STUDY AND EVALUATION SCHEME
FOR
ELECTRICAL ENGINEERING (2010)

SECOND SEMESTER

Code No.	Subject	Study Scheme Period/Week			Evaluation Scheme						Total Marks
					Internal Assessment		External Assessment Exam				
							Written Paper		Practical		
		L	T	P	Theory	Prac-tical					
					Max Marks	Max. Marks	Max. Marks	Hrs.	Max. Marks	Hrs.	
*BS-113	Applied Physics	4	-	2	50	25	100	3	50	3	225
*CM-401	*Communication Techniques-II	3	-	-	50	-	100	3	-	-	150
*BS-212	Applied Mathematics-II	3	1	-	50	-	100	3	-	-	150
*ES-221	Engineering Drawing-II	-	-	8	-	50	100	3	-	-	150
+ME-131	Elements of Mech Engineering	3	-	2	25	25	100	3	50	3	200
*ME-230	Workshop Practice-II	-	-	6	-	50	-	-	100	3	150
*ES-122	Introduction to Computers	-	-	4	-	50	-	-	100	3	150
	**Student Centered Activities	-	-	4	-	-	-	-	-	-	-
	TOTAL	13	1	26	175	200	500	-	300	-	1175

*   Subjects common with Civil, Electrical, Mechanical and Automobile Engineering.

+   Course common with Civil Engineering

**   Student centered activities will include: extension lectures, field visits, seminars, debates, hobby clubs, library studies, awareness regarding ecology and environment, conservation of energy (Petroleum products, electricity etc.), social service camps and other co-curricular activities including games.

Advanced planning for each semester has got to be made.

*BS-113 APPLIED PHYSICS

L	T	P
4	-	2

RATIONALE

Applied physics is a foundation course. Its purpose is to develop proper understanding of physical phenomenon and scientific temper in the students. The course covers basics like Mechanics, Heat, Sound and Light.

DETAILED CONTENTS

1. **Measurement** (10%)
   (i) **Units and Dimensions**
   Fundamental and derived units, SI units, dimensions of physical quantities, dimensional formula and dimensional equation, principles of homogeneity of dimensions and applications of homogeneity principle in:
   (b) Checking the correctness of physical equation.
   (c) Deriving relations among various physical quantities.
   (d) Conversion of numerical values of physical quantities from one system of units into other system.
   (ii) Errors in measurement accuracy, estimation of percentage error in the result of measurement.

2. **Waves** (20%)
   Generation of waves by vibrating particles, progressive wave, equation of waves, energy transfer by particles and waves, superposition of waves and its applications to interference, beats and stationary waves (graphical); sound and light as wave – range of frequencies, wavelengths, velocities and their nature, electromagnetic spectrum Doppler effect.

3. **Sound** (15%)
   (i) **Acoustics**
   Reflection, refraction and absorption of sound waves by materials; definition of pitch, loudness, quality and intensity of sound waves, units of intensity (bel and decibel); Echo and reverberation and reverberation time, control of reverberation time. Acoustic insulation (qualitative treatment only of reverberation).
   (ii) **Ultrasonic**
   Production of ultrasonic waves by magnetostriction and piezoelectric effect, detection and properties of ultrasonic; applications to drilling, cold welding, cleaning, flaw detection and exploration (sonar);

4. **Light**
   Geometrical Optics: (15%)
   Defect in image formation, eyepieces construction and principles of preparation of telephoto and zoom lens, principle of optical projectors, optical principles of OHP and slide film projectors.

Wave Optics: (15%)

Interference of light waves; Young's experiment; Newton's ring application of interference (Plainness testing measurement of small thickness), basic ideas about diffraction and polarization of light waves.

5. **Laser and its Applications** (10%)

Laser principle, types of Lasers; detailed study of the He-Ne and Ruby lasers and their applications. Fluorescent tube; mercury arc light, xenon source, sodium lamp.

6. **Atomic Structure and Energy Levels** (10%)

Bohr model of atomic structure,; Energy levels, ionization and resonance potentials, Energy levels of conductors, insulators and semiconductors. Atomic and crystal structure of silicon and germanium, covalent bonds, effect of temperature on conductivity of germanium and silicon.

7. **Radioactivy and Detection of Radiations** (5%)

Natural radioactivity; half-life; decay constant; mean life; radioactive transformation Principles of nuclear fission and fusion; energy generation. Source of background radiations; health Hazards of radiations. Units of radiation.

LIST OF PRACTICALS

1. Use of Vernier calipers and micrometer for determination of diameter of a wire.
2. Study of interference of sound waves using Quincke's tube.
3. Study of resonance in air column and determination of velocity of sound in air.
4. To make a telescope by combination of suitable lenses and determine its magnifying power.
5. Measurement of small thickness by interference method (by Fresnel's Biprism method)
6. To make a compound microscope by suitable combination of lenses and determine its magnifying power.
7. To determine the wavelength of sodium light by Newton's ring method.
8. Setting an OHP lenses and mirrors for its best performance.
9. Determination of wavelength of various spectral lines of mercury lamp.
10. Measurement of illumination level of a white surface under: natural daylight, incandescent light and fluorescent light.
11. To compare the intensity of illumination by Bunsen's photometer.
12. Study of diffraction of He-Ne laser beam by markings on a Vernier scale and determination of its wavelength.
13. To measure the first ionization potential of Hg using a diode.

SUGGESTIONS

While teaching the subject, teacher should make maximum use of demonstration to mak the subject interesting to the students.

Electrical- C·T·II

CM-401 *COMMUNICATION TECHNIQUE –II

	L	T	P
	3	-	-

RATIONALE

Diploma holders are support to communicate verbally and in written forms. Further technical report writing forms another essential requirement of these people. Keeping in view above requirements, this subject has been added to develop necessary competencies in written and oral communication. Efforts should be made to give practice of communication to the students.

Contents

Note: Weightage for each topic for external examination is given in the brackets.

1. **Précis writing:** (15%)

    Précis writing of simple passages of about 250 words.

2. **Concepts of Communication:** (20%)
    Importance of communication, one way and two way communication, methods of communication – oral, written and non-verbal, barriers to communication and techniques of overcoming the barriers, concept of effective communication, telephonic communication, public speaking and attending interviews.

3. **Correspondence:** (40%)

    (i) Business, official, social letters and letters to pres. Two questions of 10 marks each are to be attempted out of four.
    (ii) Telegrams, press release, advertisement, notices and memorandum. Two questions of 10 marks each are to be attempted out of four.

4. **Report Writing:** (15%)

    Choice to attempt one out of three topic is to be given.

5. **Practice of writing resume and applications for job.** (10%)

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*BS-212   APPLIED MATHEMATICS-II

$$L \quad T \quad P$$
Pds/Week   3   1   -

RATIONALE

The course aims at developing analytical abilities in basics of applied mathematics such as: differential and integral calculus and solution of first order differential equations. Besides applications of the above elements in engineering, the course of study will also provide continuing education base to them.

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

DETAILED CONTENTS

1. **COMPLEX NUMBERS**   (5%)
    (i)   Euler's exponential form (modulus argument form)
    (ii)   Hyperbolic function, relation between hyperbolic and circular functions.
    (iii) Phaser, addition of sinusoidal form, Phaser diagram of R-L, R-C, and L-R-C circuits.

2. **DIFFERENTIAL CALCULAS.**   (40%)
    (i)   Functions, concept of evaluation of following limits.

$$\text{Limit}_{x \to 0} \frac{\sin x}{x}, \qquad\qquad \text{Limit}_{x \to a} \frac{x^n - a^n}{x - a},$$

$$\text{Limit}_{x \to 0} (1 + x)^x, \qquad\qquad \text{Limit}_{x \to a} \frac{a^x - 1}{x},$$

    (ii)   Differential coefficient. Its physical application. As rate measure, Geometric interpretation as slope of a curve. Differentiation from first prim of functions like x^n, a^x, Log x , Sin x, Cos x and Tan x. Differentiation of sum, product and quotient of functions.
    (iii) Differentiation of Trigonometric and inverse Trigonometric functions. Differentiation of function of a function, Implicit functions, parametric functions Logarithmic differentiation.
    (iv)   Application of differentiation in finding errors, Tangent and normal of curves Maxima of functions.

3. **INTEGRAL CALCULAS.**
    (i)   Integration as inverse operation of differentiation. Integral of standard functions   (35%)
           Integration by substitution, by parts and by partial fractions.
    (ii)   Evaluation of integral of rational and irrational functions of the form.

$$\frac{dx}{ax^2 + bx + c} \qquad\qquad ax^2 + bx + c \quad dx$$

(iii) Simple definite integrals. Reduction formulae. Evaluation of $\int Sin^n x\, dx$, $\int Cos^n x\, dx$, $\int Sin^m x \cdot Cos^n x\, dx$.(m,n positive integers)

(iv) Applications of integration to finding area under a curve and axes, volume of solid of revolution of area about axes (simple problems). Mean value and R.M.S. value of a function.

(v) Numerical integrations. Approximate evaluation of definite integral by Trapezoidal rule and by Simpson's rule (without proof).

4. PARTIAL DIFFERENTIATION. (10%)

(i) First order and second order partial derivatives of functions of two variables.
(ii) Euler's theorem on partial differentiation of homogeneous functions. Total differentiation.

5. SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS. (10%)

(i) Order and degree of a differential equation. Solving first order first degree differential equation – variable separable form, Homogeneous form and linear differential equation.
(ii) Solving second order differential equation – complementary function, particular integral with functions of the form e^x, Sin ax , Cos ax , x^n, on the right hand side of the equation.
(iii) Applications to L-C-R electric circuits.

ES-221   ENGINEERING DRAWING – II   L T P
                                          - - 8

RATIONALE

Having got knowledge of orthographic projection, student should be able to understand the importance of Standards. In this course, students are expected to make the drawing fully using the standards as detailed in the Indian Standards. Where as the items chosen for drawing has relevance to all engineers, they should be treated as examples. The student should be able to see object, make a sketch in the sketch book, measure the dimensions and mark them on the sketch and later make detailed and assembly drawing using the information in the sketch book. The Engineering Drawing II which is common to all branches and also the subsequent drawing course must aim at building this ability in the student. The extensive use of actual components is therefore essential.

DETAILED CONTENTS

1. Lecture on Indian Standards. Sketchbook detailing standards.   (5%)
2. Lecture on standard methods of dimensioning.   (5%)
3. Different types of screw threads representation. Sheet #1 Scale drawing of 3 typical solids 3 orthographic views each- with dimensions.   (15%)
4. Lecture on different types of Nuts, meaning of terms – Stud, Bolt and functions of washer Sheet #2.   (10%)
5. Lecture on Locking Devices. Sheet #3 Lock Nut, Castle Nuts, Pin Nut, Sawn Nut, Spring washer, Locking Plates.   (10%)
6. Lecture on Keys, cotters, Cotter Joint, Knuckle Joint Sheet #4, 5, Keys, Cotter Joint, and Knuckle Joint.   (10%)
7. Lecture on Shaft Couplings Sheet # 6, 7, 8 Split Muff Coupling, Protected Flange Coupling, Flexible Coupling.   (10%)
8. Lecture on Riveted Joints, Caulking and fullering of riveted joints. Sheet #9, 10 Rivet Heads, Lap, but joint (double strap) Zigzag, chain.   (10%)
9. Lecture on Welding – Symbols and conventions. Sheet #11 typical sample of welding symbol representation.   (10%)
10. Lecture on pipe joints, Flange and expansion joints. Sheet #12, 13 Flanged Joint Expansion Joint.   (15%)

ELEMENTS OF MECHANICAL ENGINEERING

ME-131

L	T	P
3	-	2

RATIONALE

The purpose of this course is to impart elementary knowledge about transmission of power, boilers, turbines, IC engines, compressors and material handling techniques which students will come across in their professional life. This will help them in understanding their working principles and usages.

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

DETAILED CONTENTS

1. **Transmission of Power:** (25%)
   Uses of belt and ropes, pulleys, different types of pulleys, chain drive, its comparison with belt drive, gear drive, types of gears, simple gear trains and velocity ratio. Description of single plate disc clutch.

2. **Steam Boilers:** (20%)
   Cocharn boiler, lanchashire boiler, Babcock and Wilcox boiler, their mountings and accessories.

3. **Turbines** (20%)
   Classifiction and application of turbines. Elementary study of different types of turbines-construction and working of D'level and Parson's turbine, pelton wheel, Francis and Kaplan turbine.

4. **IC Engines and Compressors:** (25%)
   Classification and application of IC engines commonly used, spark ignition and compression ignition engines, working principles of two stroke and four stroke Petrol and Diesel engines. Ignition system in Petrol engines, Simple carburatter and cooling system of IC engine, Construction and working of a simple reciprocating compressors.

5. **Material Handling:** (10%)
   Brief description with special reference to usage of bulldozer, shovel, road roller, concrete mixer, crane, traveling gantry crane, screw Jack, hydraulic Jack.

LIST OF PRACTICAL

1. Study of various devices for transmission of power, models of belts, pulleys, gears and chains.
2. Study of baby vertical boiler with the help of model.
3. Study of Lancashire boiler with the help of model.
4. Study of Babcock and Wilcox boiler with the help of model.
5. Study of simple steam turbine with the help of model.
6. Study of four-stroke petrol and diesel engines with the help of model.

ME-230   **WORKSHOP PRACTICE-II**

Pds/week	L	T	P
-	-	8

RATIONALE

This course aims at developing generic manual and machining skills in the students. Besides above the development of dignity of labour, precision, safety at work places, team working and development of right attitudes are other objectives.

DETAILED CONTENTS

1. **Fitting Shop**

    i.   Description of work bench, work holding devices, care and maintenance of various tools used in fitting

    ii.   Fitting practice, checking by straight edge and try square

    iii. Specification of files, precautions while filing

    iv.   Introduction to various types of drilling machines (Portable, pillar type, bench type. radical drilling machine etc)

    Simple exercises including the use of above machines

2   **Forging Shop**

    i.   Introduction and demonstration of tools, equipment and operations used in smithy and forging

    ii.   Upsetting operation, production of a blank for a bolt from round bar

    iii. Exercise on drawing down operation

    iv.   Exercise involving use of power hammer

    v.   Exercise in the making of DE Spanner/Hook

3   **Sheet Metal Shop**

    Description of tools and operations involved in sheet metal fabrication such as shearin bending, joining (locked groves joint, riveting, soldering Brazing) Exercise like tray, Mu Funnel etc

Note: -Making a record of exercise / job completed by the student is a part of the work for intern evaluation.

Practicals

(1).   **Preparation of documents through word processing.**
       Idea of text editors like Microsoft word
i.   Opening a document
ii.   Creating shortcut
iii.   Preparing documents in circuit diagram & tables

Editory document

       Character, used & line editing.
       Margin setting paragraph alignment
       Block operations
       Spell checker
       Saving & printing a document
Information presentation for decision making using spread sheet (Excel/Lotus 1-.2-.3)

       Applications of spreadsheet. Structure of spreadsheet.
       Preparing of spread sheet for simple data & numeric operations
i.   Using formulae in spread sheet operations
ii.   Making tables, sorting & querying
iii.   Creation of graphs, pie-charts, bar charts
iv.   Printing reports
v.   Power point Applications

(2).   **Computer Aided Drafting (2-D Drawings)**
i.   Introduction & application of auto CAD
ii.   Geometrical features
iii.   Editing
iv.   Layering
v.   Dimensioning
vi.   Rendering
vii.   Plotting

(3).   **Web technologies/Introduction to Internet.**
i.   What is Internet? WWW. search engines/Google.
ii.   About Internet addresses (Basic)
iii.   Equipment required for Internet.
iv.   For basics of audio & video conferencing.

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*ES-122   INTRODUCTION TO COMPUTERS

L	T	P
1	-	4

RATIONALE

Computers have made great inroads into engineering design, personnel administration, project planning and monitoring, banking, transportation, automatic machine operation and many other areas of human endeavor. During the past decade, the use of computers has been growing at fast rate. The time has now come when engineering technician has to familiarize themselves with computers to enable them to cope with the inevitable computerization of a significant portion of their job. Hence this subject. This is a practical course. Theory, if any, may be dealt in the practical session only.

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

DETAILED CONTENTS

(1)   **Evolution of computing machines**
i.   Computer Generations
ii.   Block diagram of a computer & over view of its working.
iii.   Era of personal computing
iv.   Digital computers, micro-computers
v.   Input/output devices - interconnections of various peripherals with Computer
vi.   Auxiliary storage device.
vii.   Classification of programming languages
viii.   Evolution of programming paradigm
ix.   Fourth general languages (4GL)
x.   Application Vs system program
xi.   File organization, file types
xii.   Classification of computers-SIMD, MISD, SISD, MIMD.
xiii.   Basics of printing, scanning devices used in industries.

(2).   **Familiarization with operating system. - Introduction to operating system as Dos, Windows 95/98/2000/NT/XP and   WNIX along with these comparisons.**

i.   Introduction to DOS structure, system files, batch files & configuration files.
ii.   Booting the system from floppy & hard disk.
iii.   Brief introduction to DOS internal & external commands.
iv.   Familiarization with windows, structures its use & application
v.   Introduction to client- server technology (basic)

(3)   **Data Structures.**
i.   Stacks.
ii.   Single link list, Double link list.
iii.   Array.
iv.   Tree Structures.