

Syllabus

Name of the Course: **B. Voc (Electronics Manufacturing Services)**

Semester I

Subject Name: Electronic Measurements and Instrumentation-I	
Course Code : BVEMC101	Semester: I
Weekly Teaching Hours: TH: 03 Tut: 00	Scheme of Marking TH: 40 , IA: 10 , Total: 50
TH Exam Duration: 02 Hours	Scheme of Marking PR: --
Credit: 3	

Content		Hours
Unit – I	1.0. Unit, dimensions and standards	09
	Scientific notations and metric prefixes. SI electrical units, SI temperature scales, Other unit systems, dimension and standards.	
Unit – II	2.0. Measurement Errors	09
	Gross error, systematic error, absolute error and relative error, accuracy, precision, resolution and significant figures, Measurement error combination, basics of statistical analysis.	
Unit – III	3.0. Analog meters	09
	PMMC instrument, galvanometer, DC ammeter, DC voltmeter, series ohm meter Transistor voltmeter circuits, AC electronic voltmeter.	
Unit – IV	4.0. Digital meters	09
	Current measurement with electronic instruments, probes Digital voltmeter systems, digital multimeters, digital frequency meter system.	

Books

Name of Authors	Title of the Book	Publisher
Kalsi H S	Electronic Instrumentation	Mcgraw Higher Ed
Albert D. Helfrick, William David Cooper	Modern Electronic Instrumentation and Measurement	PHI
A Course in Electrical and Electronic Measurements and Instrumentation	A. K. Sawhney, Puneet Sawhney	Rai

Subject Name: Identification of Components, Tools, SOP & Work Instructions-I

Course Code : BVEMC102	Semester: I
Weekly Teaching Hours: TH: 03 Tut: 00	Scheme of Marking TH: 40 , IA: 10 , Total: 50
TH Exam Duration: 02 Hours	Scheme of Marking PR: --
Credit: 3	

Content		Hours
Unit – I	1.0. Main components & modules/ sub-assemblies of electronic	09
	Control Panel (System Controller), Keypads, Door and Window Contacts, Motion Detectors, Glass Break Detection, Smoke Detectors, Heat Sensors, Carbon Monoxide Detectors, Water Detectors (or Water Bug), Temperature Sensors, Capacitance switches / control push buttons & rotary switches.	
Unit – II	2.0 . Digital Electronics	09
	Electronic controls in a common way, Counters, Flip- flops, Logic gates, Multiplexers, Decoders.	
Unit – III	3.0. Amplification factors	09
	Concept of Amplification factor, Gain & Signal distortion	
Unit – IV	4.0. TCP/IP	09
	Protocols like TCP/TP for communication purpose and for digital networks & circuits.	

Books

Name of Authors	Title of the Book	Publisher
Andrew S. Tanenbaum	Computer Network	Pearson
Jon S. Wilson	Sensor Technology Handbook - Volume 1	Newnes Pub.
Kennedy	Electronic Communication Systems	Tata MC Graw Hill

Subject Name: Tools, Equipment and Safety Measures-I

Course Code : BVEMC103	Semester: I
Weekly Teaching Hours: TH: 03 Tut: 00	Scheme of Marking TH: 40 , IA: 10 , Total: 50
TH Exam Duration: 02 Hours	Scheme of Marking PR: --
Credit: 3	

Content		Hours
Unit – I	1.0. Types of Cables	09
	Classification of cables: Non-metallic Sheathed Cable, Un-grounded / grounded Power supply cable, metallic Sheathed Cable, Multi-Conductor Cable, Coaxial Cable, Unshielded Twisted Pair Cable, Shielded twisted pair cable, Ribbon Cable, Armoured & Unarmoured Cable, Twin-Lead Cable, Twin axial Cable, Optical fiber cable.	
Unit – II	2.0. Specification and material of Cables	09
	Study of material and electrical Specification of all cables in Unit-I	
Unit – III	3.0. Connectors and sockets	09
	Study of Connectors and sockets for all types of cables and electrical devices	
Unit – IV	4.0. ESD Clothing	09
	What to wear, how to wear	

Books

Name of Authors	Title of the Book	Publisher
----	Cable Assemblies, Cables, Connectors and Passive Microwave Components: Screening Attenuation Measurement by the Reverberation Chamber Method	International Electrotechnical Commission
William G. Duff	Cables and Connector	IET Digital Library
----	Hardware Book, http://www.hardwarebook.info/	----
Andrew S. Tanenbaum,, David J. Wetherall	Computer Network	Pearson
Albert D. Helfrick, William David Cooper	Modern Electronic Instrumentation and Measurement	PHI

Subject Name: Soldering & De-Soldering of Components-I

Course Code : BVEMC104	Semester: I
Weekly Teaching Hours: TH: 03 Tut: 00	Scheme of Marking TH: 40 , IA: 10 , Total: 50
TH Exam Duration: 02 Hours	Scheme of Marking PR: --
Credit: 3	

Content		Hours
Unit – I	1.0.Soldering Tools	07
	Different types of Soldering Guns related to Temperature and wattages, types of tips, Solder materials and their grading.	
Unit – II	2.0.Soldering and De Soldering Stations	07
	Soldering and De Soldering Stations and their Specifications, Preparing Component for Soldering.	
Unit – III	PCB	07
	PCB Applications, Types of PCB, Soldering Basic Components on PCB.	
Unit – IV	De soldering tools	07
	De soldering Basic Components, Safety precautions while Soldering & De soldering, Check for cold continuity of PCB.	
Unit – V	Identification of Faults	08
	Identification of loose/dry solder, broken tracks on printed wire assemblies & discrete components mounted circuit boards , Join the broken PCB track and test, De soldering using Pump and wick, Introduction of SMD Components.	

Books

Name of Authors	Title of the Book	Publisher
----	http://spoken-tutorial.org/watch/KiCad/Designing+printed+circuit+board+in+KiCad/Hindi/	----
Bruce R. Archambeault and James Drewniak	PCB Design for Real-World EMI Control	Springer Science
Kraig Mitzner	Complete PCB Design Using OrCad Capture and Layout	Newnes Pub

Subject Name: Identification of Components, Tools, SOP & Work Instructions-I –Lab

Course Code : BVEMML105	Semester: I
Weekly Practicals: PR: 01 Tut: 00	Scheme of Marking TH: --
TH Exam Duration: --	Scheme of Marking PR: 25 , IA: 25 , Total: 50
Credit: 1.5	

Content

1. Identification & working of various electronic components (1.a., 1.b and 1.c. for any three group of components)
2. Working of testing equipment (2.a., 2.b and 2.c. for any two equipments)
3. 3.a. Measurement using Multimeter
3.b. Measurement using Clamp meter
4. Battery health check-up
5. Measure and test the voltage of given cells.

Subject Name: Electronic Measurement and Instrumentation -I Lab

Course Code : BVEML106	Semester: I
Weekly Practicals: PR: 01 Tut: 00	Scheme of Marking TH: --
TH Exam Duration: --	Scheme of Marking PR: 25 , IA: 25 , Total: 50
Credit: 1.5	

Content

1. 1. a. Study of semiconductor diode voltmeter
1.b. Its use as DC average responding AC voltmeter.
2. 2.a. Study of construction of L.C.R. bridge
2.b. Determination of the value of the given components using LCR Q meter.
3. Study of distortion factor meter and determination of the % distortion of the given oscillator.
4. Study of the diode testing and determination of the parameters of the given diode.
5. Study of the transistor tester and determination of the parameters of the given transistors.
6. Study of the IC tester and determination of the parameters of the given IC.
7. Use a galvanometer as voltmeter.
8. Use a galvanometer as ammeter.

Group GEM1 of Qualifier Packs

Subject Name: Embedded Software Engineer (ELE/Q1501)	
Course Code : BVEME117	Semester: I
Weekly Skilling Hours: PR: 24 Tut: 00	Scheme of Marking TH: 00 , IA: 00 , Total: 00
PR Exam Duration: 06 Hours	Scheme of Marking PR: 200 , IA: 00 , Total: 200
Credit: 15	Choose any one from specified Group GEM1 of Qualification Packs
Syllabus for this qualifier Pack is available on http://essc-india.org/assets/qp-embedded_software_engineer.pdf	

Subject Name: Security Pack-security surveillance and access control supervisor (ELE/Q4611)	
Course Code : BVEME128	Semester: I
Weekly Skilling Hours: PR: 24 Tut: 00	Scheme of Marking TH: 00 , IA: 00 , Total: 00
PR Exam Duration: 06 Hours	Scheme of Marking PR: 200 , IA: 00 , Total: 200
Credit: 15	Choose any one from specified Group GEM1 of Qualification Packs
Syllabus for this qualifier Pack is available on http://essc-india.org/assets/ithw_security-surveillance-and-access-control-supervisor.pdf	

Subject Name: Systems Analyst (ELE/Q8701)	
Course Code : BVEME139	Semester: I
Weekly Skilling Hours: PR: 24 Tut: 00	Scheme of Marking TH: 00 , IA: 00 , Total: 00
PR Exam Duration: 06 Hours	Scheme of Marking PR: 200 , IA: 00 , Total: 200
Credit: 15	Choose any one from specified Group GEM1 of Qualification Packs
Syllabus for this qualifier Pack is available on http://nqr.gov.in/sites/default/files/QP-Systems%20Analyst.pdf	

*Skill Practical assessment will be done rules/ procedure of respective Skill Sector Council of India.

Syllabus

Name of the Course: B. Voc (Electronics Manufacturing Services)

Semester II

Subject Name: Electronic Measurement and Instrumentation –II	
Course Code : BVEMC201	Semester: II
Weekly Teaching Hours: TH: 03 Tut: 00	Scheme of Marking TH: 40 , IA: 10 , Total: 50
TH Exam Duration: 02 Hours	Scheme of Marking PR: --
Credit: 3	

Content		Hours
Unit – I	Voltmeter and ammeter	07
	Study of Galvanometer, Voltmeter and ammeter and measuring methods	
Unit – II	Wheatstone bridge, low resistance measurements	07
	Low resistance measuring instruments AC bridge theory, capacitance bridges, Inductance bridges, and Q meter.	
Unit – III	CRO Construction	07
	CRT, wave form display, time base, dual trace oscilloscope	
Unit – IV	CRO based measurements	08
	Measurement of voltage, frequency and phase by CRO, Oscilloscope probes, Oscilloscope specifications and performance. Delay time based Oscilloscopes, Sampling Oscilloscope, DSO, DSO applications.	
Unit – V	Instrument calibration	07
	Comparison method, digital multi-meters as standard instrument, calibration instrument Recorders: X-Y recorders, plotters.	

Books

Name of Authors	Title of the Book	Publisher
Albert D. Helfrick, William David Cooper	Modern Electronic Instrumentation and Measurement	PHI
U.A.Bakshi, A.V.Bakshi	Electrical Measurements And Measuring Instruments	Technical Publications
R.K. Rajput	Electrical Measurements and Measuring Instruments	S chand

Subject Name: Identification of Components, Tools, SOP & Work Instructions-II

Course Code : BVEMC202	Semester: II
Weekly Teaching Hours: TH: 03 Tut: 00	Scheme of Marking TH: 40 , IA: 10 , Total: 50
TH Exam Duration: 02 Hours	Scheme of Marking PR: --
Credit: 3	

Content		Hours
Unit – I	Introduction to wireless communication	08
	Analog Communication: AM, FM etc Digital communication: ASK, PSK etc Wifi communication, Bluetooth communication etc	
Unit – II	Signal Converters	07
	AC to DC converts, DC to AC converters, DC to DC converters, Signal conditioning, Instrumentation Amplifier	
Unit – III	Tools & their Uses	07
	Use of tester to monitor AC Power, Skin the electrical wires/cables using the wire stripper and cutter, Main cable for control & electronic circuit wires, Crimping tools and buses.	
Unit – IV	Introduction to measuring equipment's	07
	Signal generator's, CRO, Function Generators, Frequency Counter, Logic analyzer, Spectrum analyzer, LCRQ Meter.	
Unit – V	Standard Operating Procedures and Work Instructions	07
	What is SOP and WI, How to read & follow SOP and WI, Overall Quality Assurance Plan.	

Books

Name of Authors	Title of the Book	Publisher
Behrouz A. Forouzan, Sophia Chung Fegan	Data Communications and Networking	McGraw Hill
Andrew S. Tanenbaum,, David J. Wetherall	Computer Network	Pearson
Albert D. Helfrick, William David Cooper	Modern Electronic Instrumentation and Measurement	PHI
P. S. Bimbhra	Power Electronics	Khanna
U.A.Bakshi, A.V.Bakshi	Electrical Measurements And Measuring Instruments	Technical Publications

Subject Name: Tools, Equipment & Safety Measures –II

Course Code : BVEMC203		Semester: II
Weekly Teaching Hours: TH: 03 Tut: 00		Scheme of Marking TH: 40 , IA: 10 , Total: 50
TH Exam Duration: 02 Hours		Scheme of Marking PR: --
Credit: 3		
Content		Hours
Unit – I	Tools & Equipment	08
	Study of all types of tools used in manufacturing.	
Unit – II	Equipments	07
	Study of all equipment required and deployed in manufacturing.	
Unit – III	Installing & servicing processes	07
	Installing & servicing, Identification and termination process, General maintenance of tools/equipment and recalibration of Test equipment, General safety and common-sense safety.	
Unit – IV	PPE	07
	Usage & benefits of PPE, Electronics Manufacturing Services and Types & usage of various PPE, Maintenance of PPE.	
Unit – V	Clean Room Environment	07
	Do's and Don't and Shop Floor Discipline.	

Books

Name of Authors	Title of the Book	Publisher
R. S. Khandpur	Troubleshooting Electronic Equipment	McGraw Hill Professional
David Herres	Troubleshooting and Repairing Commercial Electrical Equipment	McGraw Hill Education
John Cadick, Mary Capelli-Schellpfeffer, Dennis Neitzel	Electrical Safety Handbook 3E	Delmar Publishers
W Fordham Cooper	Electrical Safety Engineering	Newnes-Butterworths

Subject Name: Soldering & De-Soldering of Components & Emergency actions II		
Course Code : BVEMC204		Semester: II
Weekly Teaching Hours: TH: 03 Tut: 00		Scheme of Marking TH: 40 , IA: 10 , Total: 50
TH Exam Duration: 02 Hours		Scheme of Marking PR: --
Credit: 3		
Content		Hours
Unit – I	Introduction to SMD Components	07
	Identification of 2, 3 and 4 terminal SMD components.	
Unit – II	Soldering the SMD components	08
	Soldering the SMD components on the PCB, Make the necessary settings on SMD soldering station to solder various ICs of different packages by choosing proper clamping tools, Identify various connections and the setup required for SMD soldering station.	
Unit – III	De soldering	07
	De solder the SMD components from the given PCB, Make the necessary settings on SMD soldering station to de solder various ICs of different packages by choosing proper clamping tools.	
Unit – IV	Make a panel board	07
	Make a panel board using different types of switches for a given application, Identification of crimping tools for various IC packages and Reliable Soldering Practices.	
Unit – V	Emergency actions	07
	Minimum Requirements, Reporting Emergencies, Emergency exits, Primary and secondary evacuation routes, Locations of fire extinguishers, Fire alarm pull stations' location, Assembly points and Medical Services.	

Books		
Name of Authors	Title of the Book	Publisher
R. Sengupta	Principles of Reliable Soldering Techniques	New Age International
Ray P. Prasad	Surface Mount Technology: Principles and Practice	Springer
Mel M. Schwartz	Soldering: Understanding the Basics	ASM International
John Cadick, Mary Capelli-Schellpfeffer, Dennis Neitzel	Electrical Safety Handbook 3E	Delmar
W Fordham Cooper	Electrical Safety Engineering	Newnes-Butterworths

Subject Name: Soldering & De-Soldering of Components-Lab

Course Code : BVEML205	Semester: II
Weekly Practicals: PR: 01 Tut: 00	Scheme of Marking TH: --
TH Exam Duration: --	Scheme of Marking PR: 25 , IA: 25 , Total: 50
Credit: 1.5	

Content

1. Study of soldering and de soldering tools and machinery (any 2 tools)
2. Assemble the product (any 3 products)
3. Dis-assemble the product (any 3 products)
4. Safety Precautions & emergency plans (study of minimum 2 methods)

Subject Name: Electronic Measurement and Instrumentation -II Lab

Course Code : BVEML206	Semester: II
Weekly Practicals: PR: 01 Tut: 00	Scheme of Marking TH: --
TH Exam Duration: --	Scheme of Marking PR: 25 , IA: 25 , Total: 50
Credit: 1.5	

Content

1. Study of the following transducer
 - (i) PT-100 trans
 - (ii) J- type trans.
 - (iii) K-type trans
 - (iv) Presser trans
2. 2.a. Measurement of phase difference
 - 2.b. Measurement of frequency using CRO (lissajous figure)
3. Measurement of low resistance Kelvin's double bridge.
4. Radio Receiver Measurements (any 3 parameter measurements)

Group GEM2 of Qualifier Packs

Subject Name: Smartphone Repair Technician (ELE/Q8104)	
Course Code : BVEME217	Semester: II
Weekly Skilling Hours: PR: 24 Tut: 00	Scheme of Marking TH: 00 , IA: 00 , Total: 00
PR Exam Duration: 06 Hours	Scheme of Marking PR: 200 , IA: 00 , Total: 200
Credit: 15	Choose any one from specified Group GEM2 of Qualification Packs
Syllabus for this qualifier Pack is available on http://essc-india.org/assets/qp-commn-smartphone-repair-technician.pdf	

Subject Name: Business Development Executive (ELE/Q1101)	
Course Code : BVEME228	Semester: II
Weekly Skilling Hours: PR: 24 Tut: 00	Scheme of Marking TH: 00 , IA: 00 , Total: 00
PR Exam Duration: 06 Hours	Scheme of Marking PR: 200 , IA: 00 , Total: 200
Credit: 15	Choose any one from specified Group GEM2 of Qualification Packs
Syllabus for this qualifier Pack is available on http://nqr.gov.in/sites/default/files/QP-Business%20Development%20Executive.pdf	

***Skill Practical assessment will be done rules/ procedure of respective Skill Sector Council of India.**