

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

SYLLABUS

L-SCHEME

(Implements from the Academic year 2011-2012 onwards)

Course Name	:	All branches of Diploma in Engineering and Technology and Special Programmes except DMOP, HMCT and Film & TV
Course Code	:	
Semester	:	II Semester
Subject Title	:	Basic Engineering
Subject Code:		2002

Teaching and Scheme of Examination:**No of weeks per semester: 16 weeks**

Subject	Instructions		Examination			Duration
	Hours/Week	Hours/Semester	Marks			
			Internal Assessment	Board Examination	Total	
Basic Engineering	3 Hrs	48 Hrs	25	75	100	3 Hrs

Topics and Allocation of Hours:

Sl.No.	Topic	Time(Hrs)
1.	SIMPLE MACHINES, FRICTION AND MECHANICS OF FLUIDS	10
2.	THERMODYNAMICS AND ELECTRICITY	10
3.	OPTICAL INSTRUMENTS, ELECTROMAGNETIC WAVE PROPAGATION AND DIGITAL COMMUNICATION	10
4.	INTRODUCTION TO COMPUTERS	9
5.	COMPUTER COMMUNICATION	9
Total		48

RATIONALE:

With the advent of Industrial and Communication Revolutions, the various branches of Engineering are also advancing rapidly in developing a variety of modern gadgets. The growth of them depends on the synergy effect of multi disciplines of Engineering.

This subject is introduced in the Second Semester of Diploma in engineering with the intention of providing a reasonable foundation related to the different branches of engineering like Mechanical, Civil, Electrical, Electronics and Communication and Computer Engineering.

OBJECTIVES:

At the end of the study of this Subject in II Semester the student will be able to

- Gain knowledge about some important simple machines and methods of transfer of power.
- Identify the good and bad effects of friction, which is a necessary evil.
- Analyse the fluid pressure and practical applications of Pascal's Law and Bernoulli's theorem.
- Acquire knowledge about the working of petrol and diesel engines.
- Identify the relative advantages of the three methods of inducing E.m.f.
- Understand the practical ways of distributing the three phase A.C.
- Understand the working of spectrometer and sextant.
- Analyse the principles of digital communication through wire and fibre cable.
- Know the basic concepts of computer hardware.
- Understand the different types of softwares.
- Work with windows software.
- Understand the Basic concepts of Computer communication through network.

SEMESTER-II**2002 BASIC ENGINEERING****Contents: Theory**

Unit	Name of the Topic	Hours	Marks
I	SIMPLE MACHINES, FRICTION AND MECHANICS OF FLUIDS		
	1.1 SIMPLE MACHINES	3 Hrs	15
	Simple machines, Load and Effort – Definition – Mechanical Advantage, Velocity Ratio and Efficiency of a simple machine – Definitions – Relation between Mechanical Advantage, Velocity Ratio and Efficiency of a simple machine – Inclined plane – Expression for mechanical advantage of the inclined plane when the effort is acting parallel to the plane – Weston Differential pulley – Expression for its mechanical advantage – power transfer by Gear wheel and Belt drive.		
	Simple problems based on relation between M.A, V.R and Efficiency of a Simple Machine and expression for M.A of Inclined Plane.	3 Hrs	
	1.2 FRICTION		
Friction – Force of friction – Limiting Friction – Laws of Static friction – Coefficient of Friction – Angle of friction – Cone of friction – Experimental determination of coefficient of friction – Dynamic friction – Friction is a necessity and also an evil – Methods of reducing friction.	4 Hrs		
	1.3 MECHANICS OF FLUIDS		
Thrust and pressure – Definitions and Units – Expression for the pressure at a point inside a fluid at rest – Expression for the thrust acting on a rectangular lamina immersed vertically with one side parallel to the free surface of the liquid – Pascal's law – Applications of Pascal's law – Hydraulic lift and hydraulic brakes – Pascal's Law and effect of gravity – Bernoulli's Principle and theorem – Application – Lift on an aeroplane wing.			
Simple problems based on Expressions for pressure and thrust			

	acting on a lamina.		
II	<p>THERMODYNAMICS AND ELECTRICITY</p> <p>2.1 THERMODYNAMICS</p> <p>Heat Engine – Reversible and irreversible processes – Concept of Carnot Engine with indicator diagram – Working of Otto engine with indicator diagram – Working of diesel engine with indicator diagram – Concept of single and multi cylinder engines.</p> <p>2.2 ELECTRO MAGNETIC INDUCTION</p> <p>Methods of inducing e.m.f - (i) By changing magnetic induction – (ii) By changing the area enclosed by the coil and (iii) By changing the orientation of the coil.</p> <p>2.3 ALTERNATING CURRENT</p> <p>A.C. Generator – Single phase and three phase – Distribution of three phase A.C. – Star and delta connections – Salient features of star and delta connections.</p>	<p>4 Hrs</p> <p>3 Hrs</p> <p>3 Hrs</p>	15

III	<p>OPTICAL INSTRUMENTS, ELECTROMAGNETIC WAVE PROPAGATION AND DIGITAL COMMUNICATION</p> <p>3.1.OPTICAL INSTRUMENTS</p> <p>Spectrometer – Description with parts – Sextant – Principle - Description – Method of determining the angle of elevation and height of tall structures.</p> <p>3.2 ELECTROMAGNETIC WAVE PROPAGATION</p> <p>Electromagnetic waves – Characteristics of Electromagnetic waves – Transverse nature of Electro magnetic waves (no analytical treatment) – Propagation of Electromagnetic (radio) waves in atmosphere – Modes of propagation – Ground (Surface) Wave propagation – Space Wave Propagation – Reflection of Electromagnetic waves by ionosphere – Skip distance and Skip Zone.</p> <p>3.3 DIGITAL COMMUNICATION</p> <p>Data Transmission and Reception - Analog Communication and Digital Communication – Advantages and Disadvantages – Principles of Modem and Fax – Data transfer through wire, cable and OFC – Satellite Communication – Merits and Demerits.</p>	<p>2 Hrs</p> <p>4 Hrs</p> <p>4 Hrs</p>	<p>15</p>
IV	<p>INTRODUCTION TO COMPUTERS</p> <p>4.1 COMPUTER HARDWARE</p> <p>Block diagram of a Digital Computer – Central Processing Unit - Computer Memory – Main Memory, Secondary memory – Input devices – Output Devices.</p> <p>4.2 COMPUTER SOFTWARE</p> <p>System software, Application software – Computer languages – Machine language, Assembly language, High level language – Operating Systems – Windows, Linux (features only) – Number Systems – Binary, Octal, decimal, Hexadecimal – Conversion.</p>	<p>4 Hrs</p> <p>5 Hrs</p>	<p>15</p>

V	<p>BASIC COMPUTER OPERATION</p> <p>5.1 DESKTOP OPERATING SYSTEM Introduction to Windows XP – Desktop – Part of a Window – Starting an Application – Shutting down windows – Windows Explorer – Files – Creating a New Folder – Selecting files and folders – Copying files and folders – Moving files and folders – Renaming file or Folder – Deleting Files and folders – Finding files and folders</p> <p>5.2 COMPUTER NETWORKING Types of Computer Network - LAN, WAN, MAN - Internet Access – E-mail Creation – Sending and Receiving e-mails</p> <p>5.3 BASICS OF OFFICE AUTOMATION Introduction to MS-Word – File Creation – Saving, Opening, Formatting a file – table creation – Mail merge.</p>	<p>3 Hrs</p> <p>3 Hrs</p> <p>3 Hrs</p>	15
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Text Book : 1) Physics – Higher secondary – First year – Volume I & II – Second Year – Volume I & II - Tamil Nadu text book Corporation.

2) Computer Science – Higher Secondary – First Year – Volume – I & II – TamilNadu text book Corporation.

Reference Book : 1) Physics – Resnick and Haliday – Wisley Toppan publishers – England

2) Mechanics – Narayana Kurup – S. Chand Publishers.

3) Fundamental of Electricity – D.N.Vasudeva - S. Chand & Co.

4) Intermediate physics – Volume I & II – Anwar Kamal – Foundation books private Ltd.

5) MS-Office - Ralph Soucie – Tata Mc Graw Hill

II SEMESTER

2002 BASIC ENGINEERING
MODEL QUESTION PAPER

Time : 3 Hrs

Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions.

1. Define efficiency of a simple machine.
2. Define coefficient of friction.
3. Mention the methods of reducing friction.
4. Mention the applications of Pascal's Law.
5. What is a Heat engine?
6. What are the three methods of producing induced e.m.f. ?
7. What are the essential parts of an A.C. Generator?
8. Why the three phase alternators are widely preferred?
9. What are the important parts of Spectrometer?
10. Write any two characteristics of electromagnetic waves?
11. Mention the different ways of radio wave propagation.
12. Write any two advantages of Digital communication.
13. Define Computer.
14. Distinguish between System software and Application software.
15. What is the function of an Operating System?
16. Convert the Decimal number $(87)_{10}$ to Binary.
17. How will you create a folder?
18. Expand WAN.
19. Mention two popular browsers available in the internet.
20. What is the use of Mail merge?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing any two sub divisions from each question.

ii) All sub divisions carry equal marks.

- I** a) Derive an expression for Mechanical advantage of an Inclined plane when the power is acting parallel to the plane.
- b) Describe an experiment to determine the coefficient of friction.
- c) In a Dam, the top edge of a shutter is placed at a depth of 20m from the surface of water. Find the thrust acting on the shutter, if the height of the shutter is 3m and its width is 1.5m.
- II** a) Explain the working of a four stroke petrol engine with the help of an Indicator Diagram.
- b) Derive an expression for the E.m.f induced by changing the orientation of the coil inside the uniform magnetic field of induction B.
- c) Explain the salient features of star and delta connections in three phase A.C. distribution.
- III** a) Describe a Sextant and Explain how it is used to measure the height of a tall structure.
- b) Explain ground (Surface) wave propagation and space wave propagation.
- c) Explain the process of Satellite communication.
- IV** a) Draw the Block diagram of a Digital computer and explain its parts.
- b) Explain the different types of Computer Languages.
- c) Convert the following numbers as directed.
- i) $(1111)_{10} = (?)_8$
- ii) $(78)_{16} = (?)_2$
- iii) $(1111.101)_2 = (?)_{10}$
- V** a) Write the procedure for the following operations i) Moving files and folders ii) Copying files and folders iii) Renaming files and Folders
- b) Write a procedure to send and receive the e-mail
- c) How will you create a table in MS-Word?

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