



## G. H. Raisoni College of Engineering, Nagpur

(An Autonomous Institution under UGC Act 1956 & Affiliated to Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur)

### Department of Electrical Engineering

| Name of Sector                                   | Sub- Sector  | Qualification Pack (Course Name)    | Link  | Scheme                                     | DURATION  |
|--|--|-------------------------------------|---|--|---|
| Electronics                                      | Industrial Electronics   | ELE/Q7302 - Wireman – Control Panel | <a href="https://www.nsd.cindia.org/sites/default/files/files/Wireman-Control-Panel.pdf">https://www.nsd.cindia.org/sites/default/files/files/Wireman-Control-Panel.pdf</a> | Pradhan Mantri Kaushal Vikas Yojna (PMKVY) | <b>300 HOURS</b> [5-Months]<br>(7-HOURS PER DAY / 2-DAYS PER WEEK)<br>Start Date : 01.12.17 |
| Applicable National Occupational Standards (NOS) | 1.ELE/N7302 Wire Control Panel<br>2.ELE/N9962 Interact With Co-Workers<br>3. ELE/N9963 Maintain safe work surrounding<br><br>Optional:<br>Not Applicable |                                     |   |  |   |
| Name of Trainer Faculty                          | 1.Prof. P. L. Ramtekkar<br>2.Prof. J. G. Chaudhari<br>3.Prof. P. P. Jagtap<br>4.Prof. R. H. Adware<br>5.Prof. A. K. Gupta                                |                                     |   |  |   |

### TEACHING PLAN

| Topic Nos.  | Syllabus Contents                              | Resources Person | Date       | Hours |
|---|--|------------------|------------|-------|
| <b>ELE/N7302 Wire Control Panel (54 HOURS)</b>                  |  |                  |            |       |
| <b>1. Understanding Basics of Electrical &amp; Electronics.</b> |  |                  |            |       |
| 1.  | Understanding Concepts of Current & Voltage    | <b>PLR</b>       | 01/12/2017 | 1     |
| 2.  | Understanding Concepts of Power Factor & Power | <b>AKG</b>       | 01/12/2017 | 1     |
| 3.  | Kirchhoff's laws                               | <b>JGC</b>       | 01/12/2017 | 2     |
| 4.  | Ohms Law                                       | <b>PPJ</b>       | 01/12/2017 | 2     |
| 5.  | Understanding AC & DC Current & Voltage.       | <b>RHA</b>       | 01/12/2017 | 1     |
| 6.  | Concept of Line & Neutral                      | <b>PLR</b>       | 02/12/2017 | 2     |
| 7.  | Concept of 1-ph (L-N)                          | <b>AKG</b>       | 02/12/2017 | 2     |
| 8.  | 3- ph (RYB - N)                                | <b>RHA</b>       | 02/12/2017 | 2     |
| 9.  | Using Diodes, Triodes, Transistors,            | <b>PPJ</b>       | 02/12/2017 | 1     |
| 10  | Resistors, Capacitors, Inductors               | <b>PLR</b>       | 08/12/2017 | 1     |

|  |   |            |            |   |
|--|---|------------|------------|---|
| 11   | Class Room Test-I                             | <b>AKG</b> | 08/12/2017 | 1 |
| 12   | LEDs, Thermistors etc                         | <b>JGC</b> | 08/12/2017 | 2 |
| 13   | Using Push Buttons,                           | <b>PPJ</b> | 08/12/2017 | 2 |
| 14   | Indicating Lamps,                             | <b>RHA</b> | 08/12/2017 | 1 |
| 15   | Selector/Key Switches                         | <b>PLR</b> | 09/12/2017 | 2 |
| 16   | Understanding Transformers (CT/PT),           | <b>AKG</b> | 09/12/2017 | 2 |
| 17   | Voltmeter, Ammeter, Energy meter              | <b>RHA</b> | 09/12/2017 | 2 |
| 18   | Terminal Blocks & Din Rails                   | <b>PPJ</b> | 09/12/2017 | 1 |
| 19   | Understanding Concept of Relays               | <b>PLR</b> | 15/12/2017 | 1 |
| 20   | Understanding Concept of Contactors (NO/NC)   | <b>AKG</b> | 15/12/2017 | 1 |
| 21   | Using Power Supplies                          | <b>JGC</b> | 15/12/2017 | 2 |
| 22   | Earthing & Grounding                          | <b>PPJ</b> | 15/12/2017 | 2 |
| 23   | Using Shielded & Unshielded Cables            | <b>RHA</b> | 15/12/2017 | 1 |
| 24   | Cable Gauges & AWG sizes                      | <b>PLR</b> | 16/12/2017 | 2 |
| 25   | IS standards for Colour Codes & Application   | <b>AKG</b> | 16/12/2017 | 2 |
| 26   | Class Room Test-II                            | <b>RHA</b> | 16/12/2017 | 2 |
| 27   | Understanding Electrical Circuits (Series)    | <b>PPJ</b> | 16/12/2017 | 1 |
| 28   | Understanding Electrical Circuits (Parallel)  | <b>PLR</b> | 22/12/2017 | 1 |
| 29   | Understanding Daisy Chain                     | <b>AKG</b> | 22/12/2017 | 1 |
| 30   | Point to Point Networking                     | <b>JGC</b> | 22/12/2017 | 2 |
| 31   | Star & Delta Connections                      | <b>PPJ</b> | 22/12/2017 | 2 |
| 32   | Bus Bars                                      | <b>RHA</b> | 22/12/2017 | 1 |
| 33   | Line chokes & Capacitors                      | <b>PLR</b> | 23/12/2017 | 2 |
| 34   | ISA Symbols                                   | <b>AKG</b> | 23/12/2017 | 2 |
| 35   | Class Room Test-III                           | <b>PPJ</b> | 23/12/2017 | 1 |
| <b>2.WIRING DRAWING OF CONTROL PANELS(17Hours)</b> |   |            |            |   |
| 36   | Reading AutoCAD drawings of Wiring            | <b>RHA</b> | 23/12/2017 | 2 |
| 37   | Reading AutoCAD drawings of Wiring            | <b>PLR</b> | 05/01/2018 | 1 |
| 38   | Reading AutoCAD drawings of Wiring            | <b>AKG</b> | 05/01/2018 | 1 |
| 39   | Reading AutoCAD drawings of Wiring            | <b>JGC</b> | 05/01/2018 | 2 |
| 40   | Reading AutoCAD drawings of Wiring            | <b>PPJ</b> | 05/01/2018 | 2 |
| 41   | Understanding Basic AutoCAD Commands          | <b>RHA</b> | 05/01/2018 | 1 |
| 42   | Understanding Basic AutoCAD Commands          | <b>PLR</b> | 06/01/2018 | 2 |
| 43   | Understanding Basic AutoCAD Commands          | <b>AKG</b> | 06/01/2018 | 2 |
| 44   | Understanding Basic AutoCAD Commands          | <b>RHA</b> | 06/01/2018 | 2 |
| 45   | Understanding Basic AutoCAD Commands          | <b>PPJ</b> | 06/01/2018 | 1 |
| 46   | Class Room Test-IV                            | <b>PLR</b> | 12/01/2018 | 1 |
| <b>3.ELECTRICAL SAFETY(12 Hours)</b>               |   |            |            |   |
| 47   | Use of Rubber soled Shoes, Gloves and Goggles | <b>AKG</b> | 12/01/2018 | 1 |

|   |   |            |            |   |
|---|---|------------|------------|---|
| 48  | Understanding of Conductivity of Water<br>o Earthing Pit<br>o Earthing Plates & Strips    | <b>JGC</b> | 12/01/2018 | 2 |
| 49  | Understanding of MCBs   | <b>PPJ</b> | 12/01/2018 | 2 |
| 50  | Understanding of ELCBs  | <b>RHA</b> | 12/01/2018 | 1 |
| 51  | Understanding of SFUs   | <b>PLR</b> | 13/01/2018 | 2 |
| 52  | Understanding of Earthing Pit   | <b>AKG</b> | 13/01/2018 | 2 |
| 53  | Understanding of Earthing Plates & Strips<br>Class Room Test-V                            | <b>RHA</b> | 13/01/2018 | 2 |
| <b>4.TOOLS &amp; EQUIPMENT(22Hours)</b>   |   |            |            |   |
| 54  | Using a Multi-meter for Current, voltage (AC/DC),<br>Resistance & Continuity measurements | <b>PPJ</b> | 13/01/2018 | 1 |
| 55  | Using a tester  | <b>PLR</b> | 19/01/2018 | 1 |
| 56  | Using a tester  | <b>AKG</b> | 19/01/2018 | 1 |
| 57  | Using a Tong-Tester   | <b>JGC</b> | 19/01/2018 | 2 |
| 58  | Using Pliers and Wire Stripper  | <b>PPJ</b> | 19/01/2018 | 2 |
| 59  | Screw Driver Set (All terminal types)   | <b>RHA</b> | 19/01/2018 | 1 |
| 60  | Use of Allen Key Set  | <b>PLR</b> | 20/01/2018 | 2 |
| 61  | Using a Power Drill (Drill bits)  | <b>AKG</b> | 20/1/2018  | 2 |
| 62  | Using Insulation Tape   | <b>RHA</b> | 20/1/2018  | 2 |
| 63  | Using Wire Lugs   | <b>PPJ</b> | 20/1/2018  | 1 |
| 64  | Using a soldering Iron  | <b>PLR</b> | 27/1/2018  | 2 |
| 65  | Using a Megger  | <b>AKG</b> | 27/1/2018  | 2 |
| 66  | Using Wrenches, Hammer, Wire bender etc   | <b>RHA</b> | 27/01/2018 | 2 |
| 67  | Using a Ladder  | <b>PPJ</b> | 27/01/2018 | 1 |
| <b>5.WIRING A CONTROL PANEL(16 Hours)</b> |   |            |            |   |
| 68  | Determining BOQ of Components   | <b>PLR</b> | 02/2/2018  | 1 |
| 69  | Checking received material for specifications as per<br>drawing.                          | <b>AKG</b> | 02/2/2018  | 1 |
| 70  | Creating Channel layout   | <b>JGC</b> | 02/2/2018  | 2 |
| 71  | Selecting the correct Conductor   | <b>PPJ</b> | 02/2/2018  | 2 |
| 72  | Testing for Shorts / Continuity   | <b>RHA</b> | 02/2/2018  | 1 |
| 73  | Cutting required lengths  | <b>PLR</b> | 03/2/2018  | 2 |
| 74  | Using Ferrules & Cable lugs   | <b>AKG</b> | 03/2/2018  | 2 |
| 75  | Terminal Tightening Torque  | <b>RHA</b> | 03/2/2018  | 2 |
| 76  | Checking the circuits   | <b>PPJ</b> | 03/2/2018  | 1 |

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|--|---|------------|------------|---|
| 77   | Dressing the Cables   | <b>PLR</b> | 09/2/2018  | 1 |
| 78   | Using Cable Glands (Single Compression /Double Compression) | <b>AKG</b> | 09/2/2018  | 1 |
| <b>6.IDENTIFYING FACULTY COMPONENTS (12Hours)</b>                    |   |            |            |   |
| 79   | Testing Power Supply  | <b>JGC</b> | 09/2/2018  | 2 |
| 80   | Testing Relays & Contactors                                 | <b>PPJ</b> | 09/2/2018  | 2 |
| 81   | Testing CT/PT   | <b>RHA</b> | 09/2/2018  | 1 |
| 82   | Testing Pushbuttons, Indicating Lamps & Selector Switches   | <b>PLR</b> | 10/2/2018  | 2 |
| 83   | Ammeter & Energy meter                                      | <b>AKG</b> | 10/2/2018  | 2 |
| 84   | Testing Voltmeter   | <b>RHA</b> | 10/2/2018  | 2 |
| 85   | Troubleshooting of Control Panels                           | <b>PPJ</b> | 10/2/2018  | 1 |
| <b>7.BASIC PLC &amp; HMI COMPONENTS (09 Hours)</b>                   |   |            |            |   |
| 86   | Understanding Components of a PLC system                    | <b>PLR</b> | 16/2/2018  | 1 |
| 87   | Types of I/Os (Analog, Digital, HS Pulse)                   | <b>AKG</b> | 16/2/2018  | 1 |
| 88   | Wiring for I/Os   | <b>JGC</b> | 16/2/2018  | 2 |
| 89   | Testing of I/O Terminations (Point Testing)                 | <b>PPJ</b> | 16/2/2018  | 2 |
| 90   | Source and Sink Connections                                 | <b>RHA</b> | 16/2/2018  | 1 |
| 91   | HMI Wiring & mounting                                       | <b>PLR</b> | 17/2/2018  | 2 |
| <b>8.FUNDAMENTALS OF MOTORS,GENERATORS &amp; STARTERS (07 Hours)</b> |   |            |            |   |
| 92   | Understanding Motors and Generators                         | <b>AKG</b> | 17/2018    | 2 |
| 93   | Understanding Slip ring Induction Motor                     | <b>RHA</b> | 17/2/2018  | 2 |
| 94   | Understanding Squirrel Cage Induction Motor                 | <b>PPJ</b> | 17/2/2018  | 1 |
| 95   | Understanding DOL Starter                                   | <b>PLR</b> | 23/2/2018  | 1 |
| 96   | Understanding Star / Delta Starter                          | <b>AKG</b> | 23/2/2018  | 1 |
| <b>9.BASIC OF AC DRIVES &amp; SOFT STARTERS (11 Hours)</b>           |   |            |            |   |
| 97   | Understanding Components of a AC Drive system               | <b>JGC</b> | 23/02/2017 | 2 |
| 98   | Understanding Types of VFD Control Terminals                | <b>PPJ</b> | 23/02/2017 | 2 |
| 99   | Understanding Wiring for I/Os                               | <b>RHA</b> | 23/02/2017 | 1 |
| 100  | Understanding Components of a Soft starter                  | <b>PLR</b> | 24/02/2017 | 2 |
| 101  | Understanding Types of Soft starter Control Terminals       | <b>AKG</b> | 24/2/2018  | 2 |
| 102  | Understanding Wiring for I/Os                               | <b>RHA</b> | 24/2/2018  | 2 |
| <b>10. PROFESSIONAL SKILLS (08 Hours)</b>                            |   |            |            |   |
| 103  | Reading Job sheets  | <b>PPJ</b> | 24/2/2018  | 1 |
| 104  | Preparing indents, Maintenance logs invoices and            | <b>PLR</b> | 02/3/2018  | 1 |

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|---|--|------------|------------|---|
| 105   | Using MS Excel & MS Word for Record keeping                                  | <b>AKG</b> | 02/3/2018  | 1 |
| 106   | Preparing As-built documentation, Ferrule list                               | <b>JGC</b> | 02/3/2018  | 2 |
| 107   | Sharing and delegation of Tasks  | <b>PPJ</b> | 02/3/2018  | 2 |
| 108   | Preparing Task Reports   | <b>RHA</b> | 02/3/2018  | 1 |
| <b>11.CO-ORDINATION &amp; COMMUNICATION SKILLS (14 Hours)</b> |  |            |            |   |
| 109   | Preparing Service Reports  | <b>PLR</b> | 03/03/2018 | 2 |
| 110   | Preparing Delivery Documentation   | <b>AKG</b> | 03/03/2018 | 2 |
| 111   | Preparing Minutes of Meeting   | <b>RHA</b> | 03/03/2018 | 2 |
| 112   | Managing Team Members  | <b>PPJ</b> | 03/03/2018 | 1 |
| 113   | Managing Time Targets & Commitments to Customers                             | <b>PLR</b> | 09/03/2018 | 1 |
| 114   | Preparing faulty parts report  | <b>AKG</b> | 09/03/2018 | 1 |
| 115   | Understanding Material Workflow (Stores to Production)                       | <b>JGC</b> | 09/03/2018 | 2 |
| 116   | Writing e-mails  | <b>PPJ</b> | 09/03/2018 | 2 |
| 117   | Understanding Principles of 5S & Kaizen                                      | <b>RHA</b> | 09/03/2018 | 1 |
| <b>12. WORKPLACE HEALTH &amp; SAFETY (16 Hours)</b>           |  |            |            |   |
| 118   | Using Fire & Hazardous chemicals handling                                    | <b>PLR</b> | 10/3/2018  | 2 |
| 119   | Incident Reporting   | <b>AKG</b> | 10/3/2018  | 2 |
| 120   | Using Fire Extinguishers A,B,C, ABC  | <b>RHA</b> | 10/3/2018  | 2 |
| 121   | ESD Procedures for handling electronic components                            | <b>PPJ</b> | 10/3/2018  | 1 |
| 122   | Use of Safety Helmets, Ear plugs, Shoes, Gloves, goggles & Safety harnesses. | <b>PLR</b> | 16/03/2018 | 1 |
| 123   | Using First aid for Electrical Shock & Burn victims                          | <b>AKG</b> | 16/03/2018 | 1 |
| 124   | Fire Drills & Evacuation procedures  | <b>JGC</b> | 16/03/2018 | 2 |
| 125   | Use of helmet & Respect for Traffic rules                                    | <b>PPJ</b> | 16/03/2018 | 2 |
| 126   | Understanding Health Policy  | <b>RHA</b> | 16/03/2018 | 1 |
| 127   | Understanding Posture, exercise & diet                                       | <b>PLR</b> | 17/03/2018 | 2 |
| <b>13. WORKPLACE ASSET MANAGEMENT (05 Hours)</b>              |  |            |            |   |
| 128   | Creating Tool list & Storage of tools  | <b>AKG</b> | 17/03/2018 | 2 |
| 129   | Calibrating Measuring instruments  | <b>RHA</b> | 17/03/2018 | 2 |
| 130   | Managing Tool Crib library   | <b>PPJ</b> | 17/03/2018 | 1 |
| <b>14.HANDS ON PRACTICE (97 Hours)</b>                        |  |            |            |   |
| 131   | Hands on practice  | <b>PLR</b> | 23/03/2018 | 1 |
| 132   | Hands on practice  | <b>AKG</b> | 23/03/2018 | 1 |
| 133   | Hands on practice  | <b>JGC</b> | 23/03/2018 | 2 |
| 134   | Hands on practice  | <b>PPJ</b> | 23/03/2018 | 2 |
| 135   | Hands on practice  | <b>RHA</b> | 23/03/2018 | 1 |
| 136   | Hands on practice  | <b>PLR</b> | 24/03/2018 | 2 |
| 137   | Hands on practice  | <b>AKG</b> | 24/03/2018 | 2 |
| 138   | Hands on practice  | <b>RHA</b> | 24/03/2018 | 2 |
| 139   | Hands on practice  | <b>PPJ</b> | 24/03/2018 | 1 |

|     |                   |            |            |   |
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| 140 | Hands on practice | <b>PLR</b> | 30/03/2018 | 1 |
| 141 | Hands on practice | <b>AKG</b> | 30/03/2018 | 1 |
| 142 | Hands on practice | <b>JGC</b> | 30/03/2018 | 2 |
| 143 | Hands on practice | <b>PPJ</b> | 30/03/2018 | 2 |
| 144 | Hands on practice | <b>RHA</b> | 30/03/2018 | 1 |
| 145 | Hands on practice | <b>PLR</b> | 31/03/2018 | 2 |
| 146 | Hands on practice | <b>AKG</b> | 31/03/2018 | 2 |
| 147 | Hands on practice | <b>RHA</b> | 31/03/2018 | 2 |
| 148 | Hands on practice | <b>PPJ</b> | 31/03/2018 | 1 |
| 149 | Hands on practice | <b>PLR</b> | 06/04/2018 | 1 |
| 150 | Hands on practice | <b>AKG</b> | 06/04/2018 | 1 |
| 151 | Hands on practice | <b>JGC</b> | 06/04/2018 | 2 |
| 152 | Hands on practice | <b>PPJ</b> | 06/04/2018 | 2 |
| 153 | Hands on practice | <b>RHA</b> | 06/04/2018 | 1 |
| 154 | Hands on practice | <b>PLR</b> | 07/04/2018 | 2 |
| 155 | Hands on practice | <b>AKG</b> | 07/04/2018 | 2 |
| 156 | Hands on practice | <b>RHA</b> | 07/04/2018 | 2 |
| 157 | Hands on practice | <b>PPJ</b> | 07/04/2018 | 1 |
| 158 | Hands on practice | <b>PLR</b> | 13/04/2018 | 1 |
| 159 | Hands on practice | <b>AKG</b> | 13/04/2018 | 1 |
| 160 | Hands on practice | <b>JGC</b> | 13/04/2018 | 2 |
| 161 | Hands on practice | <b>PPJ</b> | 13/04/2018 | 2 |
| 162 | Hands on practice | <b>RHA</b> | 13/04/2018 | 1 |
| 163 | Hands on practice | <b>PLR</b> | 14/04/2018 | 2 |
| 164 | Hands on practice | <b>AKG</b> | 14/04/2018 | 2 |
| 165 | Hands on practice | <b>RHA</b> | 14/04/2018 | 2 |
| 166 | Hands on practice | <b>PPJ</b> | 14/04/2018 | 1 |
| 167 | Hands on practice | <b>PLR</b> | 20/04/2018 | 1 |
| 168 | Hands on practice | <b>AKG</b> | 20/04/2018 | 1 |
| 169 | Hands on practice | <b>JGC</b> | 20/04/2018 | 2 |
| 170 | Hands on practice | <b>PPJ</b> | 20/04/2018 | 2 |
| 171 | Hands on practice | <b>RHA</b> | 20/04/2018 | 1 |
| 172 | Hands on practice | <b>PLR</b> | 21/04/2018 | 2 |
| 173 | Hands on practice | <b>AKG</b> | 21/04/2018 | 2 |
| 174 | Hands on practice | <b>RHA</b> | 21/04/2018 | 2 |
| 175 | Hands on practice | <b>PPJ</b> | 21/04/2018 | 1 |
| 176 | Hands on practice | <b>PLR</b> | 27/04/2018 | 1 |
| 177 | Hands on practice | <b>AKG</b> | 27/04/2018 | 1 |
| 178 | Hands on practice | <b>JGC</b> | 27/04/2018 | 2 |
| 179 | Hands on practice | <b>PPJ</b> | 27/04/2018 | 2 |
| 180 | Hands on practice | <b>RHA</b> | 27/04/2018 | 1 |

|     |                   |            |            |          |
|-----|-------------------|------------|------------|----------|
| 181 | Hands on practice | <b>PLR</b> | 28/04/2018 | 2        |
| 182 | Hands on practice | <b>AKG</b> | 28/04/2018 | 2        |
| 183 | Hands on practice | <b>RHA</b> | 28/04/2018 | 2        |
| 184 | Hands on practice | <b>PPJ</b> | 28/04/2018 | 1        |
| 185 | Hands on practice | <b>PLR</b> | 04/05/2018 | 1        |
| 186 | Hands on practice | <b>AKG</b> | 04/05/2018 | 1        |
| 187 | Hands on practice | <b>JGC</b> | 04/05/2018 | 2        |
| 188 | Hands on practice | <b>PPJ</b> | 04/05/2018 | 2        |
| 189 | Hands on practice | <b>RHA</b> | 04/05/2018 | 1        |
| 190 | Hands on practice | <b>PLR</b> | 05/05/2018 | 2        |
| 191 | Hands on practice | <b>AKG</b> | 05/05/2018 | 2        |
| 192 | Hands on practice | <b>RHA</b> | 05/05/2018 | <b>2</b> |