

| RGPV (DIPLOMA WING) BHOPAL | | OBE CURRICULUM FOR THE COURSE | | FORMAT- 3 | Sheet No. 1/2 |
|-----------------------------|---|-------------------------------|-----------------------|---------------------|---------------|
| Branch | Mechanical Engineering | | | Semester | VI |
| Course Code | | Course Name | Industrial Automation | | |
| Course Outcome 1 | Explain Industrial automation, its types. | | | Teach Hrs | Marks |
| Learning Outcome 1 | Explain basic elements of automation system. | | | 5+0 | 10 |
| Contents | Need and benefits of Industrial Automation, automation hierarchy, basic elements of automation system, description of each element. | | | | |
| Method of Assessment | paper pen test (Part of Progressive Test -1) | | | | |
| Learning Outcome 2 | Explain types of industrial automation. | | | 5+2 | 10 |
| Contents | Types of automation - fixed, programmable, flexible, Principles & strategies of automation, levels of automations. Classification of Manufacturing Systems- Manufacturing cells, GT, Cellular manufacturing, FMS, Flow lines & transfer mechanisms. | | | | |
| Method of Assessment | Theory exam (Part of end semester exam) | | | | |
| Course Outcome 2 | Describe construction, working of Hydraulic actuation system | | | Teach Hrs | Marks |
| Learning Outcome 1 | Explain construction, working of Hydraulic actuation system components. | | | 5+3 | 10 |
| Contents | Hydraulic Actuation Systems: Hydraulic fluid, Fluid delivery sub system- Reservoir, filter, Line fitting and seals; Hydraulic pumps. Accumulators- Spring loaded accumulator, Gas charged accumulator. Cylinder- Single acting cylinder, Double acting cylinder. Hydraulic Valves:- Directional control valve, Hydraulic pressure control valve, Hydraulic flow control valve | | | | |
| Method of Assessment | Theory exam (Part of end semester exam) | | | | |
| Learning Outcome 2 | Explain construction, working of Hydraulic Pumps. | | | 7+0 | 10 |
| Contents | Hydraulic Pumps- Gear pump, vane pump, piston pump, radial piston pump, swash plate design inline piston pumps. | | | | |
| Method of Assessment | Theory exam (Part of end semester exam) | | | | |
| Learning Outcome 3 | Draw Hydraulic circuit diagram of a given Hydraulic actuation system. | | | 0+9 | 10 |
| Contents | Hydraulic circuit diagram. | | | | |
| Method of Assessment | Laboratory test by observation (Part of end semester practical exam) | | | | |
| Learning Outcome 4 | Identify problems, their causes and possible remedies of a given faulty Hydraulic Actuation system. | | | 3+2 | 10 |
| Contents | Faults, there identification and troubleshooting/remedial measures in hydraulic actuation system. Selection criteria for Hydraulic actuation systems, Safety measures in operation and maintenance of hydraulic actuation systems | | | | |

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| Method of Assessment | paper pen test (Part of Progressive Test -2) | | |
| Course Outcome 3 | Describe construction, working of Pneumatic Actuation System. | Teach Hrs | Marks |
| Learning Outcome 1 | Explain construction, working of Pneumatic actuation system components. | 4+0 | 10 |
| Contents | Actuator- liner, Rotary, Limited angle; Compressor, Reservoir; Valve- based on action, number of plug and flow characteristic; piping system. Filter-regulator-lubricator(FRL), dryer | | |
| Method of Assessment | Assignment(Part of term work) | | |
| Learning Outcome 2 | Explain construction, working of Compressors. | 6+2 | 10 |
| Contents | Compressor- piston compressor, Double acting compressor, Multistage combined two stage compressor, Diaphragm compressor, Screw compressor, Rotary vane compressor, Lobe compressor, Dynamic compressor | | |
| Method of Assessment | Theory exam (Part of end semester exam) | | |
| Learning Outcome 3 | Draw Pneumatic circuit diagram of a given Pneumatic Actuation Systems. | 0+6 | 10 |
| Contents | Pneumatic circuit diagram. | | |
| Method of Assessment | Laboratory test by observation and Viva (part of lab work) | | |
| Learning Outcome 4 | Identify problems, their causes and possible remedies of a given faulty Pneumatic Actuation Systems. | 0+6 | 10 |
| Contents | Faults, there identification and troubleshooting/remedial measure in Pneumatic system. Selection criteria for Pneumatic actuation systems. Safety measures in operation and maintenance of pneumatic actuation systems. | | |
| Method of Assessment | Laboratory test by observation (Part of end semester practical exam) | | |
| Course Outcome 4 | Explain construction, working of Sensors, Transducers | Teach Hrs | Marks |
| Learning Outcome 1 | Explain terms related to Sensors, Transducers. | 6+0 | 10 |
| Contents | Sensor- Definition , classification, Transducer- Definition , classification Performance Terminology, Static and Dynamic Characteristics, range, span, error, accuracy, sensitivity , Linearity, non- linearity repeatability and reproducibility, stability, dead band/ time, resolution, zero drift, output impedance, response time , time constant. | | |
| Method of Assessment | Theory exam (Part of end semester exam) | | |
| Learning Outcome 2 | Explain construction, working of Sensors, transducers. | 8+0 | 10 |
| Contents | Sensors and transducers : Displacement, Position and Proximity sensors, Potentiometer sensors, Strain gauge element, LVDT, Optical encoders, Pneumatic sensors, Hall effect sensors, Tachogenerators, Strain gauge load cell, Thermostats, Photo Darlington. Interfacing sensors in mechatronic System as – Temperature switch circuit, Float systems. | | |
| Method of | Theory exam (Part of end semester exam) | | |

| Assessment | | | |
|-----------------------------|--|-------------|-----------|
| Course Outcome 5 | Describe construction, working of PLC. | Teach Hrs | Marks |
| Learning Outcome 1 | Explain Logic Operations in electro- mechanical applications, construction of PLC. | 6+2 | 10 |
| Contents | Simple Logic Operations: Logic circuits with AND, OR, XOR operations in electro-mechanical applications, Series and Parallel logic circuits. Components of a PLC: Chassis of a PLC, Power supply module, Input module, Output module, CPU | | |
| Method of Assessment | Theory exam (Part of end semester exam) | | |
| Learning Outcome 2 | Draw wiring diagram of a given PLC setup. | 0+6 | 10 |
| Contents | Setting up PLC, Hands on wiring of input devices to input modules, Hands on wiring of output devices to output module, Instructions to examine ON and examine OFF | | |
| Method of Assessment | Laboratory test by observation and Viva (part of lab work) | | |
| Learning Outcome 3 | Write a ladder logic programme for PLCs. | 0+12 | 10 |
| Contents | COMPUTER BASED INDUSTRIAL CONTROL Understanding Ladder Diagrams: Programming contacts, Addressing contacts, Wiring diagrams, Ladder diagrams, Ladder diagram rules. Programming a Ladder Diagram: Use of programming software for ladder diagram programming, PLC programs to solve logic problems. case studies- pick and place robot, conveyor belt system, Water Tank level. | | |
| Method of Assessment | Laboratory test by observation (Part of end semester practical exam) | | |

**elective Industrial Automation*

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | Course Code | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | <i>1</i> | |
| COURSE NAME | Industrial Automation | | | | | | | | | | |
| CO Description | Explain Industrial automation, its types. | | | | | | | | | | |
| LO Description | Explain basic elements of automation system. | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | |
| S. No. | Learning Content | Teaching – Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | Remarks | | | |
| 1 | Need and benefits of Industrial Automation, automation hierarchy, basic elements of automation system, description of each element. | Interactive classroom teaching, demonstration, quiz, assignments, tutorial | Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. | 5 | NIL | Handouts, chalk board, PPT, text book, charts, video film. | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | Maximum Marks | Resources Required | | | External / Internal | | | | |
| 1 | Paper pen test | Student will be asked to describe automation system / elements. | 10 | Test paper + Rating scale | | | Internal | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | |
| Part of Progressive Test-1 | | | | | | | | | | | |

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | <i>1</i> | <i>2</i> | |
| COURSE NAME | Industrial Automation | | | | | | | | | | | | |
| CO Description | Explain Industrial automation, its types. | | | | | | | | | | | | |
| LO Description | Explain types of industrial automation. | | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching – Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | Remarks | | | | |
| 1 | Types of automation - fixed, programmable, flexible, Principles & strategies of automation, levels of automations. Classification of Manufacturing Systems- Manufacturing cells, GT, Cellular manufacturing, FMS, Flow lines & transfer mechanisms. | Interactive classroom teaching, demonstration, quiz, assignments, tutorial | Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. | 5 | 2 | Handouts, chalk board, PPT, text book, charts, video film. | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | | Maximum Marks | Resources Required | | | | External / Internal | | | | |
| 1 | Theory exam | Student will be asked to explain types of automation/Automation levels/ types of automated manufacturing system. | | 10 | Question paper+ Rating scale | | | | External | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of end semester theory exam | | | | | | | | | | | | | |

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | <i>2</i> | <i>1</i> | |
| COURSE NAME | Industrial Automation | | | | | | | | | | | | |
| CO Description | Describe construction, working of Hydraulic actuation system | | | | | | | | | | | | |
| LO Description | Explain construction, working of Hydraulic actuation system components. | | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching – Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | Remarks | | | | |
| 1 | Hydraulic Actuation Systems: Hydraulic fluid, Fluid delivery sub system- Reservoir, filter, Line fitting and seals; Hydraulic pumps. Accumulators- Spring loaded accumulator, Gas charged accumulator. Cylinder- Single acting cylinder, Double acting cylinder. Hydraulic Valves:- Directional control valve, Hydraulic pressure control valve, Hydraulic flow control valve | Interactive classroom teaching, demonstration, quiz, assignments, tutorial | Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. | 5 | 3 | Handouts, chalk board, PPT, text book, charts, video film. | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | | Maximum Marks | Resources Required | | | | External / Internal | | | | |
| 1 | Theory exam | Student will be asked to explain construction/ working of hydraulic actuation system components. | | 10 | Question paper+ Rating scale | | | | External | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of end semester theory exam | | | | | | | | | | | | | |

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | 2 | 2 | |
| COURSE NAME | Industrial Automation | | | | | | | | | | | | |
| CO Description | Describe construction, working of Hydraulic actuation system | | | | | | | | | | | | |
| LO Description | Explain construction, working of Hydraulic Pumps | | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching – Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | Remarks | | | | |
| 1 | Hydraulic Pumps- Gear pump, vane pump, piston pump, radial piston pump, swash plate design inline piston pumps. | Interactive classroom teaching, demonstration, quiz, assignments, tutorial | Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. | 7 | NIL | Handouts, chalk board, PPT, text book, charts, video film. | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | | Maximum Marks | Resources Required | | | | External / Internal | | | | |
| 1 | Theory exam | Student will be asked to explain construction/ working of hydraulic pumps | | 10 | Question paper+ Rating scale | | | | External | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of end semester theory exam | | | | | | | | | | | | | |

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | 2 | 3 | |
| COURSE NAME | Industrial Automation | | | | | | | | | | | | |
| CO Description | Describe construction, working of Hydraulic actuation system. | | | | | | | | | | | | |
| LO Description | Draw Hydraulic circuit diagram of a given Hydraulic actuation system. | | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching – Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | Remarks | | | | | | |
| 1 | Hydraulic circuit diagram. | Lab demonstration, hands on practice, lab assignments, quiz assignments | Teacher will explain and demonstrate the learning content. The student learn through the practice . | NIL | 9 | Handouts, chalk board, PPT, text book, charts, video film, and lab manual. Hydraulic circuit trainer kit | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | Maximum Marks | Resources Required | | | | | External / Internal | | | | |
| 1 | Laboratory test by observation | Student will be asked to a.) draw hydraulic circuit diagram b.) identify components, their placement/ alternative components and their placements for a given hydraulic actuation system | 10 | Observation schedule/charts/check-list /rating scales /rubrics. | | | | | External | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of end semester practical exam | | | | | | | | | | | | | |

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | <i>2</i> | <i>4</i> | |
| COURSE NAME | | Industrial Automation | | | | | | | | | | | |
| CO Description | | Describe construction, working of Hydraulic actuation system | | | | | | | | | | | |
| LO Description | | Identify problems, their causes and possible remedies of a given faulty Hydraulic Actuation system. | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching –Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | Remarks | | | | |
| 1 | Faults, there identification and troubleshooting/remedial measures in hydraulic actuation system. Selection criteria for Hydraulic actuation systems, Safety measures in operation and maintenance of hydraulic actuation systems | Interactive classroom teaching, demonstration, quiz, assignments, tutorial | Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. | 3 | 2 | Handouts, chalk board, PPT, text book, charts, video film. | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | | Maximum Marks | Resources Required | | | | External / Internal | | | | |
| 1 | Pen paper test | Student will be asked to list probable faults and its remedial measures / trouble shooting procedures in hydraulic actuation systems. | | 10 | Test paper + Rating scale | | | | Internal | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of progressive test -2 | | | | | | | | | | | | | |

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | <i>3</i> | <i>1</i> | |
| COURSE NAME | | Industrial Automation | | | | | | | | | | | |
| CO Description | | Describe construction, working of Pneumatic Actuation System. | | | | | | | | | | | |
| LO Description | | Explain construction, working of Pneumatic actuation system components. | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching – Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | Remarks | | | | |
| 1 | Actuator- liner, Rotary, Limited angle; Compressor, Reservoir; Valve- based on action, number of plug and flow characteristic; piping system. Filter-regulator-lubricator(FRL), dryer | Interactive classroom teaching, demonstration, quiz, assignments, tutorial | Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. | 4 | NIL | Handouts, chalk board, PPT, text book, charts, video film. | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | Maximum Marks | Resources Required | | | External / Internal | | | | | | |
| 1 | Assignment | Student will be asked to explain construction/ working of Pneumatic actuation system components. | 10 | Question paper+ Rating scale | | | Internal | | | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of term work | | | | | | | | | | | | | |

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | <i>3</i> | <i>2</i> | |
| COURSE NAME | | Industrial Automation | | | | | | | | | | | |
| CO Description | | Describe construction, working of Pneumatic Actuation System. | | | | | | | | | | | |
| LO Description | | Explain construction, working of Compressors. | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching –Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | Remarks | | | | |
| 1 | Compressor-piston compressor, Double acting compressor, Multistage combined two stage compressor, Diaphragm compressor, Screw compressor, Rotary vane compressor, Lobe compressor, Dynamic compressor | Interactive classroom teaching, demonstration, quiz, assignments, tutorial | Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/quiz/tutorial to make students practice their knowledge. | 6 | 2 | Handouts, chalk board, PPT, text book, charts, video film. | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | | Maximum Marks | Resources Required | | | | External / Internal | | | | |
| 1 | Theory exam | Student will be asked to explain construction/ working of given Compressors. | | 10 | Question paper+ Rating scale | | | | External | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of end semester theory exam | | | | | | | | | | | | | |

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | <i>3</i> | <i>3</i> | |
| COURSE NAME | Industrial Automation | | | | | | | | | | | | |
| CO Description | Describe construction, working of Pneumatic Actuation System. | | | | | | | | | | | | |
| LO Description | Draw Pneumatic circuit diagram of Pneumatic Actuation Systems. | | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching –Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | Remarks | | | | |
| 1 | Pneumatic circuit diagram. | Lab demonstration, hands on practice, lab assignments, quiz assignments | Teacher will explain and demonstrate the learning content. The student learns through the practice. | NIL | 6 | Handouts, chalk board, PPT, text book, charts, video film and Pneumatic circuit trainer kit | | | 1 | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | | Maximum Marks | Resources Required | | | | External / Internal | | | | |
| 1 | Laboratory test by observation and Viva | Student will be asked to a.) draw pneumatic circuit diagram b.) identify components, their placement/ alternative components and their placements for a given pneumatic actuation system. | | 10 | Observation schedule/check-list /rating scales /rubrics | | | | Internal | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of Lab work | | | | | | | | | | | | | |

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | <i>3</i> | <i>4</i> | |
| COURSE NAME | Industrial Automation | | | | | | | | | | | | |
| CO Description | Describe construction, working of Pneumatic Actuation Systems. | | | | | | | | | | | | |
| LO Description | Identify problems, their causes and possible remedies of a given faulty Pneumatic Actuation System. | | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching –Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | Remarks | | | | |
| 1 | Faults, their identification and troubleshooting/remedial measure in Pneumatic system. Selection criteria for Pneumatic actuation systems. Safety measures in operation and maintenance of pneumatic actuation systems. | Lab demonstration, hands on practice, lab assignments, quiz assignments | Teacher will explain and demonstrate the learning content. The student learns through the practice. | NIL | 06 | Handouts, chalk board, PPT, text book, charts, video film, and laboratory manual. | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | | Maximum Marks | Resources Required | | | | External / Internal | | | | |
| 1 | Laboratory test by observation and Viva | Student will be asked to list probable faults and its remedial measures / trouble shooting procedures in pneumatic actuation systems. | | 10 | Observation schedule/charts/check-list /rating scales /rubrics | | | | External | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of end semester Practical exam | | | | | | | | | | | | | |

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | <i>4</i> | <i>1</i> | |
| COURSE NAME | | Industrial Automation | | | | | | | | | | | |
| CO Description | | Explain construction, working of Sensors, Transducers | | | | | | | | | | | |
| LO Description | | Explain terms related to Sensors, Transducers. | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching –Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | Remarks | | | | |
| 1 | Sensor- Definition , classification, Transducer- Definition , classification Performance Terminology, Static and Dynamic Characteristics, range, span, error, accuracy, sensitivity , Linearity, non- linearity repeatability and reproducibility, stability, dead band/ time, resolution, zero drift, output impudence, response time , time constant. | Interactive classroom teaching, demonstration, quiz, assignments, Tutorial. | Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. | 6 | NIL | Handouts, chalk board, PPT, text book, charts, video film. | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | | Maximum Marks | Resources Required | | | | External / Internal | | | | |
| 1 | Theory exam | Student will be asked to explain given terms related to Sensors, Transducers. | | 10 | Question paper+ Rating scale | | | | External | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of end semester theory exam | | | | | | | | | | | | | |

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | 4 | 2 | |
| COURSE NAME | Industrial Automation | | | | | | | | | | | | |
| CO Description | Explain construction, working of Sensors, Transducers | | | | | | | | | | | | |
| LO Description | Explain construction, working of Sensors, transducers. | | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching –Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | Remarks | | | | |
| 1 | Sensors and transducers : Displacement, Position and Proximity sensors, Potentiometer sensors, Strain gauge element, LVDT, Optical encoders, Pneumatic sensors, Hall effect sensors, Tachogenerators, Strain gauge load cell, Thermostats, Photo darlington. Interfacing sensors in mechatronic System as – Temperature switch circuit, Float systems. | Interactive classroom teaching, demonstration, quiz, assignments, Tutorial. | Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. | 8 | NIL | Handouts, chalk board, PPT, text book, charts, video film. | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | | | Maximum Marks | Resources Required | | | External / Internal | | | | |
| 1 | Theory exam | Student will be asked to explain construction/ working of given Sensors /transducers | | | 10 | Question paper+ Rating scale | | | External | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of end semester theory exam | | | | | | | | | | | | | |

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|--|---|--|--|----------------------|------------------------------|--|----------|--------------------|----------------------------|--|----------------|----------------|--------------|
| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | <i>5</i> | <i>1</i> | |
| COURSE NAME | Industrial Automation | | | | | | | | | | | | |
| CO Description | Describe construction, working of PLC. | | | | | | | | | | | | |
| LO Description | Explain Logic Operations in electro- mechanical applications, construction of PLC. | | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching –Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | Remarks | | | | |
| 1 | Simple Logic Operations: Logic circuits with AND, OR, XOR operations in electro-mechanical applications, Series and Parallel logic circuits. Components of a PLC: Chassis of a PLC, Power supply module, Input module, Output module, CPU | Interactive classroom teaching, demonstration, quiz, assignments, tutorial | Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge. | 6 | 2 | Handouts, chalk board, PPT, text book, charts, video film. | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | | Maximum Marks | Resources Required | | | | External / Internal | | | | |
| 1 | Theory exam | Student will be asked to explain a) given logic Operations in electro-mechanical applications b) Construction of a PLC. | | 10 | Question paper+ Rating scale | | | | External | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of end semester theory exam | | | | | | | | | | | | | |

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| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | 5 | 2 | |
| COURSE NAME | Industrial Automation | | | | | | | | | | | | |
| CO Description | Describe construction, working of PLC. | | | | | | | | | | | | |
| LO Description | Draw wiring diagram of a given PLC setup. | | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching –Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | Remarks | | | | |
| 1 | Setting up PLC, Hands on wiring of input devices to input modules, Hands on wiring of output devices to output module, Instructions to examine ON and examine OFF | Lab demonstration, hands on practice, lab assignments, quiz assignments | Teacher will explain and demonstrate the learning content. The student learn through the practice | NIL | 6 | Handouts, chalk board, PPT, text book, charts, video film, Laboratory manual, PLC/connection wires and input output devices | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | | Maximum Marks | Resources Required | | | | External / Internal | | | | |
| 1 | Laboratory test by observation and Viva | Student will be asked to draw wiring diagram of a given PLC setup. | | 10 | Observation schedule/charts/check-list /rating scales /rubrics. | | | | Internal | | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of Lab work | | | | | | | | | | | | | |

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|--|---|--|--|----------------------|---|--|----------|--------------------|--|----------------------------|----------------|----------------|--------------|
| RGPV (Diploma Wing) Bhopal | | SCHEME FOR LEARNING OUTCOME | | | Branch Code | | | Course Code | | | CO Code | LO Code | Format No. 4 |
| | | | | | <i>M</i> | <i>0</i> | <i>2</i> | | | | 5 | 3 | |
| COURSE NAME | Industrial Automation | | | | | | | | | | | | |
| CO Description | Describe construction, working of PLC. | | | | | | | | | | | | |
| LO Description | Write ladder logic programmes for PLCs. | | | | | | | | | | | | |
| SCHEME OF STUDY | | | | | | | | | | | | | |
| S. No. | Learning Content | Teaching –Learning Method | Description of T-L Process | Teach Hrs. | Pract. /Tut Hrs. | LRs Required | | | | | | Remarks | |
| 1 | COMPUTER BASED INDUSTRIAL CONTROL Understanding Ladder Diagrams: Programming contacts, addressing contacts, Wiring diagrams, Ladder diagrams, Ladder diagram rules. Programming Ladder Diagram: Use of programming software for ladder diagram programming, PLC programs to solve logic problems. Case studies. | Lab demonstration, hands on practice, lab assignments, quiz assignments | Teacher will explain and demonstrate the learning content. The student learns through the practice. | NIL | 12 | Handouts, chalk board, PPT, text book, charts, video film, laboratory manual, simulator or software for ladder logic programming | | | | | | | |
| SCHEME OF ASSESSMENT | | | | | | | | | | | | | |
| S. No. | Method of Assessment | Description of Assessment | | Maximum Marks | Resources Required | | | | | External / Internal | | | |
| 1 | Laboratory test by observation and Viva | Student will be asked to write a ladder logic programme for a given PLC setup. | | 10 | Observation schedule/charts/check-list /rating scales /rubrics. | | | | | External | | | |
| ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY) | | | | | | | | | | | | | |
| Part of end semester Practical exam | | | | | | | | | | | | | |

LIST OF EXPERIMENTS

| S. NO. | NAME OF EXPERIMENTS |
|--------|---|
| 1 | Draw a hydraulic circuit diagram of a given hydraulic actuation system. |
| 2 | Identify components, their placement/ alternative components and their placements for a given hydraulic actuation system. |
| 3 | Draw a pneumatic circuit diagram of a given pneumatic actuation system. |
| 4 | Identify components, their placement/ alternative components and their placements for a given pneumatic actuation system. |
| 5 | List probable faults and its remedial measures for a given faulty pneumatic actuation system. |
| 7 | Write the trouble shooting procedures in pneumatic actuation systems. |
| 8 | Construct and actuate pneumatic circuit for logic operations (AND/OR) |
| 9 | Draw wiring diagram of a given PLC setup. |
| 10 | Write a ladder logic programme for a given PLC setup. |