

Subject Teacher : **Abdullah Al Nisat,**
Instructor, Electrical Technology.

Subject Name : Industrial Electronics

Subject Code : 26833

Technology : Electrical

Semester : 3rd

BTEB Text Book Name : (Publisher: HAQUE PUBLICATION)

Reference Book : A text book of electrical technology – B. L. Theraja

Mark Distribution (for 200 Marks)			
Theory Marks		Practical Marks	
Mid term	30	PC	25
Assignment	7.5	PF	25
Attendance	7.5	-	-
Class test	9	-	-
Quiz test	6	-	-
Final	90	-	-
Total	150	Total	50

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

Class Timing Distribution	
Particulars	Time
Greeting with students	2 Minutes
Previous Class Review	4 Minutes
Present Class Topic Discussion and Lecture Delivery	40 Minutes
Present Class Topics Review	4 Minutes

AIMS

- To familiarize the basic electrical quantities & laws and to apply them in solving problems of electrical circuits.
- To acquaint with electro-chemistry, electro-magnetism, electro-magnetic induction and electrostatic.
- To develop skill in electrical wiring.
- To appreciate the safety measures to be taken for electrical wiring.

SHORT DESCRIPTION

Electric current and ohm's law; conductors and insulators; basic electrical circuits; power and energy; basic electro-chemistry; electro-magnetism; electro-magnetic induction; electrostatics; wires and cables; hand tools used in wiring; house wiring; controlling devices; protective devices; earthing.

Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
01	Power Electronics and Power diode	1.1 Define power electronics. 1.2 Explain the block diagram of a basic power electronic system. 1.3 Define power diode. 1.4 List the types of power semiconductor diode. 1.5. Explain the V-I characteristics of Power diode. 1.6 Explain the Switching characteristics of different types of Power diode.	After the Class, Students will be able to know about the ABC of power electronics & power diode.	Basic Class Materials & Projector YouTube Link: https://www.youtube.com/watch?v=08YugQce90A

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		1.7 Mention the V-I characteristics of series connected diodes. 1.8 Mention the application of Power diode.		
02	MOSFET and IGBT	2.1 Define MOSFET and IGBT 2.2 Classify the power transistor. 2.3 Describe the construction and operation of MOSFET. 2.4 Describe the construction and operation of IGBT. 2.5 Mention the V-I Characteristics, Switching characteristics of MOSFET and IGBT. 2.6 Compare between MOSFET and IGBT	After the Class, Students will be able to know about the MOSFET, IGBT and their characteristics curve.	Basic Class Materials & Projector YouTube Link: https://www.youtube.com/watch?v=FoTWEuOSxSg
03	Quiz Test 1	Examination Topic: Chapter 1,2,3 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 Copy

Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
04	Class Test 1	Examination Topic: Chapter 1,2&3 Examination mark: 10 Passing Mark:4	Through class tests students will learn to evaluate themselves on their own	1) Basic Class Materials 2) Examination Copy
03	UJT and GTO	3.1 Define UJT and GTO. 3.2 Describe the construction and operation of UJT. 3.3 Describe the construction and operation of GTO. 3.4 Mention the turn-on & turn-off process of GTO. 3.5 Analyze the operation relaxation oscillator using UJT. 3.6 Mention the application of UJT and GTO.	After the Class, Students will be able to know about UJT & GTO and their characteristics curve.	Basic Class Materials & Projector YouTube Link: https://www.youtube.com/watch?v=rSHqvjDksg
04	Operational Amplifier (Op-Amp)	44.1 Define operational amplifier. 4.2 State the basic principle of Op-Amp. 4.3 List the characteristics of an ideal Op-Amp. 4.4 Explain the operation of Op-Amp in inverter, scale changer, unity follower, comparator, phase shifter, adder, subtractor, differentiator, integrator, ramp generator.	After the Class, Students will be able to know about Op-Amp.	Basic Class Materials & Projector YouTube Link: https://www.youtube.com/watch?v=azK-vVuLwCc https://www.youtube.com/watch?v=xNKBP9u9_8M
05	Thyristor.	5.1 Define Thyristor. 5.2 Describe the construction and operation of SCR. 5.3 Mention the V-I characteristics of SCR, 5.4 Explain the turn on/off process of SCR.	After the Class, Students will be able to know about the Problems of Series & Parallel Circuit	Basic Class Materials & Projector YouTube Link: https://www.youtube.com/watch?v=hyPktKnHq4

Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
		5.5 Describe the operation of phase control circuit by using SCR.		
06	Review Class	Review Class of Lecture 1,2,3,4,5	Through the review class, students can solve their problem.	Basic Class Materials
				3)
				3)
09	Lab-1	Identifies and uses electrical measuring instrument.	After the Class, Students will be able to know about the electrical measuring instrument.	Basic Class Materials.
10	DIAC and TRIAC.	6.1 Define of DIAC and TRIAC. 6.2 Describe the construction and operation of DIAC and TRIAC. 6.3 Mention the V-I characteristics of DIAC and TRIAC. 6.4 Describe the commutation process of TRIAC.	After the Class, Students will be able to know about DIAC & TRIAC and their characteristics curve.	Basic Class Materials & Projector YouTube Link: https://www.youtube.com/watch?v=PEhkDrhWapI https://www.youtube.com/watch?v=r-SCyD7f_zI
11	Single phase AC to DC conversion	7.1 state the process of AC to DC conversion. 7.2 Describe the Half wave rectification with power diode using inductive and resistive load. 7.3 Illustrate the Half wave rectification with Thyristor using inductive and resistive load. 7.4 Interpret the Full wave rectification with diode and Thyristor using	After the Class, Students will be able to know about rectification.	Basic Class Materials & Projector YouTube Link: https://www.youtube.com/watch?v=ZKhS3lmp_OM

Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
12	Three phase AC to DC conversion	<p>8.1 Describe the Operation of Three phase AC to DC conversion using diode.</p> <p>8.2 Explain the Operation of Three phase bridge rectification with diodes.</p> <p>8.3 Describe the Three phase full converter using controlled rectifier.</p> <p>8.4 Mention the application of three phase converter.</p>	After the Class, Students will be able to know about converter.	<p>Basic Class Materials & Projector</p> <p>YouTube Link: https://www.youtube.com/watch?v=dOBddKPmBpg</p> <p>https://www.youtube.com/watch?v=dVGuHgbvN-Y</p>
	Choppers.	<p>9.1 Define Chopper.</p> <p>9.2 List the classification of Chopper</p> <p>9.3 Mention the principle of operation of Chopper.</p> <p>9.4 Describe the operation of Step up and Step down Chopper.</p> <p>9.5 Describe the Chopper with DC motor as load</p> <p>9.6 Explain the operation of AC Chopper.</p>	After the Class, Students will be able to know about choppers.	Basic Class Materials
13	Inverter	<p>10.1 Define Inverter.</p> <p>10.2 List the types of Inverter.</p> <p>10.3 Describe the operation of single-phase line-commutated Inverter.</p> <p>10.4 Describe the operation of three-phase line-commutated full-controlled Inverter.</p> <p>10.5 Explain single-phase parallel-capacitor commutated Inverter.</p> <p>10.6 Describe the operation of single-phase series Inverter.</p> <p>10.7 Describe the operation of three phase forced-commutated bridge Inverter</p>	After the Class, Students will be able to know about Inverter.	<p>Basic Class Materials & Projector</p> <p>YouTube Link: https://www.youtube.com/watch?v=HHgPBMMZ26w</p> <p>https://www.youtube.com/watch?v=pXwnnlzhKSE</p>
14	Cycloconverter.	<p>11.1 Define Cycloconverter.</p> <p>11.2 List the types of Cycloconverter.</p> <p>11.3 Describe the operation of single-phase mid-point and bridge configuration Cycloconverter.</p> <p>11.4 Analyze the operation of three phase circulating and non-circulating type Cycloconverter.</p>	After the Class, Students will be able to know about cycloconverter.	<p>Basic Class Materials & Projector</p> <p>YouTube Link: https://www.youtube.com/watch?v=PPhSmZ6w9WY</p>

Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
		11.5 Mention the advantage and disadvantage of Cycloconverter.		
15	AC voltage controller	12.1 Define electric drive. 12.2 List the types of electric variable speed drive. 12.3. Mention the block diagram of AC electric drive. 12.4 Explain the operating principle of single phase Half wave converter drive and full wave Full converter drive. 12.6 Explain the operating principle of three phases Half wave converter drive and full wave Full converter drive..	After the Class, Students will be able to know about AC voltage controller.	Basic Class Materials & Projector YouTube Link: https://www.youtube.com/watch?v=XaglAjE7kHM
16	Induction and Dielectric Heating.	13.1 Define induction and dielectric heating. 13.2 Describe the principle of induction and dielectric heating. 13.3 List the effects of frequency on induction and dielectric heating. 13.4 Mention the effects of source voltage on induction and dielectric heating. 13.5 Describe the factors for choosing frequency of induction and dielectric heating. 13.6 List the advantages and applications of Induction and dielectric heating.	After the Class, Students will be able to know about Induction & Dielectric Heating.	Basic Class Materials & Projector YouTube Link: https://www.youtube.com/watch?v=8li1Vp8vLaI
17	Review Class	Review Class of Lecture 10-16 (Regarding students' problem)	Through the review class, students can solve their problem.	Basic Class Materials
18	Quiz Test 2	Examination Topic: Chapter 5,6,7,8 Examination mark: 10 Passing Mark: 04	Through Quiz Test students will learn the intellectual intelligence on the topics discussed.	4) Basic Class Materials 5) Examination Copy
19	Class Test 2	Examination Topic: Chapter 5,6,7,8 Examination mark: 10	Through class tests students will learn to evaluate themselves on their own	4) Basic Class Materials 5) Examination Copy

Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
		Passing Mark: 04		
Lab-3		Verify the characteristics of series and parallel circuits.	Basic Class Materials	
20	Exam Syllabus Review			
21	Power Supply	14.1 Illustrate the principle and operation of SMPS with block and circuit diagram. 14.2 Explain the principle and operation of UPS and IPS with block diagram. 14.3 Explain the	After the Class, Students will be able to know about Power supply.	Basic Class Materials & Projector YouTube Link https://www.youtube.com/watch?v=VDoCC-JDOEA
22	Safety & Security system.	15.1 Define electronic safety and security system. 15.2 Mention the types of Fire Sensors. 15.3 State the principle of electronic fire system. 15.4 Explain the operation of the Fire detection system with block diagram. 15.5 Describe the operation of touch and non-touch type person (thief) detector using infrared detection system with block diagram	After the Class, Students will be able to know about safety & security system.	Basic Class Materials & Projector YouTube Link https://www.youtube.com/watch?v=OdMUPjDjkdY https://www.youtube.com/watch?v=LDOa7UdfcMQ
25	Review Class	Review Class of Lecture 21-24 (Regarding students' problem)	Through the review class, students can solve their problem.	Basic Class Materials
26	Quiz Test 3	Examination Topic: Chapter 13,14,15 Examination mark: 10 Passing Mark: 04	Through Quiz Test students will learn the intellectual intelligence on the topics discussed.	6) Basic Class Materials 7) Examination Copy
27	Class Test 3	Examination Topic: Chapter 13,14,15 Examination mark: 10 Passing Mark: 04	Through class tests students will learn to evaluate themselves on their own skill.	6) Basic Class Materials 7) Examination Copy
32	Review Class	Review Class of Lecture 28-31 (Regarding students' problem)	Through the review class, students can solve their problem	Basic Class Materials

Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
33	Quiz Test 4	Examination Topic: Chapter 12,13,14 Examination mark: 10 Passing Mark: 04	Through Quiz Test students will learn the intellectual intelligence on the topics discussed.	8) Basic Class Materials 9) Examination Copy
34	Class Test 4	Examination Topic: Chapter 12,13,14 Examination mark: 10 Passing Mark: 08	Through class tests students will learn to evaluate themselves on their own	8) Basic Class Materials 9) Examination Copy
36	MODEL TEST	All Syllabus	After the Class, Students will be highly confident for Final exam	Basic Class Materials
37		Final Exam Syllabus Review		
38		Final Exam Syllabus Review		
39		Final Exam Syllabus Review		