

Second – Year Curriculum Syllabus for
B.Voc. Degree Programme in
Electronics Manufacturing Services

(Dr Babasaheb Ambedkar Technological University, Lonere)

Semester III

Sr. No.	Course Code	Name of the Course	Teaching scheme			Evaluation Scheme			Credits	Total Marks	
			L	T	P	IA	MSE	ESE			
General Education											
			Theory								
1	BVEMC301	Fault Analysis & Repairs	3	0	0	25	0	25	3	50	
2	BVEMC302	Control Panel	3	0	0	25	0	25	3	50	
3	BVEMC303	Electronics Devices Circuit	3	0	0	25	0	25	3	50	
4	BVEMC304	Electronics System Packaging and Manufacturing	3	0	0	25	0	25	3	50	
			Total						12	200	
Skill Components											
			Lab/Practical								
4	BVEML305	Electronics Devices Circuit Lab	0	0	1	25	0	25	1.5	50	
5	BVEML306	Fault analysis & RepairsLab	0	0	1	25	0	25	1.5	50	
On-Job-Training (OJT)											
			Evaluation Sheet								
						IA		ESE			
6	BVEME317	Field Engineer RACW (ELE/Q3105)				50		150		15	200
7	BVEME328	Security System Service Engineer (ELE/Q4610)									
8	BVEME338	Pre-Sales Solar Technical Support Engineer (ELE/Q5602)									
			Total							18	300

Semester IV

Sr. No.	Course Code	Name of the Course	Teaching scheme			Evaluation Scheme			Credits	Total Marks	
			L	T	P	IA	MSE	ESE			
General Education											
			Theory								
1	BVEMC401	Good Manufacturing Concepts Practices – I	3	0	0	25	0	25	3	50	
2	BVEMC402	Good Manufacturing Concepts Practices – II	3	0	0	25	0	25	3	50	
3	BVEMC403	Manufacturing & Quality Norms	3	0	0	25	0	25	3	50	
4	BVEMC404	Microcontroller & Applications	3	0	0	25	0	25	3	50	
Total									12	200	
Skill Components											
5	BVEML405	Microcontroller & Applications Lab	0	0	1	25	0	25	1.5	50	
6	BVEML406	Feedback Control System Lab	0	0	1	25	0	25	1.5	50	
On-Job-Training (OJT)											
			Evaluation Sheet								
						IA		ESE			
7	BVEME417	Purchase Executive (ELE/Q5701)	50			150		15		200	
8	BVEME428	Quality Engineer (ELE/Q7901)									
Total									18	300	

Semester

III

Syllabus

Subject Name: Fault Analysis and Repairs		
Course Code : BVEMC301		Semester: III
Weekly Teaching Hours: TH: 03 Tut: 00		Scheme of Marking TH: 25 , IA: 25 , Total: 50
TH Exam Duration: 02 Hours		Scheme of Marking PR: --
Credit:3		
Content		Hours
Unit – I	Faults	09
	Classification of fault in Electronics Circuit – Short Circuit, Open Circuit, Component Polarity, Component Value etc., Identification of fault, Rectification of fault	
Unit – II	Testing	09
	Testing Approaches – Visual Inspection / Testing, Earth Continuity Test, Insulation Resistance Test, Electrical Testing Measurement – 3 standard test measurement and 1 test indicator i.e. Current, Voltage, Resistance, Continuity etc.	
Unit – II	Repairing	09
	Repairing/ Replacing Module, Analysis for the different types of equipment's: Smartphones, Air Conditioning, Security systems, Electronically controlled doors.	
Unit – III	Fault Analysis	09
	Identification of Various Fault and analysis based on hardware and software component.	
Books		
Name of Authors	Title of the Book	Publisher
Robin Pain	Practical Electronic Fault Finding and Troubleshooting	Newnes
	Advances in Electronic Testing	Springer
Delton T. Horn	How to Test Almost Everything Electronic	McGraw Hill Book
Daniel R. Tomal, Aram S. Agajanian	Electronic Troubleshooting	McGraw Hill Education

Subject Name: Control Panel

Course Code : BVEMC302		Semester: III
Weekly Teaching Hours: TH: 03 Tut: 00		Scheme of Marking TH: 25 , IA: 25 , Total: 50
TH Exam Duration: 01 Hours		Scheme of Marking PR: --
Credit: 3		
Content		Hours
Unit – I	Basics of Electricity and Wiring	12
	Define electrical/electronic diagram and identify its types, Identify the various components of a control panel such as cables and circuit elements, Differentiate between the different types of cables used in a control panel, Selection the active, passive and electromechanical components as per their use, Categorize electric circuits into series and parallel depending on the type of connection and create such circuits, Differentiate between closed loop and open loop control system, Identify the different types of joints as well as wires and cables, Construct different types of joints such as tap splice joint, pigtail splice joint and Britannia joint, List the purpose and principles of the earthing system, Differentiate between system and equipment grounding.	
Unit – II	Control Panel Wiring	12
	Identify the factors to be considered while choosing a wire such as wire gauge and wire, Illustrate how to perform correct sizing and stripping of the chosen wires, List the panel layout considerations, Demonstrate using the wiring diagram to do the wiring, Identify the type and number of components that are to be used in the control panel accurately, Prepare a basic layout of the components on the panel board of the enclosure, Comply the steps to wire an electrical control panel, Follow the steps to add a new circuit to the panel.	
Unit – III	Electromechanical Assemblies and Cabling	12
	List the components of electromechanical assemblies - Diode, transformer, LED, transistor, capacitor, resistor, inductor, thermistor, ICs PLCs, relays, contactors, circuit breakers, solenoids, actuators, PCB, controllers, motor, generator, timer, switches etc. Differentiate between the different types of electromechanical assemblies, List the wiring instructions and the guidelines for wiring assemblies, Demonstrate how to carry out the required preparations and precautions prior to implementing the assembly process, Use defined labeling methods for a control panel and the assemblies, Identify the cables and wires to be used in an electrical panel - Coaxial cable, direct-buried cable, NM cable, metallic sheathed cable, multi core cable, paired	

	cable, ribbon cable, optic fiber cable, portable cord, twin-sheathed cable, twisted-pair cable etc., List the points to consider while securing, routing and bending cables, List the points to consider while cable forming.	
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Books		
Name of Authors	Title of the Book	Publisher
Dr. S. L. Uppal, G. C. Garg	Electrical Wiring Estimating & Costing	Khanna Publisher
John R. Hackworth, Frederick D. Hackworth Jr.	Programmable Logic Controllers Programming Methods and Applications	Pearson India

Subject Name: Electronics Devices Circuit		
Course Code : BVEMC303	Semester: III	
Weekly Teaching Hours: TH: 03 Tut: 00	Scheme of Marking TH: 25 , IA: 25 , Total: 50	
TH Exam Duration: 01 Hours	Scheme of Marking PR: --	
Credit: 3		
Content		Hours
Unit – I	Semiconductor	07
	Energy Bands and Charge Carrier in Semiconductor: Bonding forces and energy bands in solids, Charge Carriers in Semiconductors, Carrier Concentrations, Drift Mechanism. Excess carriers in Semiconductors: Optical Absorption, Carrier Lifetime: Direct Recombination, Steady State Carrier Generation, Quasi-Fermi Level, Diffusion of carriers and Einstein relation.	
Unit – II	Junctions	07
	Equilibrium Conditions, Forward and Revers Biased Junctions; Steady State Conditions. Optoelectronic Devices: Photodiode V-I characteristic, Photo detector, Solar Cells, Light Emitting Diode.	
Unit – III	BJT	07
	Review of device structure operation and V-I characteristics, BJT circuits at DC, BJT as amplifier and switch, biasing in BJT amplifier circuit, small-signal operation and models, single stage BJT amplifier, BJT internal capacitances and high frequency model, frequency response of CE amplifier.	
Unit – IV	MOSFET	08
	Device structure and its operation in equilibrium, V-I characteristics. Circuits at DC, MOSFET as Amplifier and switch, Biasing in MOS amplifier circuits, small signal operation and models, single stage MOS amplifier, MOSFET internal capacitances and high frequency model, frequency response of CS amplifier.	
Unit – V	FEEDBACK	08
	The general feedback structure, properties of negative feedback, the four basic feedback topologies, the series-shunt feedback amplifier, the series-series feedback amplifier, the shunt-shunt and shunt series feedback amplifier. Oscillators: Basic principles of sinusoidal oscillators, op-amp RC oscillator circuits, LC oscillator.	

Books		
Name of Authors	Title of the Book	Publisher
A. K. Maini	Analog Electronics	Khanna Publication House
Robert F. Pierret	Semiconductor Device Fundamental	Pearson
Ben G. Streetman, Sanjay Kumar Banerjee	Solid State Electronic Devices	Pearson

Subject Name: Electronics System Packaging and Manufacturing		
Course Code : BVEMC304	Semester: III	
Weekly Teaching Hours: TH: 03 Tut: 00	Scheme of Marking TH: 25 , IA: 25 , Total: 50	
TH Exam Duration: 01 Hours	Scheme of Marking PR: --	
Credit: 3		
Content		Hours
Unit – I	PCB Evolution, Classification and Application	12
	Evolution and Classification of Printed Circuit Boards, Challenges in Modern PCB Design and Manufacture, PCB fabrication methodologies (SSB, DSB and multilayer board), PCB design considerations/ design rules for analog, digital and power applications, Electromagnetic interference in electronic systems and its impact.	
Unit – II	Electronic Circuit Analysis	12
	Analysis of electronic circuit from noise emission point of view (both conducted and radiated emission) cross talk and reflection behavior of the circuit in time domain, Thermal management of electronic devices and systems.	
Unit – III	Semiconductor Packages	12
	Single chip packages or modules. (SCM) Commonly used packages and advanced packages; Materials in packages, Current trends in Packaging, Multichip modules (MCM)-types; System-in package (SIP); Packaging roadmaps; Hybrid circuits. Pipe and FIFOs, Shared memory, Sockets	

Books		
Name of Authors	Title of the Book	Publisher
Walter C Bosshart	Printed Circuit Board Design and Technology	Tata McGraw-Hill Publishing Company Limited
Clyde F. Coombs Jr.	Printed Circuits Handbook	Tata McGraw-Hill Companies

Subject Name: Electronic Device Circuit – Lab

Course Code : BVEML305	Semester: IV
Weekly Practical: PR: 01 Tut: 00	Scheme of Marking TH: --
TH Exam Duration: --	Scheme of Marking PR: 25 , IA: 25 , Total: 50
Credit: 1.5	

List of Practical

1. Study of Lab Equipments and Components: CRO, Multimeter, and Function Generator, Power supply- Active, Passive Components and Bread Board.
2. P-N Junction diode: Characteristics of PN Junction diode - Static and dynamic resistance measurement from graph.
3. Applications of PN Junction diode: Half & Full wave rectifier- Measurement of Vrms, Vdc, and ripple factor.
4. Characteristics of Zener diode: V-I characteristics of zener diode, Graphical measurement of forward and reverse resistance.
5. Application of Zener diode: Zener diode as voltage regulator. Measurement of percentage regulation by varying load resistor.
6. Characteristic of BJT: BJT in CE configuration- Graphical measurement of h-parameters from input and output characteristics. Measurement of Av, AI, Ro and Ri of CE amplifier with potential divider biasing.
7. Measurement of Operational Amplifier Parameters: Common Mode Gain, Differential Mode Gain, CMRR, Slew Rate.
8. Applications of Op-amp: Op-amp as summing amplifier, Difference amplifier, Integrator and differentiator.
9. Field Effect Transistors: Single stage Common source FET amplifier –plot of gain in dB Vs frequency, Measurement of, bandwidth, input impedance, maximum signal handling capacity (MSHC) of an amplifier.
10. Oscillators: Sinusoidal Oscillators. Wein's bridge oscillator b. phase shift oscillator.

Subject Name: Fault Analysis and Repairs Lab

Subject Name: Fault Analysis and Repairs Lab	
Course Code : BVEML306	Semester: III
Weekly Practical: PR: 01 Tut: 00	Scheme of Marking TH: --
TH Exam Duration: --	Scheme of Marking PR: 25 , IA: 25 , Total: 50
Credit: 1.5	
List of Practical	
<ol style="list-style-type: none">1. Identification Categorization of faults: Hardware/Software, User Induced, Component Failures.2. Testing electrical/electronic components in the product.3. Troubleshoot and repair of the faults identified in the product.<ol style="list-style-type: none">A. Smartphone FaultsB. AC FaultsC. Security SystemsD. Electronically Controlled DoorsE. LED LightF. Wiring4. Demonstrate Preventive Maintenance Services	

Group GEM3 of Qualifier Packs

Subject Name: Field Engineer RACW (ELE/Q3105)	
Course Code : BVEME317	Semester: III
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: 150 , IA: 50 , Total: 200
Credit: 15	Choose any one from specified Group GEM1 of Qualification Packs
Syllabus for this qualifier Pack is available on https://www.nqr.gov.in/sites/default/files/QP-Field%20Engineer%20%E2%80%93%20RACW.pdf	

Subject Name: Security System Service Engineer (ELE/Q4610)	
Course Code : BVEME328	Semester: III
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: 150 , IA: 50 , Total: 200
Credit: 15	Choose any one from specified Group GEM1 of Qualification Packs
Syllabus for this qualifier Pack is available on https://www.nqr.gov.in/sites/default/files/Security%20System%20Service%20Engineer%20%284%29.pdf	

Subject Name: Pre-Sales Solar Technical Support Engineer (ELE/Q5602)	
Course Code : BVEME339	Semester: III
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: 150 , IA: 50 , Total: 200
Credit: 15	Choose any one from specified Group GEM1 of Qualification Packs
Syllabus for this qualifier Pack is available on https://nsdcindia.org/sites/default/files/QP_ELE-Q5602_Pre-Sales-Solar-Technical-Support-Engineer.pdf	

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

Semester
IV
Syllabus

Subject Name: Good Manufacturing Concepts and Practices – I

Course Code : BVEMC401		Semester: IV
Weekly Teaching Hours: TH: 03 Tut: 00		Scheme of Marking TH: 25 , IA: 25 , Total: 50
TH Exam Duration: 02 Hours		Scheme of Marking PR: --
Credit: 3		
Content		Hours
Unit – I	Total Quality Management	07
	What is TQM, Principles–Customer Satisfaction, Employee Commitment, Fact-Based Decision Making, Effective Communications, Strategic Thinking, Integrated System, Process-Centered, Continuous Improvement. Importance of TQM in Organization. How to implement TQM, Tools of TQM – Check Sheet, Pareto Chart, Cause and Effect Diagram or Ishikawa Diagram, Control Chart, Histogram Bar Chart, Scatter Diagram, Flow Chart or Stratification Diagram. Key Players of TQM – Customers, Suppliers and Employees	
Unit – II	Kaizen	07
	What is Kaizen, Understanding Kaizen, Kaizen Elements – Teamwork, Personal Discipline, Improve morale, Quality Circle and Suggestions for improvement. Key Factors in Kaizen – Elimination of Waste and inefficiency, Kaizen 5S Framework (i.e. Seiri, Seiton, Sieso, Seiketu and Shitsuke), and Standardization. Applications of Kaizen.	
Unit – III	Inventory Management and Logistics	06
	What is inventory management, Types of Inventory – Raw Material, Work-in-Progress, MRO Inventory, Finished Goods, Pipeline and Decoupling inventory, Vendor Managed Inventory. Inventory Techniques – Bulk Shipment, ABC inventory management, Backordering, JIT, Consignment, Dropshipping and Cross-docking, Cycle Counting, Inventory kitting. Inventory Management Process. Inventory Control. Logistic Management	
Unit – IV	Quality Assurance and Checklist	06
	What is Quality, What is Assurance, What is Quality Assurance, Quality Assurance Process, What is Quality Control, Difference between Quality Control and Quality Assurance, Best practices of Quality Assurance, Quality Assurance Functions – Technology Transfer, Validation, Documentation, Assuring Quality of Products, Quality Improvement Plan. What is Checklist, Elements of Checklist, Benefits of Checklist, Application of checklist.	
Unit – V	Lean Manufacturing	05
	What is Lean Manufacturing, How to practice Lean Manufacturing, Principles of Lean, Types of Waste in Lean Management – Mura, Muri and Muda, Goals and Strategy of Lean Manufacturing. Pros and Cons of Lean Manufacturing.	

Unit – VI	SWOT Analysis	05
	What is SWOT Analysis, How to do SWOT Analysis, How to use SWO Analysis, When and Where to use SWOT Analysis, Characteristics of SWOT Analysis	
Books		
Name of Authors	Title of the Book	Publisher
Brenden Cooper	Good Manufacturing Practices Made Easy	
Cornelius T. Leondes	Industrial and Manufacturing Systems	Elsevier
A.S. Zope	Manufacturing Systems	Vrunda Publication

Reference Link

1. <https://www.projectmanager.com/blog/what-is-lean-manufacturing>
2. <https://www.guru99.com/all-about-quality-assurance.html>
3. <https://www.smartsheet.com/total-quality-management>
4. <https://www.tradegecko.com/inventory-management>
5. <https://searcherp.techtarget.com/definition/logistics-management#:~:text=Logistics%20management%20activities%20typically%20include,third%2Dparty%20logistics%20services%20providers.>
6. <https://www.businessnewsdaily.com/4245-swot-analysis.html>

Subject Name: Good Manufacturing Concepts and Practices – II

Course Code : BVEMC402		Semester: IV
Weekly Teaching Hours: TH: 03 Tut: 00		Scheme of Marking TH: 25 , IA: 25 , Total: 50
TH Exam Duration: 02 Hours		Scheme of Marking PR: --
Credit: 3		
Content		Hours
Unit – I	Layout of Electronic Industry	08
	Electronics industry departments – Design and Development, Manufacturing, Assembly, Electronic Equipment and Component Store, Servicing, Testing, Quality Control	
Unit – II	Work Study Concept	09
	Work study concept, work study techniques – Method Study and Work Measurement, Sequencing of Operations and timing the flow steps, Advantages and application of work study.	
Unit – III	Team Working	08
	Team forming concept, Team forming stages – Forming, Storming, Norming, Performing, and Adjourning. Advantages and application of Team Work.	
Unit – IV	Toyota Production System	08
	What is Toyota Production System, Foundation of Toyota Production System – Leveled Production, Standardized Work, Visual Management, Pilers of TPS – Just in Time, Built in Quality, Advantages of Toyota Production System.	
Unit – V	Case Studies	06
	LG, Samsung, Whirlpool, Toyota	
Books		
Name of Authors	Title of the Book	Publisher
Brenden Cooper	Good Manufacturing Practices Made Easy	
Cornelius T. Leondes	Industrial and Manufacturing Systems	Elsevier
A.S. Zope	Manufacturing Systems	Vrunda Publication
Jon Miller, Mike Wroblewki and Jaime Villafuerte	Creating A Kaizen Culture	McGraw-Hill Education

Subject Name: Basic Control System		
Course Code : BVEMC403		Semester: IV
Weekly Teaching Hours: TH: 03 Tut: 00		Scheme of Marking TH: 25 , IA: 25 , Total: 50
TH Exam Duration: 02 Hours		Scheme of Marking PR: --
Credit: 3		
Content		Hours
Unit – I	Fundamentals of Control System	07
	Control System : Classification –Positive and Negative Feedback. Laplace Transform for standard functions, Transfer Function : Definition and Derivation. R- C, R-L-C electrical Circuits : Differential Equation and Transfer Functions. Order of System : Zero, First and Second Order system, Standard Equations. Block diagram reduction technique, Need and Reduction Rules.	
Unit – II	Time Response Analysis	07
	Time Domain Analysis : Transient and Steady State Response. Standard Test Input : Step, Ramp, Parabolic and Impulse, Identify its real time applications. First order control system : Analysis for unit step input, concept of time constants. Second order control system : Analysis for unit step input, concept, and effect of damping. Time Response Specifications (No derivations): Tp, Ts, Tr, Td, Mp, Ess etc. Steady State Error and Error Constants.	
Unit – III	Stability Analysis of Control System	07
	Explain with sketches the stability of the given control system. Determine the stability of the given control system using Routh’s stability criteria. Determine the stability of the given control system using Bode Plot. Describe the procedure to troubleshoot the stability of given control system using frequency response specification.	
Unit – IV	Process Control and Control Actions	08
	Explain with sketches the control system for controlling the process industry. Describe with sketches the different control action to control the given process industry. Select the relevant controllers for controlling the given process in industry with justification. Describe with sketches the specified controller for proper control action for controlling the process. Describe the procedure to troubleshoot the given process control.	
Unit – V	Component of Servo Systems	08
	Explain with sketches the construction and working of the given type of Servo system. Explain with sketches the working of specified servo system components in servo system. Select the relevant servo component for controlling the given servo systems with justification. Describe the procedure to troubleshoot the specified components of the given type of control system.	

Books		
Name of Authors	Title of the Book	Publisher
Kumar, Anand	Control System	Prentice hall of India, New Delhi, 2014
Varmah, K.R.	Control System	Tata MaGraw Hill, New Delhi, 2010
Johnson C.D.	Process Control Instrumentation Technology	PHI Learning, New Delhi, 2015
Ramchandran C. P.	Control Engineering	Willey India, Delhi, 2013

Subject Name: Microcontroller and Application		
Course Code: BVEMC404		Semester: IV
Weekly Teaching Hours: TH: 03 Tut: 00		Scheme of Marking TH: 25 , IA: 25 , Total: 50
TH Exam Duration: 02 Hours		Scheme of Marking PR: --
Credit: 3		
Content		Hours
Unit – I	Basics of Microprocessor and 8051 Microcontroller	07
	Microprocessor, Microcomputer and Microcontroller Comparison and Application. Types of Buses – Address, Data, Control. Harvard and Von-neumen Architecture. 8051 Microcontroller Architecture, Pin Configuration, Stack and Memory Organization. Power Saving Mode – Idle and Power Down mode.	
Unit – II	8051 Instruction Set and Programming	07
	Identify the Addressing modes, Instruction Set (Data Transfer, Logical, Arithmetic, Branching, Machine Control, Stack Operation, Boolean), Software Development Cycle: editor, assembler, cross-compiler, linker, locator, compiler. Assembler Directives : ORG, DB, EQU, END, CODE, DATA	
Unit – III	8051 Timers, Interrupts, Serial and Parallel Communication	07
	I/O Port Structure and Configuration – P0, P1, P2 and P3. Timers/Counters – SFR : TMOD, TCON, Timer/Counter – Logic and Mode, Simple Programs on timer to Generate time delay (C Language Program). Interrupt – SFR : IE, IP simple program on interrupt, Serial Communication – SFR : SCON, SBUF, PCON, Modes of Serial Communication. Simple Program on Serial Communication.	
Unit – IV	8051 Memory and I/O Device Interfacing	08
	Memory Interfacing – Program and data memory, I/O Interfacing – LED, Relays, Keyboard, LCD, Seven Segment Display, Stepper Motor. Interfacing DAC – 0808 with its simple programming, Interfacing ADC – 0808/0809 with 8051 and its simple programming.	
Unit – V	Applications of Microcontroller	08
	Generate the Square Waveform using port pins of 8051, Square and Triangle waveform generation using DAC, Make water level controller, Make Temperature Controller using ADC (0808/0809), Make a circuit for stepper motor control, Make Traffic Light Controller.	
Books		
Name of Authors	Title of the Book	Publisher
Kenneth J. Ayala	8051 Microcontroller Architecture, Programming and Application	PHI Learning, New Delhi, July 2004
Sunil Mathur, Jeebananda Panda	Microprocessor and Microcontroller	PHI Learning, New Delhi, 2016

Raj Kamal	Microcontroller Architecture Programming, Interfacing and System Design	Pearson Education, Delhi, 2012
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Subject Name: Microcontroller and Application – Lab

Course Code : BVEML405	Semester: IV
Weekly Practical: PR: 01 Tut: 00	Scheme of Marking TH: --
TH Exam Duration: --	Scheme of Marking PR: 25 , IA: 25 , Total: 50
Credit: 1.5	

List of Practical

1. Identify various blocks of 8051 microcontroller development board
2. Write an C Program to generate time delay.
3. Interface LED with microcontroller and turn it ON with Microcontroller Interrupt.
4. Develop C Program to generate pulse and square wave by using Timer Delay.
5. Interface 4x4 LED matrix with 8051 to display various pattern.
6. Interface the 7-Segment display to display the decimal number from 0 to 9.
7. Interface the relay with 8051 and turn ON and OFF to it.
8. Interface the LCD with 8051 to display characters and decimal number.
9. Interface the given Keypad with 8051 to the Key Pressed.
10. Interface the ADC with 8051 to verify input/output.
11. Interface the DAC with 8051 and observe the following waveforms : Square Wave, Triangle Wave, Sawtooth Wave.
12. Interface the stepper motor to microcontroller and rotate in clockwise and anti-clockwise direction at the given angles.

Subject Name: Feedback Control System – Lab

Course Code : BVEML406	Semester: IV
Weekly Practical: PR: 01 Tut: 00	Scheme of Marking TH: --
TH Exam Duration: --	Scheme of Marking PR: 25 , IA: 25 , Total: 50
Credit: 1.5	

List of Practical

1. Classify the control system available in control system laboratory.
2. Interpret the response of First Order R-C circuit for the different standard inputs.
3. Interpret the response of First Order R-C circuit for the different standard inputs using open source software.
4. Interpret the response of First Order R-L-C circuit for the different standard inputs.
5. Interpret the response of First Order R-L-C circuit for the different standard inputs using open source software.
6. Interpret the given Type 0 of control system for step, ramp and parabolic inputs.
7. Interpret the given Type 0 of control system for step, ramp and parabolic inputs using open source software.
8. Interpret the given Type 1 of control system for step, ramp and parabolic inputs.
9. Interpret the given Type 1 of control system for step, ramp and parabolic inputs using open source software.
10. Interpret the given Type 2 of control system for step, ramp and parabolic inputs.
11. Interpret the given Type 2 of control system for step, ramp and parabolic inputs using open source software.
12. Test the stability of given control system using open source software.
13. Use ON-OFF controller for controlling the given process parameter.
14. Troubleshooting Proportional controller for controlling the given process parameter.
15. Troubleshooting PI controller for controlling the given process parameter.
16. Troubleshooting PD controller for controlling the given process parameter.
17. Troubleshooting PID controller for controlling the given process parameter.
18. Interpret the characteristics of the given Potentiometer as error detector.
19. Interpret the characteristics of the given Synchro as error detector.
20. Troubleshoot different servo components for controlling the angular position of the given DC servo system.
21. Troubleshoot different servo components for controlling the angular position of the given AC servo system.
22. Apply the generated pulse to the given stepper motor and measure its speed.

Group GEM2 of Qualifier Packs

Subject Name : Purchase Executive (ELE/Q5701)	
Course Code : BVEME417	Semester: IV
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: 150 , IA: 50 , Total: 200
Credit: 15	Choose any one from specified Group GEM2 of Qualification Packs
Syllabus for this qualifier Pack is available on https://nsdcindia.org/sites/default/files/QP_ELE-Q5701_Purchase-Executive.pdf	

Subject Name : Quality Engineer (ELE/Q7901)	
Course Code : BVEME428	Semester: IV
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: 150 , IA: 50 , Total: 200
Credit: 15	Choose any one from specified Group GEM2 of Qualification Packs
Syllabus for this qualifier Pack is available on https://www.nqr.gov.in/sites/default/files/QP-Quality%20Engineer.pdf	

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