

Bangladesh Polytechnic Institute (23104)

Technology: Computer

Semester: 4th

Subject Name: Electrical Circuit & Machines (6745)

T P C: 2 3 3

Teacher Name: **Farhin Faruk**

Mobile No: 01737 09 81 11

Course Outline

| Class No. | Discussion and Explanation of Topics/ Titles | Remarks (If necessary) |
|-----------|--|---------------------------|
| Class-1 | <ul style="list-style-type: none"> ❖ <u>Apply the Principle of Vector and Vector Quantities.</u> ➤ Define Vector Quantities. ➤ Explain the Vector representation of alternating voltage and current. ➤ Explain the Vector in polar and rectangular form. ➤ Formulate the relation between Vectors Expressed in rectangular and polar co-ordinate. ➤ Solve problems related to Vector sum and difference, multiplication and division. | |
| Class-2 | <ul style="list-style-type: none"> ❖ <u>Apply the concept of AC series circuit containing resistor, Inductor and Capacitor.</u> ➤ Draw the circuit containing resistor, Inductor and Capacitor. ➤ Draw the Vector diagram RLC series circuit. ➤ Compute the results of RLC series circuit in cartesian form and polar form notation. ➤ Solve problems of RLC series circuit in rectangular co-ordinate system and polar co-ordinate system. | |
| Class-3 | <ul style="list-style-type: none"> ➤ Draw the circuit containing resistor, Inductor and Capacitor In parallel. ➤ Draw the Vector diagram of RLC parallel circuit. ➤ Compute the results of parallel AC circuit in cartesian form and polar form notation. ➤ Solve problems on parallel Ac circuit in cartesian form and polar form notation. | |
| Class-4 | <ul style="list-style-type: none"> ❖ <u>Understand the application of complex algebra for power calculation</u> ➤ Calculate power employing complex form. Calculate VAR employing complex form. ➤ Describe the conjugate method of calculating real power. ➤ Describe the conjugate method of calculating reactive power. | |
| Class-5 |  <u>Feedback(Class Presentation)</u> | |
| Class-6 |  <u>Feedback(Class Presentation)</u> | |
| Class-7 |  <u>Class Test-1</u> | |
| Class-8 | <ul style="list-style-type: none"> ❖ <u>Understand the concept of poly-phase system.</u> ➤ State the term poly-phase system. ➤ List the advantages of poly-phase system over single phase system. State the generation of poly-phase emf. ➤ Sketch the phase voltage wave diagram. ➤ Identify the phase sequence of poly-phase system. State the effects of reverse phase sequence. ➤ Explain the methods of checking phase sequence. | |

Bangladesh Polytechnic Institute (23104)

Technology: Computer

Semester: 4th

Subject Name: Electrical Circuit & Machines (6745)

T P C: 2 3 3

Teacher Name: **Farhin Faruk**

Mobile No: 01737 09 81 11

Course Outline

| | | |
|----------|--|--|
| | <ul style="list-style-type: none"> ➤ Sketch the phase sequence diagram of 3-phase voltage. | |
| Class-9 | <ul style="list-style-type: none"> ❖ <u>Apply the concept of polyphase for interconnection.</u> ➤ Write down possible ways of interconnection of three phase system. ➤ Draw the circuit diagram of star connected 3-phase, 3-wire system. ➤ List the application of 3-phase, 3-wire, star connected system. Sketch 3-phase, 4-wire, star connection system. | |
| Class-10 | <ul style="list-style-type: none"> ➤ List application of 3-phase, 4-wire star connection system. ➤ Draw the vector diagram of 3-phase, 4-wire, star connection system. ➤ Interpret the relation between line and phase voltage and current in a balanced 3-phase, 3-wire, star connection system. ➤ Simplify the relation between line and phase voltage and current in a balanced 3-phase, 4-wire star connection system. | |
| Class-11 | <ul style="list-style-type: none"> ❖ <u>Understand the function of 3-phase star connection system.</u> ➤ Define Balance and Unbalance System Identify neutral wire in a 3-phase star connection system. ➤ Evaluate the current in the neutral wire in an unbalanced 3-phase, 4-wire, star connected system. ➤ Draw the phasor diagram of 3-phase, 4-wire star connected system. | |
| Class-12 | <ul style="list-style-type: none"> ➤ Discuss the formula $I_L = I_p$ and $V_L = \sqrt{3} V_p$ ➤ Calculate volt-ampere, power and power factor in a balanced 3-phase, 4-wire star connected system. ➤ Solve problems on star connected (balanced and unbalanced) power system. | |
| Class-13 |  <u>Feedback(Class Presentation)</u> | |
| Class-14 |  <u>Feedback(Class Presentation)</u> | |
| Class-15 |  <u>Class Test-2</u> | |
| Class-16 | <ul style="list-style-type: none"> ❖ <u>Understand the features of 3-phase delta connection system.</u> ➤ Draw the circuit diagram of a 3-phase delta connected system. ➤ Draw the phasor diagram of delta connected system. ➤ Express the deduction of the formula $V_L = V_p$ and $I_L = \sqrt{3} I_p$ for connected system. ➤ Simplify the relation between line and phase current & voltage in a balanced delta connected system | |
| Class-17 | <ul style="list-style-type: none"> ➤ Calculate the volt-ampere, power and power factor in a balanced 3-phase, delta connected system. ➤ Solve problems on delta connected balanced system. ➤ Compare the advantages of star connected system with those of delta connected system. | |
| Class-18 | <ul style="list-style-type: none"> ❖ <u>Understand the principle of operation of transformer.</u> ➤ Define transformer. Explain the working principle of transformer. ➤ Explain the emf equation of a transformer | |

Bangladesh Polytechnic Institute (23104)

Technology: Computer

Semester: 4th

Subject Name: Electrical Circuit & Machines (6745)

T P C: 2 3 3

Teacher Name: **Farhin Faruk**

Mobile No: 01737 09 81 11

Course Outline

| | | |
|----------|---|--|
| | <ul style="list-style-type: none"> ➤ .Explain no load operation of transformer. ➤ Explain operation of transformer at load condition. ➤ Solve problems related | |
| Class-19 | <ul style="list-style-type: none"> ❖ <u>Understand the concept of losses, efficiency and voltage regulation of transformer.</u> ➤ Explain different losses in transformer. ➤ Explain the factors affecting core loss and copper loss. ➤ Explain the equation for maximum efficiency. ➤ Explain the open circuit test and short circuit test of a transformer. ➤ Solve problems on efficiency and maximum efficiency ➤ Explain the equation for voltage regulation of transformer. ➤ Solve problems on voltage regulation of transformer | |
| Class-20 |  <u>QUIZE TEST-1</u> | |
| | <u>Model Test Exam</u> | |
| Class-21 | <ul style="list-style-type: none"> ❖ <u>Understand the principle of DC motor.</u> ➤ Explain the working principle of DC motor ➤ Explain generator action of motor. ➤ Explain the term torque, running torque and break down torque. Explain the torque equation of motor. ➤ Describe the constructional features of DC motor. ➤ Explain the function of commutator | |
| Class-22 | <ul style="list-style-type: none"> ❖ <u>Understand the characteristics of DC motor.</u> ➤ Identify different types of DC motor. ➤ Explain the performance characteristics of different types of DC motor. ➤ Describe starting methods of DC motor. ➤ Describe speed control of DC motor. ❖ <u>Understand the principle of induction motor.</u> ➤ Explain the general principle of induction motor. ➤ Distinguish between the principles of induction motor and conduction motor. ➤ Define slip and slip speed. Identify the types of induction motor. ➤ List the uses of induction motor. | |
| Class-23 |  <u>Feedback(Class presentation)</u> | |
| Class-24 |  <u>Feedback(Class presentation)</u> | |
| Class-25 |  <u>Class Test-2</u> | |
| Class-26 | <ul style="list-style-type: none"> ❖ <u>Understand the working principle of 3-phase induction motor.</u> ➤ Explain the construction of 3-phase induction motor. ➤ Explain the construction of a 3 phase squirrel case induction motor. ➤ Explain the construction of a 3 phase wound rotor induction motor. ➤ State the production of rotating magnetic field in a 3-phase induction motor. ➤ Describe the methods of starting 3-phase induction motor. ➤ State the principles of speed control of 3-phase induction motor. | |

Bangladesh Polytechnic Institute (23104)

Technology: Computer

Semester: 4th

Subject Name: Electrical Circuit& Machines(6745)

T P C: 2 3 3

Teacher Name: **Farhin Faruk**

Mobile No: 01737 09 81 11

Course Outline

| | | |
|----------|--|--|
| Class-27 | <ul style="list-style-type: none">❖ <u>Understand the working principle of 1-phase induction motor.</u>➤ Explain working principle of 1-phase induction motor.➤ Explain the self starting method of single phase motor.➤ Describe the principles of operation of standard split phase motor.➤ Describe the principles of operation of capacitor motor.➤ Describe the principles of operation of shaded pole motor and repulsion motor. Identify hysteresis motor, universal motor, reluctance motor and AC series motor.➤ Mention the methods of speed control of single phase induction motor. | |
| Class-28 | <ul style="list-style-type: none">❖ <u>Understand the working principle of synchronous motor and Stepper motor.</u>➤ Explain the principle of operation of synchronous motor.➤ Describe the constructional features of synchronous motor.➤ Describe the starting methods of synchronous motor.➤ Explain the working principle of stepper motor.➤ List the different types of stepper motor.➤ Describe construction of different stepper motors. | |

REFERENCE BOOKS

1. Electrical Technology – B. L. Theraja
2. Electrical Machine – Siskind