Daffodil Polytechnic Institute, Institute Code: 50238

Lesson Plan Academic session: JAN 2024 to JUN 2024

Marks	Grade Point	Letter Grade	*Marks*	Grade Point	Letter Grade
80>	4.00	A+	55-59	2.75	B-
75-79	3.75	A	50-54	2.50	C+
70-74	3.50	A-	45-49	2.25	C
65-69	3.25	B+	40-44	2.00	D
60-64	3.00	B	0-39	0.00	F

Mark Distribution (for 150 Marks)			
Theory Marks		**Practical Marks**	
Midterm	20	PC	25
Class test	10	PF	25
Quiz test	10	-	-
Final	60	-	-
Total	**100**	**Total**	**150**

Class Timing Distribution	
Particulars	Time
Greeting with students	10 Minutes
Previous Class Review	10 Minutes
Present Class Topic Discussion and Lecture Delivery	60 Minutes
Present Class Topics Review	10 Minutes

Subject Teacher : Rubel Hossen

Instructor, Electrical Technology.

Subject Name : Testing & Maintenance of Electrical Equipment
Subject Code : 26753
Technology : Electrical
Semester : 5th
BTEB Text Book Name : (Publisher: HAQUE PUBLICATION)
Google Class Code :

Aims

To provide the students opportunities to acquire knowledge, skills and attitude in the area of Testing and Maintenance of electrical equipment with the special emphasizes on:

Rationale:

Diploma in engineering level students is required to acquire the knowledge and skills on the area of Testing and Maintenance of Electrical Equipment. It is one of the most important subject in respect to provide the students opportunities to acquire knowledge, skill and attitude in the area of testing and maintenance of electrical equipment with the special emphasizes on: Trouble shooting and Maintenance of electrical equipment, Faults findings and remedy the faults of Battery, DC Generators, DC motors, Faults findings and remedy the troubles of Transformers, Induction motors, Auto Star-Delta starter, Forward-Reverse (3 -Phase) motor starter, Magnetic contact, Over Load Relay (OLR), Test trip , 3 -Phase motor reverse rotation, Phase Sequence change, Alternator Faults findings and remedy the troubles of Synchronous motor and Circuit breaker, Power factor improvement unit (PFI), Solar system maintenance.

Learning Outcome (Theory)

After Completing the subject, students will be able to:

1. Find the troubles of battery, DC generators and DC motor.
2. Describe the faults of single phase and three phase Transformer.
3. Outline the provable faults of single-phase induction motor.
4. Explain the faults of three phase induction motor
5. Explain the troubles of Alternator and Synchronous motors.

6. State the faults of Circuit breaker.
7. Illustrate the faults of Auto Star-Delta starter.
8. Explain the troubles of Overload Relay (OLR).
9. Discuss the troubles of power factor improvement unit (PFI).
10. State the faults of solar system.

Learning Outcome (Practical)

After undergoing the subject, students will be able to:

1. Perform the different test of storage Battery.
2. Detect the causes of voltage build up failure of DC generator and failure of running of DC motor.
3. Perform routine test of Single phase and three phase distribution Transformer.
4. Recognize the faults of Single phase and three phase Induction motors.
5. Detect the faults of Auto Star-Delta Starter and Overload relay.
6. Detect the common faults of Alternator.
7. Detect the troubles of Synchronous motor.
8. Identify common faults of High Voltage circuit Breaker.
9. Perform the testing of power factor improvement unit (PFI)
10. Detect the faults of solar system.

Date	Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
	1.	*BATTERY, DC GENERATOR AND DC MOTOR MAINTENANCE*	1.1Mention the troubles of storage Battery. 1.2. Explain the troubles of storage Battery. 1.3. Describe the process of repair and maintenance of storage Battery	After the Class, Students will be able to know • *BATTERY, DC GENERATOR*	Basic Class Materials & Projector, battery , dc generator YouTube Link: https://youtu.be/xgZNqDwys9s?si=ozLtm1jKuMyBkOGj

Date	Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
	2.	*BATTERY, DC GENERATOR AND DC MOTOR MAINTENANCE*	1.4. List the faults of DC Generator and DC Motor. 1.5. Explain the faults of DC Generator and DC Motor. 1.6. Describe the repair and maintenance process of DC	After the Class, ✓ Identify the Faults of DC Generator and Dc Motor Describe the process of repair and maintenance of DC Generator and Dc Motor	Basic Class Materials & Projector, dc motor YouTube Link https://youtu.be/_46p7_gAdJ4?si=xRQz28jTVyphRfmH
	3.	*SINGLE AND THREE PHASE TRANSFORMER MAINTENANCE*	2.1 List the faults of single-phase Transformer. 2.2 Explain the faults of single-phase Transformer. 2.3Describe the repair and maintenance procedure of single-phase Transformer.	After the Class, ✓ Identify the Faults of transformer Describe the process of repair and maintenance single phase transformer	Basic Class Materials & Projector, DC Generator and Dc Motor YouTube Link: https://youtu.be/TnxKqPkGwMM?si=4SZf8vMtUAqlpe54
	4.	*SINGLE AND THREE PHASE TRANSFORMER MAINTENANCE*	2.4 Mention the faults of three phase Transformer. 2.5 Explain the faults of three phase Transformer. 2.6 Describe the repair and maintenance procedure of three phase Transformer.	After the Class, ✓ Identify the Faults of transformer Describe the process of repair and maintenance three phase transformer	Basic Class Materials & Projector, 3 phase transformer YouTube Link: https://youtu.be/t6UMx2_63OE?si=SOf5ia3qoRKFWc0R
	5.	Practical 01	OBSERVE THE OPERATION OF INDICATING, INTEGRATING, RECORDING AND DIGITAL INSTRUMENTS.	After the Class Student will be able to know 1. Choose one indicating, one integrating, one recording and one digital instrument.	Must be submitted within two classes

Date	Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
				Select the tools and materials required. 2. Connect each instrument to the supply system	
	6.	*SINGLE PHASE INDUCTION MOTOR MAINTENANCE*	3.1 List the faults of single-phase Induction Motor. 3.2 Explain the faults of single-phase Induction Motor. 3.3 Describe the repair and maintenance procedure of ceiling fan.	After the Class, ✓ Identify the Faults of single phase Induction Motor Describe the process of repair and maintenance single Induction Motor	Basic Class Materials & Projector, Single phase Induction Motor. Ceiling fan. YouTube Link: https://youtu.be/miT4ctRhgcE?si=haN4pAvgVp25a10m
	7.	*SINGLE PHASE INDUCTION MOTOR MAINTENANCE*	3.4 Mention the repair and maintenance process of single-phase water pump set. 3.5 List the function of centrifugal switch of single-phase motor. 3.6 Explain the reason for fail to lifting water of centrifugal pump	After the Class, ✓ Identify the Faults of single-phase water pump set. Describe the process of repair and maintenance single single-phase water pump set and water of centrifugal pump	Basic Class Materials & Projector, single-phase water pump set, centrifugal switch of single-phase motor, to lifting water of centrifugal pump. YouTube Link: https://youtu.be/D9DHu3BdZS4?si=THsa37nIHkALdH0S
	8.	**Review Class**	Review Class of **Chapter** 1,2,3 **(**Regarding students problem)	Through the review class, students can solve their problem	Basic Class Materials
	9.	**Quiz Test 1**	Examination Topic: **Chapter 1,2,03** Examination mark: 10 Passing Mark: 04	Through Quiz Test students will learn the intellectual intelligence on the topics discussed.	1) Basic Class Materials 2) Examination Kata
	10.	**Assignment -01**	**Chapter: 01,02,03**		Must be submitted within two classes

Date	Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
	11.	**Class Test 1**	Examination Topic: **Chapter 1,2,03** Examination mark: 10 Passing Mark: 04	Through class tests students will learn to evaluate themselves on their own	1) Basic Class Materials 2) Examination Kata
	12.	Practical 02	DISASSEMBLE AND REASSEMBLE OF AMMETER AND VOLTMETER	After the Class Student will be able to know Collect ammeters and voltmeters. Collect required numbers of tools to open ammeters and voltmeter. Disassemble the parts of the instrument. Identify the controlling and damping system. Identify the parts of the meter. Identify the types of meters. Reassemble the meters Maintain the record of the performed task.	Must be submitted within two classes
	13.	*HREE PHASE INDUCTION MOTOR MAINTENANCE*	4.1 List the faults of Three-phase Induction Motor. 4.2 Illustrate the faults of Three-phase Induction Motor. 4.3 Explain phase sequence, polarity change of coil and reverse rotation. 4.4 Describe the repair and maintenance process of Three-phase Induction Motor.	After the Class, ✓ the name the Faults of Three-phase process of repair and maintenance of single phase Induction Motor	Basic Class Materials & Projector, Induction Motor YouTube Link: https://youtu.be/7UzGZpgQZwQ?si=7hYISxo2e073-G6-

Date	Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
	14.	*THREE PHASE INDUCTION MOTOR MAINTENANCE*	4.5 List the name the Faults of single phase Induction Motor 4.6 Illustrate the faults of single phase Induction Motor 4.7 Describe the process of repair and maintenance of single phase Induction Motor	After the Class, They will be the name the process of repair and maintenance of single phase Induction Motor.	Basic Class Materials & Projector, Induction Motor YouTube Link: https://youtu.be/59HBoIXzX_c?si=P1ofwRKaJHz7-qxt
	15.	Practical 03	**STUDY THE WATTMETER**	After the Class Student will be able to know Select proper tools and wattmeter. Disassemble the different parts of the wattmeter. Identify the different parts of the wattmeter. Identify the type of wattmeter. Reassemble the wattmeter. Maintain the record of the performed task.	Must be submitted within two classes
	16.	**Assignment -02**	**Chapter: 04,05,06**		Must be submitted within two classes

Date	Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
	17.	*THREE PHASE INDUCTION MOTOR MAINTENANCE*	4.8 Mention the Faults of three phase Induction Motor 4.9 Explain the faults of three phase Induction Motor 4.10 Demonstrate the process of repair and maintenance three phase Induction Motor	After the Class, ✓ Students will be able to Mention the Faults of three phase Induction Motor	Basic Class Materials & Projector, https://www.youtube.com/watch?v=Jyhd78SH8Sg
	18.	**Review Class**	Review Class of **Chapter 4,5,6** (Regarding students problem)	Through the review class, students can solve their problem	Basic Class Materials
	19.	**Quiz Test 2**	Examination Topic: **Chapter 4,5,6** Examination mark: 10 Passing Mark: 04	Through Quiz Test students will learn the intellectual intelligence on the topics discussed.	3) Basic Class Materials 4) Examination Kata
	20.	**Class Test 2**	Examination Topic: **Chapter 4,5,6** Examination mark: 10 Passing Mark: 04	Through class tests students will learn to evaluate themselves on their own	3) Basic Class Materials 4) Examination Kata
	21.	**Midterm Exam Syllabus Review**			
	22.	*ALTERNATORS AND SYNCHRONOUS MOTOR MAINTENANCE*	5.1List the name the Faults of Alternators 5.2Illustrate the faults of Alternators	After the Class, ✓ Students will be able to the name the Faults of Alternators	Basic Class Materials & Projector, Alternators https://www.youtube.com/watch?v=1bK0De9XOP0

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	23.	Practical 04	**MEASURE THE SINGLE-PHASE POWER BY AMMETER, VOLTMETER AND WATTMETER**	After the Class Student will be able to know Sketch the circuit diagram for measuring single phase power by ammeter, voltmeter and wattmeter. List and collect tools, equipment and materials required. Prepare the circuit according to the circuit diagram using necessary equipment. Check the circuit before energizing. Record the meter readings. Calculate the power and power factor from the data obtained. Determine error from calculation. Draw vector diagram from the data obtained. Maintain the record of the performed task.	Must be submitted within two classes
	24.	*ALTERNATORS AND SYNCHRONOUS MOTOR MAINTENANCE*	5.3 Describe the process of repair and maintenance of Alternators 5.4 Mention the Faults of Synchronous motors	After the Class, ✓ Students will be able to Describe the process of repair and maintenance of Alternators	Basic Class Materials & Projector, YouTube Link: https://www.youtube.com/watch?v=1bK0De9XOP0
	25.	**Assignment -03**	**Chapter: 07,08**		Must be submitted within two classes
	26.	*ALTERNATORS AND SYNCHRONOUS MOTOR MAINTENANCE*	5.5Explain the faults of Synchronous motors 5.6Demonstrate the process of repair and maintenance Synchronous motors	After the Class, ✓ Students will be able to know about Explain the faults of Synchronous motors	Basic Class Materials & Projector,
	27.			After the Class Student will be able to know	

Date	Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
		Practical 05	**MEASURE THE THREE PHASE POWER BY ONE WATTMETER METHOD**	Sketch the circuit diagram for measuring power by one wattmeter of a three-phase system. List and collect tools, equipment and materials for the experiment. Prepare the circuit according to the circuit diagram using proper equipment. Check the circuit before energizing it. Record the reading from the meter. Calculate the power. Draw vector diagram using relevant data as obtained. Maintain the record of performed task.	Must be submitted within two classes
	28.	**Review Class**	Review Class of **Chapter 7,8** (Regarding students problem)	Through the review class, students can solve their problem	Basic Class Materials
	29.	**Quiz Test 3**	Examination Topic: **Chapter 7,8,** Examination mark: 10 Passing Mark: 04	Through Quiz Test students will learn the intellectual intelligence on the topics discussed.	5) Basic Class Materials 6) Examination Kata
	30.	**Class Test 3**	Examination Topic: **Chapter 7,8** Examination mark: 10 Passing Mark: 04	Through class tests students will learn to evaluate themselves on their own	5) Basic Class Materials 6) Examination Kata
	31.	*CIRCUIT BREAKER MAINTENANCE*	6.1List the name the Faults of Circuit breaker 6.2Illustrate the faults of Circuit breaker	After the Class, ✓ Students will be able to know about the name the Faults of Circuit breaker	Basic Class Materials & Projector https://www.youtube.com/watch?v=1il4ScI6vJ8
	32.	Practical 06	MEASURE THE ENERGY OF A THREE PHASE CIRCUIT BY A THREE PHASE ENERGY METER	After the Class Student will be able to know Sketch the circuit diagram for measuring energy by three phase's energy meter of a three-phase system. List and collect	Must be submitted within two classes

Date	Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
				tools, equipment and materials for the experiment. Prepare the circuit according to the circuit diagram using proper equipment. Check the circuit before energizing it. Record the reading from the meter. Calculate the energy. Maintain the record of performed task.	
	33.	*CIRCUIT BREAKER MAINTENANCE*	6.3Describe the process of repair and maintenance of Circuit breaker	After the Class, ✓ Students will be able to describe the process of repair and maintenance of Circuit breaker.	Basic Class Materials & Projector, semiconductor. YouTube Link: https://www.youtube.com/watch?v=1il4ScI6vJ8
	34.	AUTO STAR-DELTA STARTER MAINTENANCE	7.1 List the faults of Auto Star-Delta starter. 7.2 Illustrate the faults of Auto Star-Delta starter. 7.3 Describe repair and maintenance procedure of Auto Star-Delta starter.	After the Class, ✓ Students will be able to describe the process of repair and maintenance of Auto Star-Delta starter.	Basic Class Materials & Projector, Auto Star-Delta starter. YouTube Link: https://youtu.be/2T7d234ilKY?si=eZFAeL6XbZERxBAW
	35.	OVERLOAD RELAY (OLR) TROUBLESHOOTING	8.1 List the faults of Overload Relay (OLR). 8.2 Illustrate the faults of Overload Relay (OLR). 8.3 Describe the repair and maintenance process of Overload Relay (OLR).	After the Class, ✓ Students will be able to describe the process of repair and maintenance of process of Overload Relay	Basic Class Materials & Projector, Overload Relay (OLR). YouTube Link: https://youtu.be/YdQXMPU-fTg?si=1pE4IfJKHncZ-DmH

Date	Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
	36.	*POWER FACTOR IMPROVEMENT (PFI) UNIT USING CAPACITOR BANK*	9.1 List the faults of a power factor improvement unit (PFI). 9.2 Illustrate the faults of a power factor improvement unit (PFI). 9.3 Describe repair and maintenance procedure of a power factor improvement unit (PFI).	After the Class, ✓ Students will be able to describe the process of repair and maintenance of Improvement unit (PFI).	Basic Class Materials & Projector, improvement unit (PFI). YouTube Link: https://youtu.be/nZfbvMwjqLQ?si=rCwgL4X4c0RwLemR
	37.	**Assignment -04**	**Chapter: 09,10,11**		Must be submitted within two classes
	38.	**Review Class**	Review Class of **Chapter 09** (Regarding students problem)	Through the review class, students can solve their problem	Basic Class Materials
	39.	**Quiz Test 4**	Examination Topic: Chapter 09,10,11 Examination mark: 10 Passing Mark: 04	Through Quiz Test students will learn the intellectual intelligence on the topics discussed.	7) Basic Class Materials 8) Examination Kata
	40.	Practical 07	**TEST AN ENERGY METER FOR FINDING ITS ERROR**	After the Class Student will be able to know Draw the circuit diagram for testing an energy meter. 8.2 Select an energy meter and one wattmeter. Selected and collect tools, equipment and materials for the experiment. Prepare the circuit according to he circuit diagram. Record reading from the meter. Calculate the error from the reading. Maintain the record of performed task.	Must be submitted within two classes
	41.			After the Class,	Basic Class Materials &

Date	Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
		SOLAR SYSTEM MAINTENANCE	10.1 List the faults of solar system. 10.2 Illustrate the faults of solar system.	✓ Students will be able to describe the process of repair and maintenance of solar system.	Projector, solar system. YouTube Link: https://youtu.be/PHfJuxcgojw?si=7vz1Pa2RgEq8r8TQ
	42.	*SOLAR SYSTEM MAINTENANCE*	10.3 Describe repair and maintenance procedure of solar system	After the Class, ✓ Students will be able to describe the process of repair and maintenance of solar system	Basic Class Materials & Projector, solar system. YouTube Link: https://youtu.be/HQ4SfbeGg5s?si=xQAU_py6wvd8_KPe
	43.	**Class Test 4**	Examination Topic: **Chapter 09,10,11** Examination mark: 10 Passing Mark: 04	Through class tests students will learn to evaluate themselves on their own	7) Basic Class Materials 8) Examination Kata
	44.	**Presentation**	Short presentation by individual student.	Be confident on practical life.	**Laptop, projector**
	45.	MODEL TEST	All Syllabus	After the Class, Students will be highly confident for Final exam	Basic Class Materials
	46.	Final Exam Syllabus Review			
	47.	Final Exam Syllabus Review			
	48.	Final Exam Syllabus Review			