# Daffodil Polytechnic Institute, Institute Code: 50238

## Lesson Plan – Academic session: August/September 2023 to February 2024

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| Subject Teacher | : MD.Badeuzzamal Sarker |
| | Instructor, Electrical Technology. |
| Subject Name | : Electrical Circuits - 1 |
| Subject Code | : 26721 |
| Technology | : Electrical |
| Semester | : 2nd |
| BTEB Text Book Name | : Electrical Circuits – 1 (Publisher: HAQUE PUBLICATION ) |

| 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 | 30 | PC | 25 |
| Class test | 20 | PF | 25 |
| Quiz test | 10 | - | - |
| Final | 90 | - | - |
| **Total** | **150** | **Total** | **50** |

| 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 |

**Aim**

- To understand the concept of network theorems.
- To develop understanding of AC fundamentals.
- To understand the fundamental principles of single phase AC circuit in solving the different circuit problems.
- To develop skill in measuring current, voltage and power in RL, RC and RLC circuits.

**Outcome:**

- ✓ Student Will be able to Know Network theorem, Circuit Parameters;
- ✓ They will be achieve massive knowledge about Single phase AC circuits;
- ✓ They will be able to know Principles of basic circuits; Vectors; Impedance triangle; Power and power factor.

| Lecture | Chapter/ Exam/ Industrial Visit | Learning Area | Learning Outcome | Class/Lab Supporting Equipment's |
|---|---|---|---|---|
| 1. | **Circuit parameters** | 1.1 Define direct current ( DC) <br>1.2 Define circuit parameters. <br>1.3 List the circuit parameters. <br>1.4 Define circuit parameters with units. | After the Class, <br>✓ Students will be able to know circuit parameters <br>✓ Student Will be able to Identify circuit Parameters | 1) Basic Class Materials & <br>2) Projector <br>3) Registor, Capacitor, Inductor wire |

| Lecture | Chapter/ Exam/ Industrial Visit | Learning Area | Learning Outcome | Class/Lab Supporting Equipment's |
|---|---|---|---|---|
| 2. | **Electric Network** | 2.1 Define electric networks.<br>2.2 List the different types of electric networks.<br>2.3 Explain the different types of electric networks.<br>2.4 Define active and passive network. 2.5 Define current source and voltage source.<br>2.6 Explain the current and voltage source in electric network.<br>2.7 Give example of current source & voltage source. | After the Class,<br>✓ Students will be able to know electric networks.<br>✓ They can I(dentify Electrical Network<br>✓ Students will be able to know current source and voltage source | 1) Basic Class Materials & Projector |
| 3. | **Circuit theorems** | 3.1 State &explain Kirchhoff's current Law (KCL) and Kirchhoff's voltage Law( KVL).<br>3.7 Solve problems related to Theorems.<br>. | After the Class,<br>✓ Students will be able to know The Kirchhoff's current Law (KCL) and Kirchhoff's voltage Law ( KVL, and Superposition theorem<br>✓ They will be able to calculate current , voltage and power on verious types of circuit | 1) Basic Class Materials & Projector |
| 4. | **Circuit theorems** | 3.2 State &explain Thevenin's theorem<br>3.4 State &explain Norton's theorem<br>3.7 Solve problems related to Theorems. | After the Class,<br>✓ Students will be able to know Thevenin's theorem and Norton's theorem<br>✓ They will be able to calculate current , voltage and power on verious types of circuit | 1) Basic Class Materials & Projector |
| 5. | **Lab-1** | Show skill in verifying kerchief's laws. | After the Class, Students will be able to Full Understand about kerchief's laws. | Circuit Trainer<br>Board, Ammeter, Volt meter |
| 6. | **Circuit theorems** | 3.5 State &explain Maxwell's theorem<br>3.6 State &explain Maximum power transfer theorem | After the Class,<br>✓ Students will be able to know Maxwell's theorem<br>✓ They will be able to calculate and design circuit for maximum power transfer | 1) Basic Class Materials & Projector |

| Lecture | Chapter/ Exam/ Industrial Visit | Learning Area | Learning Outcome | Class/Lab Supporting Equipment's |
|---|---|---|---|---|
| 7. | **Circuit theorems** | 3.3 State &explain Superposition theorem<br>3.7 Solve problems related to Theorems. | After the Class,<br>✓ Students will be able to know Superpositions theorem<br>✓ They will be able to calculate current ,voltage and power on verious types of circuit After the Class, | 1) Basic Class Materials & Projector |
| 8. | **Assignment-1** | Based On Lecture 1-7 | | Basic Class Materials |
| 9. | Lab-2 | Show skill in using oscilloscope in measuring AC voltage &frequency. | After the Class,<br>✓ Students will be able to know how to use osciloscope<br>✓ They can measure Wave shape by Using Osciloscope | Osciloscope, Pow2er supply, Registor<br>https:// www.youtube.com/watch?v=5yNDSkQBEy0 |
| 10. | **Review Class** | Review Class of Lecture **1-3**<br>**(**Regarding students problem**)** | Students will be Highly confident for analysis Electrical Network.<br>Through the review class, students can solve their problem | Basic Class Materials |
| 11. | **Quiz Test 1** | Examination Topic: **Chapter 1, 2, 3**<br>Examination mark: 10<br>Passing Mark: 04 | Through Quiz Test students will learn the intellectual intelligence on the topics discussed. | 1) Basic Class Materials |
| 12. | **Class Test 1** | Examination Topic: **Chapter 1, 2, 3**<br>Examination mark: 20<br>Passing Mark: 08 | Through class tests students will learn to evaluate themselves on their own | 2) Examination Khata |

| Lecture | Chapter/ Exam/ Industrial Visit | Learning Area | Learning Outcome | Class/Lab Supporting Equipment's |
|---|---|---|---|---|
| 13. | **Star- Delta conversion** | 4.1 State star-delta conversion.<br>4.2 Explain star-delta conversion.<br>4.3 Convert star to delta connection and vice versa.<br>4.4 Solve problems related to star-delta conversion. | After the Class,<br>✓ Students will be able to convert star to delta and Delta to star | 1) Basic Class Materials & Projector<br>https://www.youtube.com/watch?v=igvqOyJYAoA |
| 14. | Lab -3 | Show skill in verifying Thevenin's theorem | After the Class,<br>✓ Students will be able to measure Current , Voltage , Using Thevenin's theorem | Circuit Trainer Board, Ammeter, Voltmeter |
| 15. | **AC circuit and AC fundamentals.** | 5.1 Define AC circuit (AC).<br>5.2 Explain the importance of AC systems.<br>5.3 Describe the advantages and disadvantages of AC circuit.<br>5.4 Principle of the generation of AC voltage.<br>5.5 Derive the equation: $e = E_{max} \sin\omega t$ . | After the Class,<br>✓ Students will be able to know AC circuit.<br>✓ They will Know Generation of Ac voltage | 1) Basic Class Materials & Projector |
| 16. | **AC circuit and AC fundamentals** | 5.6 Define cycle, frequency & time period with units.<br>5.7 Show the relation: $f = P.N/120$<br>5.8 List the commercial frequency of different countries.<br>5.9 Explain phase & phase difference with diagram<br>5.10 Solve related problems | After the Class,<br>✓ Students will be able to know cycle, frequency & time period<br>✓ They can Explain phase & phase difference with diagram. | 1) Basic Class Materials Projector<br>https://www.youtube.com/watch?v=5yNDSkQBEy0 |
| 17. | **Review Class** | Review Class of Lecture **10-15**<br>(Regarding students problem) | Through the review class, students can solve their problem | Basic Class Materials |
| 18. | **Quiz Test 2** | Examination Topic: **Chapter 4, 5**<br>Examination mark: 10<br>Passing Mark: 04 | Through Quiz Test students will learn the intellectual intelligence on the topics discussed | Basic Class Materials |
| 19. | **Class Test 2** | Examination Topic: **Chapter 4, 5**<br>Examination mark: 20<br>Passing Mark: 08 | Through class tests students will learn to evaluate themselves on their own | 1. Examination Khata |
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| Lecture | Chapter/ Exam/ Industrial Visit | Learning Area | Learning Outcome | Class/Lab Supporting Equipment's |
|---|---|---|---|---|
| | MID Exam Syllabus Review | | | |
| 20. | **Alternating quantities and rms values.** | 6.1 Define instantaneous values, average and maximum values of alternating quantities.<br>6.2 Generalize the rms values.<br>6.3 Define form factor and peak factor.<br>6.4 Define ohmic resistance & effective resistance.<br>6.5 Compare ohmic & effective resistance.<br>6.6 Solve problems on instantaneous, average and rms values. | After the Class,<br>✓ Students will be able to know about Alternating quantities and rms values. | 1) Basic Class Materials & Projector |
| 21. | Lab-4 | Show skill in verifying Superposition theorem | After the Class, Students will be able to Full understand about Superposition theorem | Circuit Trainer Board, Ammeter, Voltmeter, Multimeter |
| 22. | **Vectors and vector quantities.** | 7.1 Define vector quantities.<br>7.2 Explain vector representation of alternating voltage and current.<br>7.3 Explain vector in Polar form<br>7.4 Explain vector in Rectangular form<br>7.5 Formulate the relation between vectors expressed in rectangular and polar co-ordinate.<br>7.6 Solve problems relating to vector sum & difference, multiplication and division. | After the Class,<br>✓ Students will be able to know about Vectors and vector quantities<br>✓ Students will be able to Solve problems relating to vector sum & difference, multiplication and division | 1) Basic Class Materials<br>Projector |
| 23. | **Assignment-2** | Based on Lecture 13, 15, 16, 20 & 22 | | Basic Class Materials |
| 24. | **AC circuit (containing pure resistance, inductance and capacitance).** | 8.1 Sketch a circuit containing pure Resistance.<br>8.2 Explain the vector & phasor diagram of a pure resistive circuit.<br>8.3 Deduce the current and voltage relation in pure resistive circuit.<br>8.4 Sketch a circuit containing pure Inductance.<br>8.5 Explain the vector & phasor diagram of pure Inductive circuit. | After the Class, Students will be able to know about different types of circuit | 1) Basic Class Materials<br>Projector |

| Lecture | Chapter/ Exam/ Industrial Visit | Learning Area | Learning Outcome | Class/Lab Supporting Equipment's |
|---|---|---|---|---|
| 25. | **AC circuit (containing pure resistance, inductance and capacitance).** | 8.6 Evaluate the relation among inductive reactance, current and voltage in pure Inductive circuit.<br>8.7 Sketch a circuit containing pure Capacitance.<br>8.8 Explain the vector &phasor diagram of pure capacitive circuit.<br>8.9 Formulate capacitive reactance.<br>8.10 Simplify current and voltage relation in pure capacitive circuit. | After the Class,<br>✓ Students will be able to know about different types of circuit<br>✓ They can explain the vector & phasor diagram | 1) Basic Class Materials Projector |
| 26. | **Class Test 3** | Examination Topic: **Chapter 6, 7, 8**<br>Examination mark: 10<br>Passing Mark: 04 | Through Quiz Test students will learn the intellectual intelligence on the topics discussed. | 1) Basic Class Materials |
| 27. | **Quiz Test 3** | Examination Topic: **Chapter 6, 7, 8**<br>Examination mark: 20<br>Passing Mark: 08 | Through class tests students will learn to evaluate themselves on their own | 2) Examination Khata |
| 28. | Lab-5 | Show skill in maximum power transfer theorem | After the Class, Students will be able to Full Understand about maximum power transfer theorem | Circuit Trainer, Connecting Wire, Board, Ammeter, Voltmeter, Multimeter |
| 29. | **AC series circuit (containing resistance, inductance and capacitance).** | 9.1 Draw circuit containing resistance and inductance (RL) in series.<br>9.2 Explain vector &phasor diagram in RL series circuit.<br>9.3 Formulate impedance, current and voltage drop in RL series circuit.<br>9.4 Draw impedance triangle in RL series circuit.<br>9.5 Draw circuit containing resistance and capacitance (RC) in series.<br>9.6 Explain vector &phasor diagram in RC series circuit.<br>9.7 Formulate impedance, current and voltage drop in RC series circuit. 9.8 Draw impedance | After the Class,<br>✓ Students will be able to know about different types of circuit<br>✓ Explain vector & phasor diagram in RL series circuit. | 1) Basic Class Materials Projector |

| Lecture | Chapter/ Exam/ Industrial Visit | Learning Area | Learning Outcome | Class/Lab Supporting Equipment's |
|---|---|---|---|---|
| | | triangle of RC series circuit. | | |
| 30. | **AC series circuit (containing resistance, inductance and capacitance).** | 9.9 Solve problems on RL & RC series circuits.<br>9.10 Sketch a circuit containing resistance, inductance and capacitance (RLC) in series.<br>9.11 Explain vector & phasor diagram of RLC series circuit.<br>9.12 Draw impedance triangle of RLC series circuit.<br>9.13 Calculate inductive reactance, capacitive reactance, total impedance, current & voltage drop in RLC series circuit.<br>9.14 Solve problems on RLC series circuit. | After the Class, Students will be able to know about different types of circuit | 1) Basic Class Materials Projector |
| 31. | **Power & power factor in AC circuit.** | 10.1 Define power, power factor, active & reactive power.<br>10.2 Calculate power and power factor of pure resistive circuit.<br>10.3 Calculate power and power factor of pure Inductive circuit.<br>10.4 Calculate power and power factor of pure capacitive circuit.<br>10.5 Calculate power, power factor, active & reactive power of RL, RC & RLC series circuit.<br>10.6 Explain the power diagram of R, L, C, RL, RC & RLC series circuit.<br>10.7 Solve problems on power & power factor of different series circuit. | After the Class,<br>✓ Students will be able to know power, power factor, active & reactive power.<br>✓ They can Solve problems on power & power factor of different series circuit | 1) Basic Class Materials Projector |
| 32. | **Assignment-3** | Based On Lecture 24, 25, 29, 30 &31 | | Basic Class Materials |
| 33. | **Review Class** | Review Class of Lecture<br>(Regarding students problem) | Through the review class, students can solve their problem | Basic Class Materials |
| 34. | **Class Test 4** | Examination Topic: **Chapter 9, 10**<br>Examination mark: 10<br>Passing Mark: 04 | Through Quiz Test students will learn the intellectual intelligence on the topics discussed | 1) Basic Class Materials |
| 35. | **Quiz Test 4** | | | 2) Examination Khata |

| Lecture | Chapter/ Exam/ Industrial Visit | Learning Area | Learning Outcome | Class/Lab Supporting Equipment's |
|---|---|---|---|---|
| | | Examination Topic: **Chapter 9, 10**<br>Examination mark: 20<br>Passing Mark: 08 | Through class tests students will learn to evaluate themselves on their own | |
| 36. | **Presentation** | Short presentation by individual student. | Be confident on practical life. | **Laptop, projector** |
| 37. | MODEL TEST | All Syllabpus | After the Class, Students will be highly confident for Final exam | Basic Class Materials |
| 38. | Final Exam Syllabous Review | | | |
| 39. | Final Exam Syllabous Review | | | |