

Government of the people's Republic of Bangladesh Affiliated

University of International Computer  
Administration Foundation Bangladesh



**Maintenance by**

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**Total Duration: 360 hours/6 Months**

- **Course Title: CONSUMER ELECTRONICS**

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## Course Name: CONSUMER ELECTRONICS

### Introduction :

- This course is designed to enhance the knowledge, skills and attitude in performing testing assembling/disassembling of electronic components, maintaining and repairing audio/video products and systems, terminating/connecting electrical & electronics circuit and maintaining and repairing electrically-controlled domestic appliance .It also covers Computer operation with internet browsing, industry control system, Color TV, LCD , LED,CD VCD,DVD,IPS,UPS,celluler phone, House hold appliance and using specialized equipment repair and commissioning of consumer electronic products and systems.

### Objectives

After completion the course the trainee will be able to:

- Identify electronics components and devices.
- Identify electrical components and machineries.
- Repair of electrical instruments & machineries.
- Repair of electronics instruments & machineries.
- Repair of cosumer house hold appliance .

### Course outline

Name of Course	Duration of Course		Entry Qualification
Consumer Electronics	Total 360 hrs	6 day per week, per day 3hrs	Minimum SSC or equivalent
	Theory = 60hrs	Theory =1hr, per lesson	
	Practical = 240hrs Basic competency & English =60hrs	Practical =2hrs.per practice Total=3hrs, per working day	

## LIST OF COMPETENCIES

### Generic/Basic Competency:

1. Receive and respond, participate and lead to workplace communication
2. Work with others, Team environment and lead small teams
3. Demonstrate work values, practice career professionalism and develop & practice negotiation skills
4. Practice workplace Occupational health and safety procedure
5. Use Basic mathematical concepts
6. Use English in work place

## Common Competencies:

1. Acquire knowledge on fundamental of Electronics.
2. Acquire knowledge on fundamental of Electrical.
3. Acquire knowledge on fundamental of Computers.
4. Acquire knowledge on electronic devices and machineries.
5. Acquire knowledge on electrical equipment and machineries.
6. Concept of
  - a) Radio Transmeter & Receiver
  - a) Color Transmeter & TV Receiver .
  - b) CD
  - c) VCD,DVD.
  - d) Automatic Voltage Stabilizer.
  - e) UPS/IPS.
  - f) Mobile Phone.
  - g) Power Supply.
  - h) Video Camera.
  - i) Function Generator.
  - j) Oscilloscope.
  - k) Photocopier.
  - l) Solar Energy.
7. Acquire knowledge on necessary Audio & video Electronics Equipments.

## Core Competencies:

1. Identify Electrical & Electronics components.
2. Identify Electrical & Electronics machineries.
3. Identify faulty components.
4. Identify major component used in different Electronics equipments.
5. Locate faults of different Electronics equipments.
6. Repair of Electrical & Electronics equipments.
7. Testing of Electrical and Electronics equipments.
8. Maintenance Electrical and of Electronics equipments.

## **Basic Competencies: Contents:**

### **(i) Basic Competencies - 30 hours**

<b>SL.NO.</b>	<b>Topics</b>	<b>hours</b>
<b>i). Receive and respond, participate and lead to workplace communication:</b>		
1	a) Explain & follow routinely speaking & messages in a workplace.	1
2	b) Follow routinely speaking & message.	1
3	c) Perform work duties following written notices.	1
<b>ii). Work with others, Team Environment and Lead small Teams:</b>		
4	a) Develop effective workplace relationship.	1.5
5	b) Show good Manner	1
6	c) Respect honorable person (Sir, Trainer, Senior, Trainees)	1
7	d) Describe team role and scope	1.5
8	c) Contribute to work group activities	1.5
9	d) Work as a team member.	1
10	e) Identify own role and responsibility within team	1.5
<b>iii). Demonstrate work values, practice career professionalism and develop &amp; practice negotiation skills</b>		
11	a) Define the purpose of works.	1
12	b) Apply work values/ethics.	1
13	c) Deal with ethical problems.	1
14	d) Integrate personal objectives with organizational goal.	1
15	e) Maintain professional growth and development	2
<b>iv). Practice workplace Occupational health and safety procedure</b>		
16	a) Workplace maintained as per required standards.	1
17	b) Arrange items.	1
18	c) Maintain work areas, Tools and Equipment.	1
19	d) Follow standardizes work process and procedures.	1
20	e) perform work spontaneously.	1
21	f) Occupational safety and health procedure	2
<b>v). Use Mathematical Concepts &amp; Techniques and Use Relevant Technologies:</b>		
22	a) Identify calculation requirements in the workplace.	2
23	b) Appropriate method is selected to carry out the calculation.	2
24	c) Calculations are completed using appropriate method such as addition, subtraction, multiplication and division.	2

### **a) (ii) Use English in work place - 30 hours**

Related Subject-10 hours and General Subject- 20 hours 1 hour/period

On the completion of this course trainees will be able to:

1. Communicate with target persons effectively.
2. Understand the speech of English users.
3. Achieve better professional performance.
4. Speak in English with confidence

<b>Sl. No.</b>	<b>Tropics- Conversational Situation</b>	<b>hours</b>
01	Speaking English – Getting Information & Finding one's way	1
03	Speaking English – About Tools and Equipments	1
02	Speaking English – About meeting some one & participating in class.	1
04	Speaking English – Daily Activities & Asking About Activities	1
05	Speaking English – Evening Activities and about theoretical contents.	1
06	Speaking English – Meeting at the Train station & Asking Question at the Train station.	1
07	Speaking English – Meeting at the Airport & Getting information at the Airport's	1
08	Speaking English – About different type of Measuring Tools and Cutting Tools	1
09	Speaking English – Getting to the Hotel & Asking direction.	1
10	Speaking English – Asking about Buses & Traveling by bus.	1
11	Speaking English - About Practical Class.	1
12	Speaking English – Going by Taxi and Asking the time.	1
13	Speaking English – Arriving early or late and Time and the calendar.	1
14	Speaking English – Living in an Apartment.	1
15	Speaking English – Using the Telephone.	1
16	Speaking English – Getting help in stores and talking about shopping.	1
17	Speaking English – Sending and Receiving Letters.	1
18	Speaking English – Talking about the Weather & Trips and sight seeing.	1
19	Speaking English – Talking about Eating & Dinner Conversation.	1
20	Speaking English – About Machines and Materials.	1
21	Speaking English – Common Health problem and Quitting & Finding Jobs.	1
22	Speaking English – Office Details and Office Conversation.	1
23	Speaking English – About Practical Job.	1
24	Speaking English – On a specific situation & Public speaking.	1
25	Speaking English - About Exchanging view with a Persons & Introducing oneself.	1
26	Speaking English – Describing and Narrating events, place, Objects etc.	1
27	Speaking English – About different type of computer, operating system, system and operating software, add remove software, DBM, Email and internet .	4

**Practical:**

1. Speaking on a specific Situation.
2. Public Speaking.
3. Exchanging views with target persons.
4. Introducing one self.
5. Describing & Narrating events, places, objects etc.
6. Producing the meaning of given words (by the teachers)-Vocabulary.
7. Prepared speech.

**Common & Core Competencies: Content****Theory**

Si No	Competencies	Hours
1.	<b>Define :</b> 1. Electricity (AC.DC) 2. Conductor & Insulator. 3. Soldering & desoldering. 4. Cell & Battery. 5. Transformer & Relly. 6. Switches 7. Resistance & Inductors. 8. Semiconductor(diode & transistor) 9. Intigreted circuit (IC). 10. Capacitor. 11. Speaker & Microphone. 12. DIAC, TRIAC, SCR, FET, UJTS,MOSFAT. 13. Cathod Ray Tube, LCD & LED desplay pennal. 14. Celluler phones components .	2
2.	State Ohm's Law	2
3.	Differeniate DC & AC current & voltage.	
4.	Identify the use of different Electrical & Electronics switches.	2
5.	List with Electrical & Electronics symbols.	
6.	List the primary & secondary cells.	2
7.	Mention method of charging & testing of Lead- acid cell.	
8.	Define Series, Parallel & Mixed grouping of resistance, capacitance & inductance.	2
9.	Define Electromagnet & transformer.	1
10.	Define Electrical Work, Power & Energy.	
11.	Mention the method of Frequency & Phase Testing procedure by Oscilloscope.	1
12.	Describe thefunction,operationIPS Instant power supply).	
13.	Describe the function, operation & use of UPS.	
14.	Describe the function, operation and use of Generator.	2
15.	Describe the function, operation & use of AC & DC motors.	

16.	Describe the function operation of Radio Transmitter & receiver.	2
17.	Describe the operation and use of CD, VCD & DVD.	1
18.	Describe the biasing method of PN diode.	3
19.	Describe half, full wave & bridge rectifier.	
20.	Describe necessity of filter with diagram.	
21.	Describe transistor biasing system.	2
22.	Describe transistor as an amplifier & switch.	2
23.	Describe the function & use of special diodes: 23.1 Zener diode. 23.2 LED. 23.3 LCD.	2
24.	<b>Identify the function &amp; use of :</b> 24.1 Photo-transistor. 24.2 Photo-Diode. 24.3 LDR. 24.4 photo-coupler.	2
25.	<b>Identify the function &amp; use of:</b> 35.1 SCR. 35.2 Diac. 35.3 Triac. 35.4 UJT. 35.5 IGBT	3
26.	Define relay with application.	2
27.	<b>Define :</b> 27.1 Modulation. 27.2 Demodulation. 27.3 Modulation Index. 27.4 Amplitude modulation. 27.5 Frequency modulation.	
28.	. Describe the super heterodyne radio receiver with block diagram	2
29.	List the major components required for modern radio receiver.	
30.	List the major faults & remedies for modern radio receiver.	
31.	Describe TV broadcasting system with block diagram	2
32.	. List the major components required for B&W TV receiver. Describe the operation of B&W TV Receiver with block diagram.	
33.	Describe the operation of colour TV Receiver with block diagram.	3
34.	Describe the operation of colour TV receiver major faults & remedies of colour TV receiver	
35.	Describe the operation of LCD&LED TV Receiver with block diagram. . List the major components required for LCD&LED TV receiver. Describe the operation of LCD & LED TV receiver.	
36.	Describe different mobile communication system.	2
37.	Describe the operation of mobile set.	
38.	List the major components of a mobile set.	
39.	Identify the software problems & remedies of a mobile set.	
40.	Identify the hardware problems & remedies of a mobile set.	



41.	Describe OP-AMP with application.	2
42.	Define basic timer with circuit diagram.	
43.	Define regulated power supply with application.	
44.	Define SMPS & IPS with circuit diagram.	1
45.	Classify different types Microphone & Speaker.	1
46.	<b>Identify major components, fault &amp; remedies of :</b> 46.1 VCD & DVD player. 46.2 Dish Receiver 46.3 PABX. 46.4 Public Address system. 46.5 Telephone set.	2
47.	<b>Identify the use of:</b> 47.1 Ammeter 47.2 Voltmeter. 47.3 Watt meter. 47.4 Energy meter. 47.5 Multi Meter. 47.6 Tachometer. 47.7 Megger 47.8 Oscilloscope 47.9 signal generator/Function generator . 47.10 pattern generator.	2
48.	Describe the method how to use transistor tester & IC tester.	1
49.	Describe the method of screen printing & Photo Printing.	1
50.	<b>Identify with use of.</b> 50.1 LVDT. 50.2 RTD 50.3 Thermostat 50.4 Bourdon tube. 50.5 Potentiometer transducer. 50.6 Piezo electric transducer. 50.7 Photo voltaic cell. 50.8 Thermo-couple 50.9 Load cell.	2
51.	Demonstration of microprocessor trainer(PLC)	1
52.	Describe different type of sensor and switches, (a) Inductive proximity sensor (b) Capacitive proximity sensor (c) Ultrasonic proximity sensor (d) Photoelectric proximity sensor (e) Pressure Switches (f) Temperature Switching (g) solenoid valve.	5

## Practical

SI No	Competencies	Hours
1	Identify common electronics Hand tools & equipment.	6
2	Identify common electronics components	3
3	Test the different electronics component	6
4	Identify electronics tools, hand equipment.	6
5	Measure Resistance, Voltage and Current with an Analog and Digital multi meter.	6

6	Determine the value of different resistors & capacitors with the help of color code & AVO meter.	6
7	Test the resistance of earthling.	3
8	Test the insulation resistance of electric motor by using merger.	3
9	Assemble components wiring board, soldering & disordering method.	6
10	Install & operate the LED lamp	3
11	Verify Ohm's Law.	3
12	Verify characteristic of Resistance Series & Parallel circuits	3
13	Measure power AC&DC voltage-current phase & 3-phase of an Electric circuit by wattmeter ,volt & Ampermeter.	3
14	Identify the components/parts of AC&DC 3-phase induction motor.	3
15	Prepare a connection cell, battery& solercell pannalboard for UPS, IPS & others induction motor.	3
16	Identify the components/parts of VCD&DVD player.	3
17	Locate the stage, major components & of a color TV Receiver.	3
18	Practice the fault finding process & remedies for color TV Receiver & Monitors.	6
19	Set up proper controls of signal generator to produce specific wave form in the oscilloscope and measuring amplitude, time period, frequency & phase angle with oscilloscope.	9
20	Measure input & output voltage of rectifier circuits such as half wave, full wave circuit.	6
21	Measure input & output voltage of rectifier circuits such as bridge circuit.	6
22	Construct of low voltage DC regulated, fixed & variable power supply.	9
23	The operation of a automatic battery charger & voltage regulator.	6
24	The operation of over voltage & current protection circuit.	3
25	Prepare a inverter circuit.	3
26	Prepare a SMPS.	6
27	Construct and test fire indicator system.	6
28	Prepare a water level controller Circuit	6
29	Prepare a timer circuit by using 555 timers and test it.	6
30	Prepare a connection of steeper motor with control circuit.	6
31	Measure the light intensity by photocell and apply it home solar system.	9
32	Make the single sided PCB using screen printing techniques.	12
33	Demonstrate the operation of microwave oven.	6
34	Study the operation of multimedia projector.	6
35	Identify the components/parts of LCD&LED TV recever.	9
36	Practice the fault finding process & remedies forLCD&LED color TV Receiver & Monitors.	9
37	Study the components used in Photocopier & Printer.	6
38	Study the components of the Hardware & Software of a mobile Phone.	9

39	Identify the use of: 39.1 Inductive proximity sensor. 39.2 Capacitive proximity sensor 39.3 Ultrasonic proximity sensor 39.4 Photoelectric proximity sensor 39.5 Pressure Switch 39.6 Solenoid Valve 39.7 Analog transducers 39.8 Digital Transducers	9
40	If the student should have proper knowledge on electronics instrument eg. Multi meter, Logic pulsar, Logic probe, soldering & disordering system, oscilloscope, transistor tester, analog & digital IC tester etc. then they perform the exercise on fault finding & repair of following devices.  40.1 Amplifiers/CD player. 40.2 Telephone Handset. 40.3 Regulated power supply 40.4 Automatic stabilizer. 40.5 Inverter UPS. 40.6 PABX 40.7 Mobile Phone. 40.8 Fan Regulator. 40.9 Major Biomedical Equipment.	2

### Entry Qualification:

Minimum SSC or equivalent .

### Employment Opportunity:

1. NGO's
2. Abroad
3. Self Employment

### List of Tools & Equipment:

Electrical Electronics Equipment List		
Item no	Item Name	Quantify
1	Digital Multi meter	6pcs
2	Analog Multi meter	6pcs
3	DC Power Supply	6pcs
4	Function Generator	6pcs
5	Oscilloscope	6pcs
6	LCR Meter	3pcs
7	PLC Programmer	2pcs
8	Transistor Tester	6pcs
9	MOSFET Tester	4pcs

10	Digital Tester	4pcs
11	PABX System	4pcs
12	Digital Trainer Board	4pcs
13	LCD TV Recever.	05pcs
14	LED TV Recever.	05pcs
15	Battery Charger.	10pcs
16	Scanner	01pcs
17	High voltage Tester (1kv~17kv)	02pcs
18	Dish Antena	02pcs
19	LNB (dish antenna)	02pcs
20	Distibuter for Dish antena	02pcs
21	Hand tool set.	10pcs
22	Logic Lab unit ED1006	30pcs
23	Analog Lab unit ED 2200	30pcs
24	μ-processor trainer	10pcs
25	RF Generator	05pcs
26	Sweep Generator	05pcs
27	Soldering Iron	100pcs
28	Soldering Iron Stand	100pcs
29	Frequency counter	02pic
30	Spectrum Analyzer	02pic
31	PCB Board	100pcs
32	Copper Clade Board	100pcs
33	Screen Printing Materials	Need as
34	Nose Pliers	6pcs
35	Cutting Pliers	6pcs
36	Combination Pliers	6pcs
37	Anti Cutter	6pcs
38	Flat Screw Driver	6pcs
39	Star Screw Driver	6pcs
40	Inter Changeable Screw Driver	6pcs
41	Junior Hacksaw	6pcs
42	Flat File	6pcs
43	Round File	6pcs
44	Hammer	6pcs
45	Electronics hand drill machine	2pcs
46	Voltage stabilizer	2pcs
47	IPS with 2pcs Battery	2pcs
48	UPS 500VA, 220V 50Hz	2pcs
49	Solar Panel	1Set
50	Meager 500 Volt, 1000Volt	2pcs
51	DC circuit/Network Trainer	1Set
52	AC Circuit/ Network Trainer	2Set
53	Change Over Switch	2set
54	Electric Panel Board	3set
55	Single Phase Induction Motor	3set
56	Three Phase Induction Motor	3set
57	Watt Meter	5set
58	Ampere Meter	5set
59	Volt Meter	5set

60	Voltage Variac	5set
61	Frequency Meter	5set
62	Star-Delta Manual Starter	2set
63	Star-Delta Auto Starter	2set
64	Single Phase Magnetic Contact Switch	2set
65	Three Phase Magnetic Contact switch	2set
66	Taco Meter	4set
67	Wire Gauge	4set
68	Venire Calipers	4set
69	Transformer 220V/12V	8set
70	B&W & Color TV Receiver	6pcs
71	Monitor	6pcs
72	Photocopier	1pcs
73	Fax Machine	1pcs
74	Mobile Set	1pcs
75	Telephone Set	1pcs
76	DVD/CD Player	5pcs
77	Video Camera	1pcs
78	Computer System	5pcs
79	Multi media	01pic
80	Screen	01pic
81	AVR system	01pic
82	Wheatstone Bridge	02pic
83	colour TV Trainer	02pic
84	Audio power Amplifier	02pic

### Raw Materials:

<b>Electrical Electronics Raw materials List</b>		
<b>Item no</b>	<b>Item Name</b>	<b>Quantify</b>
1.	Resistor 1/4W, 1/2W, 1W,2W (diff. type)	1000pcs
2.	Capacitor (diff. type)	1000pcs
3.	Diode (diff. type)	1000pcs
4.	Zener Diode (diff. type)	1000pcs
5.	Transistor (diff. type)	1000pcs
6.	MOSFET (diff. type)	1000pcs
7.	Thyristor (diff. type)	1000pcs
8.	UJT	1000pcs
9.	LDR (diff. type)	1000pcs
10.	VDR (diff. type)	1000pcs
11.	Transformer (diff. type)	100pcs
12.	Digital IC (diff. type)	1000pcs
13.	Analog IC (diff. type)	1000pcs
14.	Reg. IC (diff. type)	1000pcs
15.	Soldering Lead	10kg
16.	Ragon	02kg

17.	PCB Board	1000pic
18.	Copper Clade Board	1000pic
19.	Screen Printing Materials	As need
20.	FET	100pic
21.	SCR	100pic
22.	LED(diff.colour)	500pic
23.	Relay	50pic
24.	speaker(diff.ohms&watt)	100pic
25.	Buzzer	50pic
26.	Switch (diff.type)	100pic
27.	Microphone	10pic

### Physical facilities:

Physical facilities required for each group of 30 trainees.

Classroom-1 [20'x30']

Laboratory -4 [each 20'x30']

1-Electrical Lab

1-Electronics Lab

1- Biomedical Lab

1-Computer Lab

### Reference Book:

Sl. No	Name of Books	Author
1.	Basic electricity	
2.	Basic electronics	
3.	Industrial electronics	
4.	Communicative english	
5.	Digital electronics	

End