reference Books		
	H.S. Hall & S.R. Knight	Higher Algebra	Book Palace, New Delhi
	S.L. Loney	Trigonometry	S. Chand & Co.
	H.K. Dass	Engineering Mathematics	S. Chand & Co.
	T.M. Apostol	Calculus, Volume-1	John Wiley & Sons
	B.K.Pal, K.Das	Engineering Mathematics, Volume-1	U.N. Dhar & Sons

Syllabus of Engineering Mechanics

Name of the Course: **Engineering Mechanics**	
Course Code:	Semester: First
Duration: 15 Weeks	Maximum Marks: 100
Teaching Scheme	Examination Scheme
Theory: **3** hrs/week	Internal Examination: 20
Tutorial: **1** hrs/week	Assignment & Quiz: 10
Practical: hrs/week	End Semester Exam:70
Credit: **4**	

Aim:

1. To study and realize the action of force system & moment on a rigid body.
2. To study the concept of Centroid & Centre of gravity.
3. To study the law of motion of simple lifting machine.
4. To study the effect of friction on a body.
5. To prepare the students for further understanding of other allied subjects (e.g. SOM, TOS, MOM,TOM, DOM, DOS).

Objective: The students will be able to

1. Make composition of forces, resolution of force, and find resultant and equilibrant of coplanar force system.
2. Calculate moment of force & couple and thus support reactions of statically determinate beams under different load conditions.
3. Solve the problems of friction, its effect on ladder, horizontal plane and inclined plane.
4. Find the centre of gravity of composite solids and centroid of composite plain figures.
5. Find mechanical advantage, velocity ratio, efficiency of simple machines.

Pre-Requisite: Students should know

1. Basic Physics
2. Geometry and Trigonometry
3. General Mathematical manipulation

Contents:

		Hrs/unit	Marks
Unit 1	**Force Systems:** **1.1 Fundamentals and Force system:** Definitions of Mechanics, engineering mechanics, statics, dynamics, kinetics, kinematics, rigid body, scalar and vector, force, SI unit of force, representation of force by vector and by Bow's notation method, Characteristics of a force, effect of a force, Principle of transmissibility, Classification of force system(coplanar & non coplanar), detail classification of coplanar force system (collinear, concurrent, non concurrent, parallel, like parallel & unlike parallel). **1.2 Resolution of a force:** Definition, Method of resolution, mutually perpendicular components and non – perpendicular components. **1.3 Moment of a Force:** Definition, measurement of moment of a force, SI unit of moment, physical significance of moment of a force, classification of moments according to direction of rotation, sign convention, law of moments – Varignon's	12	15

	theorem and it's use. Couple- Definition, SI unit, measurement of moment of a couple, Equivalent couples- resultant of any number of coplanar couples, resolution of a given force into a force acting at a given point and a couple, properties of couple. **1.4 Composition of Force:** Definition of resultant force, method of composition of force – **Analytical method -** parallelogram law, triangles law & polygon law of force, Algebraic method for determination of resultant for concurrent, non-concurrent & parallel coplanar force system. **Graphical method -** space diagram, vector diagram and funicular polygon to determine resultant for concurrent & parallel force system only		
Unit 2	**Equilibrium:**	10	15
	2.1 Definition, condition 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 & explanation, Application of this theorem for solving various engineering problems. 2.3 Definition of equilibrant, relation between resultant and equilibrant, equilibrant of concurrent & non concurrent force system. 2.4 Beams – Definition, types of beams (cantilever, simply supported, overhanging, fixed and continuous), types of end supports (simple support, hinged, roller, fixed), classification of load, reaction of a simply supported, cantilever and overhanging beam subjected to vertical point load and uniformly distributed load by analytical and graphical method.		
Unit 3	**Friction:**	08	13
	3.1 **Definition:** friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction & angle of repose, cone of friction & its significance, types of friction, laws of friction, advantages & disadvantages of friction. 3.2 **Equilibrium of bodies on horizontal and inclined plane**: equilibrium of body on horizontal plane subjected to horizontal and inclined force, equilibrium of body on inclined plane subjected to forces parallel to inclined plane only, Ladder friction		
Unit 4	**Centroid and Centre of gravity**	08	12
	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, quadrant of a circle. Centroid of composite figure. (No deduction for determining Centroid of basic geometrical figures) 4.2 **Centre of gravity**: Definition of centre of gravity, centre of gravity of simple solids such as cylinder, sphere, hemisphere, cone, cube and rectangular block. Centre of gravity of composite solids. (No deduction for determining Centre of gravity of simple solids)		
Unit 5	**Simple Machine:**	10	15
	5.1 Definition: simple machine, compound machine, load, effort,		

	mechanical advantage, velocity ratio, input of a machine, output of a machine, efficiency of a machine, ideal machine, ideal load, ideal effort, machine friction, load lost in friction, effort lost in friction. 5.2 **Analysis:** Law of machine, maximum mechanical advantage of a machine & maximum efficiency of a machine, Reversibility of a machine, condition of Reversibility of a machine, self locking machine. 5.3 **Study of Simple machine:** Calculation of mechanical advantage, velocity ratio, efficiency and identification of reversible or self locking machine of following machines: Simple Axle & Wheel, Differential axle and Wheel, Weston's differential pulley block, Single Purchase crab, Double Purchase crab, Worm & Worm wheel, geared pulley block, Screw Jack, Pulleys (first, second & third system of pulleys).		
Total:		48(Lecture + Tutorial)	70

Text Books:

Name of Author	Title of the Book	Edition	Name of the Publisher
D.S.Kumar	Engineering Mechanics		S.K. Kataria & Sons
R.S.Khurmi	Engineering Mechanics		S. Chand & Co
Basu	Engineering Mechanics		Tata McGraw Hill
R.C. Hibbeler	Engineering Mechanics		Pearsion Education
S. S. Bhavikatti, K. G. Rajashekarappa	Engineering Mechanics		New Age International

Reference Books:

R.K. Rajput	Engineering Mechanics		S.K. Kataria & Sons
Beer – Johnson	Engineering Mechanics		Tata McGraw Hill
S.Ramamruthum	Applied Mechanics		Dhanpat Rai & Sons

Suggested List of Laboratory Experiment: **Nil** (As decided in the meeting of subject coordinators)

Suggested list of Assignments / Tutorial:

	Group A
1.	Numerical on resolution of force / moment of force / Resultant of force System.
2.	Numerical on Application of Lami's Theorem.
3.	Numerical on calculation of reaction of beam subjected to point load and uniformly distributed load.
4.	Numerical on friction force acting on body resting on horizontal surface / inclined surface and ladder friction.
5.	Numerical on calculation of Centroid of composite figures.
6.	Numerical on calculation of Centre of gravity of composite solids.
7.	Numerical on calculation of M.A., VR, Efficiency, Law of Machine for simple machine.

8.	Free body diagram of different mechanical system /2 dimensional force body.		
	Group B		
1.	Graphical Solution of Concurrent force system – 2 problems		
2.	Graphical Solution of parallel force system – 2 problems		
3.	Graphical Solution of Reaction of beam – 2 problems		
Note:			
	Total students have to be divided into 10 groups. Each group shall be allotted five different numerical from group A and three 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
1,2	9	4	2
3,4	9	3	2
5	9	2	1
1	1	6	6
2	1	6	6
3	1	4	4
4	1	3	3
5	1	6	6
		Total	5*9+25*1 = 70

Syllabus of Technical Drawing

Name of the Course:	**TECHNICAL DRAWING**		
Course Code: ETCE,MLT,FPT,EE,CSWT,CST,DP,PHO,CHE,EIE,IT,MET,ME,MEP,CE,AE,ARCH,MIN ,MS,SE,PT,LGT,And FWT.		**Semester:** First	
Duration: 17 weeks		**Maximum Marks: 100**	
Teaching Scheme		**Examination Scheme**	
Theory: 2 hrs./week		Internal Examination: marks: 10	Marks on attd.: 05
Tutorial: hrs./week		Continuous Internal Assessment: 25	External Assessment : 25
Practical: 3 hrs./week		End Semester Exam.:	Marks : 35
Credit:			

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: Drawing Instruments and their uses.	1.1 Letters and numbers (Single stroke vertical 1.2 Convention of lines and their applications. 1.3 Scale (reduced, enlarged & full size) plain scale and diagonal scale. 1.4 Geometrical construction	**04**	**07**
Unit: 2 Name of the Topics: Engineering curves & Loci of Points.	2.1 To draw an ellipse by (a) Directrix and focus method (b) Arcs of circle method (c) Concentric circles method 2.2 To draw a parabola by (a) Directrix and focus method (b) Rectangle method 2.3 To draw a hyperbola by (a) Directrix and focus method (b) Passing through given points with reference to asymptotes 2.4 To draw involutes of circle & polygon 2.5 To draw a cycloid, epicycloid, hypocycloid 2.6 To draw Helix & spiral 2.7 Loci of points with given conditions and examples related to simple mechanism.	**08**	**07**
Unit: 3 Name of the Topics: Orthographic projections	3.1 Introduction to Orthographic projections 3.2 Conversion of pictorial views into Orthographic views (First Angle Projection Method only) 3.3 Dimensioning technique as per SP-46	**06**	**07**
Unit: 4 Name of the Topics: Isometric projection	4.1 Isometric scale 4.2 Conversion of orthographic views into isometric views / projection (Simple objects)	**04**	**07**
Unit: 5 Name of the Topics: Projection of Straight Lines and Planes	5.1 Lines inclined to one reference plane only and limited to both ends in one quadrant. 5.2 Projection of simple planes of circular, square, rectangular, rhombus, pentagonal and hexagonal, inclined to one reference plane and perpendicular to	**06**	**07**

	the other.		
Unit: 6 Name of the Topics: Introduction to CAD	6.1 To draw line, rectangle, circle, polygon with given dimensions and hatch	**04**	
	Total	**32**	**35**

Contents (Practical)

List of Practical	Intellectual skills	Motor skills
1. **LETTERING , SCALE & GEO.CONST.** Single Stroke vertical Alphabets &Numerical Plain Scale and Diagonal Scale (reduced & enlarged) Construction of Regular Polygons (1 Sheet)	To develop ability to understand Scaling and problem on geometrical constructions	To develop ability to draw Scale & geometrical constructions
2. **Engineering Curves & loci of points** Draw ellipse , parabola, hyperbola, involutes, cycloid, spiral Draw locus of point on any one mechanism (1 Sheet)	To develop ability to differentiate between conic and curves. To develop ability to identify the type of locus from the nature of surface and the position of generating circle. Able to interpret the given mechanisms and locus of points.	To develop ability to draw different types of curves.
3. **Orthographic projections** Four objects by first angle method (1 Sheet)	Develop ability to interpret first angle projection method To interpret and able to solve problem on orthographic projection of given object.	Develop ability to draw orthographic projections by first angle projection method
4. **Isometric projection** Four objects ,two objects by true scale and another two by isometric scale (1 Sheet)	Develop ability to differentiate between isometric view and isometric projections. To differentiate between isometric scale and true scale	Develop ability to draw isometric views and isometric projections from given orthographic views of an object
5. **Projection of line and planes** Two problems on projection of lines and Two problems of planes. (1 Sheet)	To develop ability to differentiate between true length and apparent length. To interpret the position of lines and planes with plane	Able to draw orthographic projections of line and planes.
6. **Introduction to CAD** Draw a figure with the help of different draw and modify Command by Computer And redraw any one object of orthographic projection.	To develop ability to handle different tools of CAD	To develop ability to draw different figure by 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.
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.
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. Student should solve assignment on each topic.
3. Use approximately 570mm x 380mm size Drawing Sheet for sessional work

Syllabus of Computer Fundamentals

Name of the Course: Computer Fundamentals (For All Branches of Diploma in Engineering and Technology)	
Course Code:	**Semester: First**
Duration:	**Maximum Marks: 50 (Practical 25+25)**
Teaching Scheme	**Examination Scheme**
Theory: 1 hrs./week	Mid Semester Exam.: Marks
Tutorial: hrs./week	Assignment & Quiz: 25 Marks
Practical: 3 hrs./week	End Semester Exam.: 25 Marks
Credit: 3	

Aim: To understand computer and able to work with it i.e. to operate it and familiar with Office and Internet.

Sl. No.	
1.	To Understand basics of Computer and operate it.
2.	To Learn various application software's like MS Office or Open Office.
3.	To understand and use of Internet and Email.

Objective: Student will be able to

Sl. No.	
1.	Understand a computer system that has hardware and software components, which controls and makes them useful.
2.	Understand the operating system as the interface to the computer system.
3.	Use the basic functions of an operating system.
4.	Compare major OS like Linux and MS-Windows.
5.	Use file mangers, word processors, spreadsheets, presentation software's and Internet.
6.	Have hands on experience on operating system and Office package.
7.	Use the Internet to send mail and surf the World Wide Web.

Pre-Requisite:

Sl. No.	
1.	Basic knowledge of computer is helpful.
2.	Basic knowledge of Internet is helpful

Contents (Theory)		Hrs./Unit	Marks
Unit: 1 Name of the Topics: Fundamentals of Computer	1.1 Introduction, Components of PC 1.2 The system Unit, Processor, Motherboard, Memory. 1.3 Monitor,Keyboard, Mouse, Printer, Scanner,Disk drive, Speaker, Modem, Pendrive, CD, DVD etc.	4	
Unit: 2 Name of the Topics: **Introduction to Windows XP/7.**	2.1 Working with window, Desktop,Components of window. 2.2 Windows Explorer, Folders, Files , Start button. 2.3 Use of Paint, Notepad, WordPad etc.	3	
Unit: 3 Name of the Topics: **Use of Office or Open Office**	3.1 Basics of Word application and its use. 3.2 Basics of Excel/Spreadsheet application and its use. 3.3 Basics of Presentation application and its use.	4	
Unit: 4	4.1 Internet and its use, Browser, ISP, Search Engine etc.	3	

Name of the Topics: **Introduction to Internet**	4.2 Creating Email account, Composing and sending mails, Chatting, Downloading etc.		
Unit: 4 Name of the Topics: **Usage of Computers in Various Domains**	5.1 Computer application in Offices, books publication, data analysis ,accounting , investment, inventory control, graphics, Airline and railway ticket reservation, robotics	1	
	Total	**15**	

Contents (Practical)

Sl. No.	List of Practicals
1.	Working with Windows 2000 desktop, start icon, taskbar, My Computer icon, the Recycle Bin and deleted files, Creating shortcuts on the desktop, Use of Notepad, WordPad, Paint, Calculator.
2.	The Windows Explorer, concept of drives, Switching drives, Folder creation, Moving or copying files, Renaming, Deleting files, and folders.
3.	Printing, Installation of a printer, Maintaining print queue, Handling common printer problems.
4.	Moving through a Word document menu bar and drop down menus toolbars, Entering text into a Word document, selection techniques, Deleting text, Font formatting, keyboard shortcuts, Paragraph formatting, Bullets and numbering, Page formatting, Page margins, Page size and orientation Page breaks, Headers and footers, Introducing tables and columns, Printing, Print setup, Printing options, Print preview.
5.	Development of application using mail merge, Mail merging addresses for envelopes, Printing an addressed envelope and letter, Creating and using macros in a document.
6.	Creating and opening workbooks, Navigating in the worksheet, Inserting and deleting cells, rows and column, Moving between worksheets, saving worksheet, workbook; Formatting and customizing data.
7.	Formulas, functions; Creating, manipulating & changing the chart type; Printing, Page setup, Margins; Sheet printing options, Printing a worksheet;
8.	Preparing presentations with Microsoft Power Point; Slides and presentations, Opening an existing presentation , Saving a presentation; Using the AutoContent wizard ,Starting the AutoContent wizard; Presentation type; Presentation titles, footers and slide number.
9.	Selecting a slide layout; Manipulating slide information within normal and outline view; Formatting and proofing text; Pictures and backgrounds; drawing toolbar; AutoShapes; Using clipart; Selecting objects; The format painter.
10.	Navigating through a slide show; Slide show transitions; Slide show timings; Animation effects.
11.	Internet; Connecting to the Internet; The Internet Explorer program window and other browser software; Searching the Internet; Searching the Internet using Yahoo, Google and other search engines; Favorites, security & customizing Explorer; Use of antivirus software to increase the protection of the system;
12.	Using electronic mail; Creating and sending emails; Attached files; Receiving emails; Creating a mailing group; Locating and subscribing to newsgroups; Posting a message to a newsgroup.
13.	Chatting on internet, Understating chat environment.

Text Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
Vikas Gupta	Comdex Computer Course Ki	1st	Dreamtech
Henry Lucas	Information Technology for management	7th	TMH
Ramesh Bangia	Computer Fundamentals and Information Technology	2nd	Laxmi Publication Pvt Ltd.
Dinesh Maidasani	Learning Computer Fundamentals, MS office ,Internet & Web Technology.	2nd	Laxmi Publication Pvt Ltd.

Reference Books:			
Name of Authors	Title of the Book	Edition	Name of the Publisher
Sanjay Saxsena	A First Course in Computer	2nd	Vikash Publishing House
Bangia,Arora and Jalota	Computer Software and Application	1st	Laxmi Publication Pvt Ltd.

Suggested list of Laboratory Experiments:	
Sl. No.	Laboratory Experiments
1.	Installation of a printer and taking print out.
2.	Creating a resume of your own using Word.
3.	Creating a letter by using mail merge and taking print out of those letters.
4.	Prepare a student mark sheet in excel.
5.	Prepare a salary bill in excel.
6.	Making a presentation on any topics of your subject.
7.	

Suggested list of Assignments / Tutorial:	
Sl. No.	Topic on which tutorial is to be conducted
1.	Draw a picture on paint brush and take print out.
2.	Creating a resume of your own using Word.
3.	Creating a letter by using mail merge and taking print out of those letters.
4.	Prepare a student mark sheet in excel.
5.	Prepare a salary bill in excel.

Note:	
Sl. No.	
1.	Internal marks will be given mainly on the basis on Laboratory work and assignment given.

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.:20Marks	
Tutorial: Nil hrs./week		Attendance & Teacher's Assessment 10 Marks	
Practical: Nil hrs./week		End Semester Exam.:70Marks	
Credit: 3			
Aim:			
Sl. No.	The Students will be able to:		
1.	Understand some basic economic principles applied in business		
2.	Analyse 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 judgement 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.	Theorising skill		
4.	Decision making skill		
5.	Accounting skill		
6.	Computing skill		
Pre-Requisite:			
Sl. No.			
1.	Elementary knowledge about Co-ordinate Geometry		
2.	Basic knowledge in Algebra and Differential Calculus		
Contents : GROUP: A BUSINESS ECONOMICS TOTAL PERIODS: 30		Hrs./Unit	Marks
Unit: 1 Name of the Topics: **Economics and Its Relation**	***1.1 Subject Matter of Economics and its relation with Engineering*** **The domain where both the Engineering and Economic**	**Period 1**	

with Engineering **Period: 10**	**Principles operate** Uses of resources for *production* of goods and services for the *market.* Scarcity of resources; Alternative uses of resources; Choice of resources; Choice of technique; Efficient use of resources. ***1.2. Core Economic Ideas and Principles*** 1.2.1 Most basic level : Individual choice => demand 1.2.2 Most basic level : Firm, the production unit => supply 1.2.3 Opportunity cost: something must be given up to get something else. Every choice either economic or engineering involves a trade-off. 1.2.4 People are rational and respond to incentives: Individuals maximise self-interest. 1.2.5 People calculate costs and benefits: 'How much of something 'is a decision at the margin => marginal analysis. ***1.3. Market Mechanism*** 1.3.1 Define market : An institutional arrangement which allows demand and supply determine equilibrium market price. 1.3.2 Price mechanism : Use linear demand and supply curves ; equilibrium process ; 1.3.3 Stability of equilibrium : stability condition : D'(Q) < S'(Q) 1.3.4 Shifts of demand and supply curves : economic reasons behind shifts and its implications => graphical analysis 1.3.5 Application : solving linear demand and supply equations , also their shifts ***1.4 Theory of demand*** 1.4.1Demand function : use of elementary calculus ; demand schedule 1.4 .2 Law of demand : use of diagram and mathematical conditions; examples of violation of law of demand 1.4.3 Price elasticity of demand : definition and its importance 1.4.4 Point elasticity of demand in a linear demand curve Interpretation: E =0, E <1, E >1 E =1 and E = ∞. Use diagrams, give examples and classify goods as necessity/luxury 1.4.5 Income and Cross Elasticity of demand : Classification of goods as normal/ inferior , substitutes/complements 1.4.6 Determinants of price elasticity Application : **(a)** Calculating elasticity from linear demand equation; **(b)** Change of elasticity because of change of position and **s**lope of linear demand curve	**Period 1** **Period 4** **Period :4**	

Unit: 2 Name of the Topics: **Theory of Production, Cost and Profit Maximisation** ***Principles*** **Periods: 12**	***2.1 Theory of Production and Costs*** 2.1.1 Production function : technical relation between output and factors of production 2.1.2Concept of short run and long run: concept of fixed and variable inputs 2.1.3Short run : Law of Variable Proportion – graphical & tabular analysis 2.1.4 Long run : Laws of returns to scale – IRS , CRS, DRS 2.1.5 Application : Cobb-Douglas production function : $Q = AL^{\alpha}K^{\beta}$ Short run: derive AP & MP; verify Law of Diminishing Returns; Mathematical relations => (1) MP> 0 (2) d/dL(MP)<0 **(a)** Solving values of MP_L & MP_K from for specific values of L, K, α and β **(b)**Proving that $MP_L = AP_L$ when AP_L is maximum. **(c)** Finding out output elasticity of L & K: $€_L = MP_L / AP_L = \alpha$ and $€_K = MP_K / AP_K = \beta$; output elasticity is defined as proportional change in output resulting from proportional change in input; it is a constant. 2.1.6 Theory of Costs : Cost function 2.1.7 Short run : Concept of Fixed cost, Variable cost ,TFC ,TVC , TC ; AFC ,AVC , AC ,MC ; relation between AC & MC ; use diagrams 2.1.8 Long run average cost curve : direct consequences of IRS, CRS & DRS. ***2.2 Market and Profit Maximization*** 2.2.1 Basic features of (a) Perfectly Competitive Market (b) Monopolistic Competition (c) Oligopoly and (d) Monopoly, with relevant examples from business situation 2.2.2 Economic concept of profit : $\pi = TR - TC$ 2.2.3 Revenue function R = R (Q) ; Cost function : C = C (Q) Profit function $\pi = \pi (Q)$ Deriving results of First order condition of profit maximization, MR = MC; Second order condition: R" (Q) < C" (Q); Graphical analysis; economic interpretation. 2.2.4 Application: (a) Set linear demand equation and quadratic/cubic cost function to calculate profit maximizing output; verify S.O.C.	**Period 8** **Period :4**	

Unit: 3 **Investment Planning and Problems of Indian Economy** **Periods: 8**	**3.1 Investment Planning** 3.1.1 Concept of investment 3.1.2 Evaluating Capital Projects : (a) Payback Period Method (b) Net Present Value Method 3.1.3 Application : Solving numerical problems on Payback Period & NPV methods **3.2 Economic Concepts in the Context of Indian Economy** (Only brief macro- economic ideas to be mentioned and students are expected to answer **short notes only**): Mixed Economy; Globalisation; Gross Domestic Product; Inflation; Business Cycle and unemployment; Foreign Direct Investment; Balance of Payment and Foreign Exchange; Contemporary Industrial Growth and Investment. **NOTE: All symbols and notations are of usual meaning.**	**Period: 3** **period: 5**	
	Total		
GROUP – B ACCOUNTANCY TOTAL PERIODS: 30			
Unit: 4 Name of the Topics: **Fundamentals of Accountancy** **<u>Periods: 12</u>**	**4.1 Introduction to Accountancy** 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 **4.2 Double Entry System** 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	**Periods: 2** **Periods:10**	
Unit: 5 Name of the Topics: **Cash Book and Trial Balance** **<u>Periods: 9</u>**	**5.1 Cash Book** 5.1.1. Single Columns and Double Column including Contra Entry 5.1.2. Concept of Petty Cash Book **5.2 Trial Balance**	**Periods: 3**	

	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	**Periods: 6**	
Unit: 6 Name of the Topics: **Preparing Final Account** **<u>Periods: 9</u>**	**6.1 Basic Concepts Regarding Final Account** General Concept – Assets, Liabilities, Capital Drawings, Provision, Reserve, Reserve Fund, Bad Debts, Provision for Debts, Investments Share& Debentures, Profit Seeking and Non-profit Seeking Concerns **6.2 Final Account** Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustment)	**Periods:2** **Periods: 7**	

Text Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
Samuelson & Nordhaus	Economics		Tata McGraw Hill
Asis Banerjee & Debashis Mazumdar	Fundamentals of Economic Principles & Problems		ABS Publishing House
A.N. Agarwal	Indian Economy: Problem of Development and Planning		New Age International
Hanif & Mukerjee	Financial Accounting		
Ranesh Roy	Bharat-er Arthaniti (Bengali Version)		Mitram
Haridas Acharya	Adhunik Arthaniti		De Book Concern

Reference Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
Archibald & Lipsey	Introduction to Mathematical Economics		Harper & Row
Basu & Das	Financial Accounting		

Sl. No.	Question Paper setting tips
A	Short Question: 10 Marks, Students will answer 10 questions, each carrying 1 mark out of 14 questions.
B	Long question:- 25 Marks, Students have to answer any 5 questions choosing at least 1 from each of the 3 units. A total of 9 questions have to be set 3 from each unit. Each question will carry 5 Marks. Only short note type question to be set from Unit 3 Chapter 2

Syllabus of Applied Physics

Name of the Course: All Branches of Diploma in Engineering except Modern Office Practice & Management. **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:	

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.	• 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.	• Analyze magnetic effect of electric current and its application. • Learn the applications of electromagnetic induction.
3.	• 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 **B**	**1, 2, 3** **4, 5**	**6** **4**	**10**	**5** **4**	**3** **2**	**5**	**25**

- 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**	**1.1 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). **1.2 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).	6	7
Unit – 2 **ROTATIONAL DYNAMICS**	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). Angular momentum (definition & SI unit). Relation between torque and angular momentum (no derivation). Principle of conservation of angular momentum (Statement only). Moment of inertia of disc, solid cylinder, solid & hollow sphere about their own axis (formula only). (Simple problems). Parallel and perpendicular axes theorem (statement & one example of each).	5	7

Unit – 3 **CURRENT ELECTRICITY**	**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. **3.2 HEATING EFFECTS OF CURRENT:** Joule's law — Electrical work, energy and power with practical units (Simple numerical problems). **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.	6	7
Unit – 4 **ELECTROMAGNETISM**	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) 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.	5	5
Unit – 5 **MODERN PHYSICS**	**5.1 SEMI – CONDUCTOR:** Energy band in solids (Idea 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). **5.2 X – rays**: Production of X- rays by Coolidge X- ray tube. X-ray spectra – continuous and characteristic X-	8	9

	rays (Graphical plot only), minimum wavelength (simple problems). Properties of X- rays. Application of X- rays. **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).		
	TOTAL	30	35

Practicals:

Sl. No.	Skills to be developed
1.	**1) Intellectual skills-** • 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.	**2) Motor skills-** • 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:

- **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.
  Distribution of marks: Theory – 5. Table, units & data taking – 10. Viva – Voce – 10.

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

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: All Branches of Diploma in Engineering And Technology (Applied Chemistry)			
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.			
1.			
2.			
Detailed Course Content **GROUP: A**		Hrs./Unit	Marks
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: General method of preparation and use in printing only – Alcohol: Ethanol; Aldehyde and Ketone: Acetaldehyde, Methyl Ethyl Ketone,	**3**	**4**

	Methyl isobulyl ketone; Acid : Formic Acid & Acetic Acid; Ester: Ethyl Acetate. Aromatic compounds : Benzene: chlorination, Nitration, Friedel-Crafts reactions; Aniline: conversion into diazonium salt and reactions of diazonium compound.		
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,	**5**	**6**

	Saran. Synthetic rubber : Buna –S, Buna –N, Neoprene, Butyl, rubber, silicone, Vulcanization of rubber. Synthetic Fibres : Nylon , Terylene , Rayon.		
GROUP – C			
Unit: 8 Name of the Topics: **Environmental Pollution**	Introduction , Definition , Causes of pollution, Types of pollution. **<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. **<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 Biologocal characteristics, BOD, COD, Effects of water pollution.	**6**	**6**
a) Internal Examination Marks : 10 b) Final Examination Marks : 35 c) Attendance + Assignment + interaction. : 5 } Full Marks = 50			
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 evoporation]		
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_2SO_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

Syllabus of Engineering Mathematics

Name of the Course : **ENGINEERING MATHEMATICS** (Second Semester all branches)		
Course Code : */2/T5/EMTH	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	TA : 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.	
2.		
3.		

Content (Name of Topic)		Periods	
Group – A			
Unit 1	**DETERMINANTS & MATRICES**	**12**	
	1.6 Determinant 1.6.1 Definition & expansion of determinants of order 2 and 3. 1.6.2 Properties of determinants (statement only) 1.6.3 Minors and cofactors. 1.6.4 Evaluation of determinants of order 4 by Chio's method.		
	1.7 Matrix Algebra 1.7.1 Definition of a matrix of order mxn, leading element, principal diagonal. 1.7.2 Types of matrices – null matrix, square matrix, diagonal matrix, identity matrix etc. 1.7.3 Symmetric and Skew symmetric matrices. 1.7.4 Matrix algebra – addition, subtraction, scalar multiplication and multiplication of matrices. 1.7.5 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 2^{nd} 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			

	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
	Reference Books		
	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

Syllabus of STRENGTH OF MATERIALS

Syllabus of Electrical Technology

Name of the Course:	**ELECTRICAL TECHNOLOGY**		
Course Code: * / 2 / T* / ETK		**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: 3			

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.	Sound knowledge of basics of physics and mathematics at 10+2 std.

Contents (Theory)		Hrs./Unit	Max Marks
G R O U P – A **Module 1 : Importance of Electrical Energy in Modern Civilization**	1.1 Different forms of energy 1.2 Advantages of Electrical Energy 1.3 Uses of Electrical Energy	2L	7+5x4 =27
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) Kirchhoff'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	
G R O U P-B **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	4+5x2 =17
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	
G R O U P-C **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	4+5x2 =14
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 earthling	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		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

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 of Engineering Drawing

Name of the Course:	**ENGINEERING DRAWING**		
Course Code: ME,MEP,CE,AE,ARCH,MIN,MS,SE,PT,LGT, AND FWT		**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:			
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: **Sectional Views**	1.1 Types of sections 1.2 Conversion of pictorial view into sectional orthographic views (First Angle Projection Method only)	**03**	**05**
Unit: 2 Name of the Topics: **Missing Views[Not for ARCH]** **Perspective Projection [For ARCH]**	2.1 Draw missing view from the given orthographic views-simple components (First Angle Projection Method only)[Not for ARCH] Introduction to the Principles 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]	**01**	**03**
Unit: 3 Name of the Topics: **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**	**07**
Unit: 4 Name of the Topics: **Projections of Solids**	4.1 Projections of Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube with their axes perpendicular /inclined to one reference plane and parallel to other.	**02**	**05**
Unit: 5 Name of the Topics: **Sections of Solids**	5.1 Prism, Pyramid, Cone, Cylinder, Tetrahedron, Cube resting on their base on Horizontal plane. 5.2 Prism, Cylinder : Axis parallel to both the reference plane 5.3 Section plane inclined to one reference plane and perpendicular to other	**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.**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
2.**Missing Views** Two problems by first angle projection method **[Not for ARCH]** Two simple problems on Perspective Projection [**For ARCH]** (1 sheet)	To interpret the missing view from given orthographic views. [Not for ARCH] To generate the perspective views from given orthographic views. [For ARCH]	To develop ability to draw missing view from given orthographic views. To develop ability to draw perspective view from given orthographic views.
3.**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.
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 or 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.
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.
Suggested list of laboratory experiments:			
	Not Applicable		
Suggested list of Assignments/ Tutorial:			
	Not Applicable		
Note :			
4. Students should use two separate A3 Size Sketch books, One for class work practice and another for assignment.			
5. Student should solve assignment on each topic.			
6. Use approximately 570mm x 380mm size Drawing Sheet for sessional work			

Syllabus of WORKSHOP PRACTICE