

# Bangladesh Polytechnic Institute

Technology: **Electrical**

Semester: 4<sup>th</sup>

Sub. Name: Elec. Installation, Planning & Estimating (6742)

T P C: 3 3 4

## Course Outline

Teacher Name: Syeda Tanzila Zaman

Mob.No: 01740 91 87 24

Class No.	Discussion and Explanation of Topics/ Titles	Remarks
Class-1,2	<ul style="list-style-type: none"> <li>❖ <b>HOUSE WIRING</b></li> <li>❖ <b>Understand the types of electrical wiring.</b> <ul style="list-style-type: none"> <li>➤ List of residential wiring.</li> <li>➤ Describe the high rising residential building.</li> <li>➤ Describe the high rising commercial building.</li> <li>➤ Explain the indoor and outdoor wiring.</li> <li>➤ Distinguish between indoor and outdoor wiring.</li> <li>➤ Draw the wiring layout of a residential building.</li> <li>➤ Draw the wiring layout of a commercial residential building.</li> <li>➤ Describe the electrical building symbol.</li> </ul> </li> </ul>	
Class-3,4,5	<ul style="list-style-type: none"> <li>❖ <b>Understand the constructional details and working principles of different types of electric lamps.</b></li> <li>➤ Explain the different types of lamps.</li> <li>➤ Explain the working principle of tungsten filament lamp .</li> <li>➤ Explain constructional details of tungsten filament lamp.</li> <li>➤ Show diagrammatically the circuit of a fluorescent lamp and its auxiliary components.</li> <li>➤ Describe the working principle of a fluorescent lamp stating the function of the choke coil and starter.</li> <li>➤ Discuss advantages and disadvantages of fluorescent lamp.</li> <li>➤ Describe the detail circuit diagram of a electronically controlled fluorescent lamp.</li> <li>➤ Discuss the advantages of electronically controlled fluorescent lamp.</li> <li>➤ Explain the working principle of sodium vapour and mercury vapour lamps.</li> <li>➤ Explain constructional details of Sodium Vapour &amp; Mercury Vapour lamp.</li> <li>➤ Show diagrammatically with the auxiliary components the circuit diagram of sodium vapour and mercury vapour lamps.</li> <li>➤ List the uses of sodium vapour and mercury vapour lamps.</li> <li>➤ Describe constructional details of a compact fluorescent lamp.</li> <li>➤ Explain working principle of a compact fluorescent lamp.</li> </ul>	

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Class- 6,7,8	<ul style="list-style-type: none"> <li>❖ <b>Understand the construction and uses of controlling and protective devices.</b> <ul style="list-style-type: none"> <li>➤ State the meaning of controlling and protective devices.</li> <li>➤ Describe the constructional features and uses of tumbler switch, iron clad switch, push button switch, gang operated switch etc.</li> <li>➤ Explain the meaning and uses of SPST, SPDT, DPST, DPDT, TPST switch.</li> <li>➤ List different types of fuses used in electrical wiring.</li> <li>➤ Describe the construction and uses of renewable fuses.</li> <li>➤ Describe the construction and uses of MCB and its advantages.</li> <li>➤ Give reasons for the uses of a lightning arrester</li> <li>➤ Give reasons for the uses of a droop out fuse in distribution system.</li> </ul> </li> </ul>	
Class-9,10	<ul style="list-style-type: none"> <li>❖ <b>Understand the concepts of earthing.</b> <ul style="list-style-type: none"> <li>➤ List at least three elements required for earthing.</li> <li>➤ Discuss the factors to be considered in performing earthing.</li> <li>➤ Explain and sketch pipe, plate, sheet and rod earthing.</li> <li>➤ Describe the principle and operation of earth testes.</li> <li>➤ Describe the measure of earth resistance.</li> <li>➤ Explain the earth resistance range in different installation.</li> </ul> </li> </ul>	
Class-11,12	<ul style="list-style-type: none"> <li>❖ <b>Understand the phenomenon of dynamically induced emf.</b> <ul style="list-style-type: none"> <li>➤ Explain dynamically induced emf.</li> <li>➤ Deduce the formula of dynamically induced emf.</li> <li>➤ Solve problems related to dynamically induced emf.</li> </ul> </li> <li>❖ <b>Understand the phenomenon of statically induced emf.</b> <ul style="list-style-type: none"> <li>➤ Explain self induced emf.</li> <li>➤ Define Coefficient of self-induction by First, Second and Third method for selfinductance</li> </ul> </li> </ul> <p>(L).</p> <ul style="list-style-type: none"> <li>➤ Apply the formula obtained by First, Second and Third Method to find L of iron core.</li> <li>➤ Explain Mutual Inductance (M).</li> <li>➤ Define coefficient of self-induction by First, Second and Third Method for (M).</li> <li>➤ Apply the formula obtained by First, Second and Third method to find out Mutual Inductance (M).</li> </ul>	
Class-13	 <b>Feedback</b>	
Class-14	 <b>Feedback</b>	
Class-15	<ul style="list-style-type: none"> <li>❖ <b>Understand the concept of co-efficient of coupling.</b> <ul style="list-style-type: none"> <li>➤ Explain co-efficient of coupling.</li> <li>➤ Deduce the expression for co-efficient of coupling.</li> <li>➤ Solve problems on mutual inductance and co-efficient of coupling..</li> </ul> </li> </ul>	
Class-16	<ul style="list-style-type: none"> <li>❖ <b>Understand how Inductance are connected in series.</b> <ul style="list-style-type: none"> <li>➤ Define the expression for inductance in series.</li> <li>➤ Derive the expression for inductance in series.</li> <li>➤ Solve problems on inductance in series.</li> </ul> </li> </ul>	
Class-17,18	<ul style="list-style-type: none"> <li>❖ <b>Understand the principle of magnetization of magnetic materials.</b></li> </ul>	

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	<ul style="list-style-type: none"> <li>➤ Explain magnetization properties of materials.</li> <li>➤ Prepare a list of magnetic materials.</li> <li>➤ Describe the properties of iron, steel and other magnetic materials.</li> <li>➤ List the uses of magnetic materials.</li> <li>❖ <b>Understand cycles of magnetization.</b></li> <li>➤ Explain cycle of magnetization.</li> <li>➤ Draw magnetization (B-H) curve.</li> <li>➤ Mention applications of B-H curve.</li> </ul>	
Class-19	 <b><u>Feedback</u></b>	
Class-20	 <b><u>Class test-1</u></b>	
Class-21	<ul style="list-style-type: none"> <li>❖ <b>Understand the concept of hysteresis loss.</b></li> <li>➤ Define magnetic hysteresis.</li> <li>➤ Explain hysteresis loss.</li> <li>➤ Explain hysteresis loop.</li> <li>➤ Determine area of hysteresis loop.</li> <li>➤ Deduce the expression for energy loss in one cycle of magnetization per cubic meter.</li> <li>➤ State the uses of hysteresis loss curves.</li> </ul>	
Class-22,23	<ul style="list-style-type: none"> <li>❖ <b>Understand the concepts of Steinmetz's hysteresis law.</b></li> <li>➤ State Steinmetz's hysteresis law.</li> <li>➤ Explain Steinmetz's hysteresis law.</li> <li>➤ Derive the formula for hysteresis loss on the basis of the Steinmetz's law.</li> <li>➤ Solve problems on hysteresis loss related to Steinmetz's law.</li> <li>❖ <b>Understand the concept of eddy current loss and their minimization.</b></li> <li>➤ Define eddy current loss.</li> <li>➤ Discuss the methods for minimization of eddy current loss.</li> <li>➤ Describe the expression for eddy current loss.</li> </ul> <p style="text-align: center;">13.4 Solve problems related to eddy current loss</p>	
Class-24	<ul style="list-style-type: none"> <li>❖ <b>Understand the concept of energy stored in a magnetic field.</b></li> <li>➤ Explain the principle of energy stored in a magnetic field.</li> <li>➤ Derive the expression for energy stored in a magnetic field.</li> <li>➤ Solve problems related to energy stored in a magnetic circuit.</li> <li>➤ Explain the lifting power of electromagnet.</li> <li>➤ Mention the application of lifting power of electromagnet.</li> </ul>	
Class-25,26	<ul style="list-style-type: none"> <li>❖ <b>Differentiate the conducting non-conducting materials.</b></li> <li>➤ Define conducting, non-conducting and semi-conducting materials.</li> <li>➤ Distinguish between non-conducting and semi-conducting materials.</li> <li>➤ List at least three items from each group of materials.</li> <li>➤ Define resistivity of materials.</li> <li>➤ Define temperature coefficient and melting point.</li> <li>➤ Define malleability, conductivity and tensile-stress.</li> <li>➤ List the factors affecting resistivity of metal.</li> <li>➤ Describe the mechanical properties and resistivity of hard and annealed copper,</li> </ul>	

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	<p>aluminium, low and high tensile steel.</p> <ul style="list-style-type: none"> <li>➤ Define contact materials.</li> <li>➤ Describe the physical and electrical properties of silver, tungsten, carbon and copper.</li> <li>➤ Explain the use of copper and graphite as materials for brushes.</li> <li>➤ Compare the advantages of using copper and graphite as brush material</li> </ul>	
Class-27,28	<ul style="list-style-type: none"> <li>❖ <b>Know high resistive materials.</b></li> <li>➤ Define the term high resistivity.</li> <li>➤ State general properties of nichrome, eureka, manganin and German silver.</li> <li>➤ State composition of nichrome, eureka, manganin and German silver.</li> <li>➤ List uses of high resistive materials.</li> <li>➤ Define fuse, metal and alloys.</li> <li>➤ List the name of metal and alloys to be used fuse material.</li> <li>➤ Compare the advantage of using metals and alloys as fuse materials.</li> </ul>	
Class-29,30	<ul style="list-style-type: none"> <li>❖ <b>Understand the concepts of magnetic-materials.</b></li> <li>➤ Define magnetic materials, soft magnetic material and hard magnetic materials</li> <li>➤ Classify the magnetic materials as diamagnetic, paramagnetic and ferromagnetic types.</li> <li>➤ Name the types of soft and hard magnetic materials.</li> <li>➤ Describe the characteristic features of soft magnetic materials.</li> <li>➤ Describe composition and properties of hard magnetic materials.</li> <li>➤ List the uses of hard and soft magnetic materials</li> </ul>	
Class-31	 <b>Feedback</b>	
Class-32	 <b>Class test-2</b>	
Class-33,34,35	<ul style="list-style-type: none"> <li>❖ <b>Understand the concepts of insulating materials.</b></li> <li>➤ Describe insulating materials.</li> <li>➤ State the importance of insulating materials.</li> <li>➤ State the basis of classifying insulating materials.</li> <li>➤ Interpret the classification of insulating material on the basis temperature.</li> <li>➤ State the criteria for selection of proper insulating materials.</li> <li>➤ List the properties of an ideal insulating material.</li> <li>➤ State electrical properties of insulating materials.</li> <li>➤ Name the normal range for the resistivity of a low grade, medium grade and high grade insulating materials.</li> <li>➤ State the effect of temperature on the insulating material.</li> <li>➤ Write down the factors for the electric breakdown strength of insulating material.</li> <li>➤ State the temperature limit for class “C” and class “F” insulating materials.</li> <li>➤ Name an insulating material which an withstand temperature higher than 180o C.</li> <li>➤ State the effect of moisture on the insulating material.</li> <li>➤ Define Loss angle with respect to an insulating material.</li> </ul>	
Class-36,37,38	<ul style="list-style-type: none"> <li>❖ <b>Understand the characteristics of solid insulating materials.</b></li> <li>➤ List the solid insulating materials.</li> <li>➤ List the Fibrous type of insulating materials.</li> </ul>	

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	<ul style="list-style-type: none"> <li>➤ State the properties and application of cotton, varnish, cloth insulating materials.</li> <li>➤ compare the properties and application of cotton, varnish, cloth and silk insulating materials.</li> <li>➤ State the properties of impregnated paper insulation.</li> <li>➤ List the application of impregnated paper insulating materials.</li> <li>➤ State the properties of glass and asbestos insulation.</li> <li>➤ List the application of glass and asbestos insulation.</li> <li>➤ Write down the properties and applications of ceramic/procelain insulating materials.</li> <li>➤ List two types of Mica insulating materials.</li> <li>➤ State the properties and applications of Mica of liquid insulating materials.</li> </ul>	
	<p>❖ <b><u>Model Test Exam</u></b></p>	
<p>Class-39,40,41,44</p>	<p>❖ <b>Understand the characteristics of solid insulating materials.</b></p> <ul style="list-style-type: none"> <li>➤ List the solid insulating materials.</li> <li>➤ List the Fibrous type of insulating materials.</li> <li>➤ State the properties and application of cotton, varnish, cloth insulating materials.</li> <li>➤ compare the properties and application of cotton, varnish, cloth and silk insulating materials.</li> <li>➤ State the properties of impregnated paper insulation.</li> <li>➤ List the application of impregnated paper insulating materials.</li> <li>➤ State the properties of glass and asbestos insulation.</li> <li>➤ List the application of glass and asbestos insulation.</li> <li>➤ Write down the properties and applications of ceramic/procelain insulating materials.</li> <li>➤ List two types of Mica insulating materials.</li> <li>➤ State the properties and applications of Mica.</li> <li>➤ Write down the properties of Poly ISO Butyle (PIB) insulating materials.</li> <li>➤ State the properties of cross Link Poly Ethylene (XLPE) insulating materials.</li> <li>➤ List the applications of Poly ISO Butyle and cross Link Poly Ethylene insulating materials.</li> <li>➤ State the reasons for giving due importance to the mechanical properties of insulating materials board.</li> </ul>	
<p>Class-45,46</p>	<p>❖ <b>Understand the characteristics of Liquid Insulating Materials.</b></p> <ul style="list-style-type: none"> <li>➤ State the properties of insulating oil.</li> <li>➤ State the physical properties of liquid insulating material.</li> <li>➤ Write down the electrical properties of liquid insulating material.</li> <li>➤ State thermal properties of liquid insulating material.</li> <li>➤ Write down the causes of failure of insulation in oil.</li> <li>➤ Explain the testing of di-electric strength of liquid insulating materials.</li> <li>➤ Compare the advantage and disadvantage of liquid insulating</li> </ul>	

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	materials.	
Class-47	<b><u>Class test-3</u></b>	
Class-48	<b><u>Feedback</u></b>	

### **REFERENCE BOOKS**

1 Planning, Estimating of Electrical Installation

– J. B. Gupta

2 A text book of Electrical Technology

– B. L. Theraja

3 Intro ducting to

Electrical Engineering V.K. Metha.