



National Occupational Standards



Fundamentals of Robotronics

Unit Code: ELE/N7123

Version: 1.0

NSQF Level: 2.5

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Description

A Fundamentals of Robotronics carries out the basic understanding of the robotics systems followed by its Assembly & Inspection for desired and rated functionality, while ensuring adherence to standard working practices. The role of the individual likely to be responsible for assisting with the setup, maintenance, and troubleshooting of various robotics systems with no prior knowledge. Tasks might include assembling robotic components, calibrating sensors and actuators, programming controllers, conducting experiments, and documenting results.

Scope

The scope covers the following :

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 - 1) The role of the individual likely to be responsible for assisting with the setup, maintenance, and troubleshooting of various robotics systems and equipment used in research and development.
 - 2) Testing and learning how to operate small-scale robotic devices, such as rovers and robotic arms, for a variety of purposes.

Elements and Performance Criteria

Knowing the parts and fundamentals of a robotics system's operation

To be competent, the user/individual on the job must be able to:

- PC1.** Identify and explain the function of key components in a robotics system.
- PC2.** Demonstrate knowledge of different types of robotic systems and their applications.
- PC3.** Describe the basic structure and layout of a robotics system.

Determine the various components of a robotics system

To be competent, the user/individual on the job must be able to:

- PC4.** List and explain the role of essential electronic components in robotics.
- PC5.** Identify various sensors and their applications in robotics systems.
- PC6.** Explain the types of actuators used in robotics and their functions.

Understanding the fundamental functions and applications of a robotics system

To be competent, the user/individual on the job must be able to:

- PC7.** Describe the basic coding principles used in robotics.
- PC8.** Explain the motion control concepts in robotics.
- PC9.** Demonstrate the ability to interface sensors with a robotics system using basic coding.

Recognize the fitting mechanisms and the appropriate tools required for the assembly and fitting

To be competent, the user/individual on the job must be able to:

- PC10.** Match each component of a robotics system with its specific function.
- PC11.** Identify the appropriate tools and techniques for assembling robotics systems.
- PC12.** Demonstrate proper fitting mechanisms for assembling a functional robotics system.

Testing and Maintenance of Robotics Systems

To be competent, the user/individual on the job must be able to:

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- PC13.** Connect each part of a robotics system to an external power source for examination.
- PC14.** Utilize multimeters and other instruments to verify the functionality of each component.
- PC15.** Test robotic parts according to provided circuits and drawings.
- PC16.** Conduct pre-tests to verify that robotic systems operate as per rated standards.

Reporting and Documentation

To be competent, the user/individual on the job must be able to:

- PC17.** Document and describe the workload and current state of completion.
- PC18.** Report work status using organizational requirements and appropriate formats.
- PC19.** Inform relevant stakeholders about unresolved issues during assembly and explain the reasons.
- PC20.** Assemble and complete the installation feedback form about the product deployment.

Quality Assurance and Feedback

To be competent, the user/individual on the job must be able to:

- PC21.** Verify that all components meet the specified quality standards before integration.
- PC22.** Conduct a final systems check to ensure all parts function together correctly.
- PC23.** Review and analyze test results to identify any discrepancies or malfunctions.
- PC24.** Provide recommendations for improvements based on testing and feedback.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** Typical procedures for taking apart and reassembling the robot
- KU2.** Techniques for troubleshooting
- KU3.** Methods of inspection and several kinds of examinations to find defective parts
- KU4.** Different tests and how they are conducted to verify the robot
- KU5.** Use of a soldering gun, multimeter, and other instruments to repair the robot.
- KU6.** Policy of the organization on rewards and staff administration
- KU7.** The significance of each person's function in the process
- KU8.** The organization's reporting structure is follows
- KU9.** Products offered by the organization

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** Write standard phrases and terms that are utilized in the work.
- GS2.** Create checklists, reports, and fill out forms in Hindi, English, or the local language, keep track of work-related notes and documents
- GS3.** Study the pertinent literature to learn the most recent developments in the field of work.
- GS4.** Be kind and professional in your communication.
- GS5.** Pay close attention to what is being said in order to comprehend it.



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GS6. Make judgments quickly to handle accidents or problems at work.

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Knowing the parts and fundamentals of a robotics system's operation</i>	6	6	-	-
PC1. Identify and explain the function of key components in a robotics system.	2	2	-	-
PC2. Demonstrate knowledge of different types of robotic systems and their applications.	2	2	-	-
PC3. Describe the basic structure and layout of a robotics system.	2	2	-	-
<i>Determine the various components of a robotics system</i>	6	6	-	-
PC4. List and explain the role of essential electronic components in robotics.	2	2	-	-
PC5. Identify various sensors and their applications in robotics systems.	2	2	-	-
PC6. Explain the types of actuators used in robotics and their functions.	2	2	-	-
<i>Understanding the fundamental functions and applications of a robotics system</i>	6	6	-	-
PC7. Describe the basic coding principles used in robotics.	2	2	-	-
PC8. Explain the motion control concepts in robotics.	2	2	-	-
PC9. Demonstrate the ability to interface sensors with a robotics system using basic coding.	2	2	-	-
<i>Recognize the fitting mechanisms and the appropriate tools required for the assembly and fitting</i>	6	6	-	-
PC10. Match each component of a robotics system with its specific function.	2	2	-	-
PC11. Identify the appropriate tools and techniques for assembling robotics systems.	2	2	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. Demonstrate proper fitting mechanisms for assembling a functional robotics system.	2	2	-	-
<i>Testing and Maintenance of Robotics Systems</i>	8	12	-	-
PC13. Connect each part of a robotics system to an external power source for examination.	2	3	-	-
PC14. Utilize multimeters and other instruments to verify the functionality of each component.	2	3	-	-
PC15. Test robotic parts according to provided circuits and drawings.	2	3	-	-
PC16. Conduct pre-tests to verify that robotic systems operate as per rated standards.	2	3	-	-
<i>Reporting and Documentation</i>	8	8	-	-
PC17. Document and describe the workload and current state of completion.	2	2	-	-
PC18. Report work status using organizational requirements and appropriate formats.	2	2	-	-
PC19. Inform relevant stakeholders about unresolved issues during assembly and explain the reasons.	2	2	-	-
PC20. Assemble and complete the installation feedback form about the product deployment.	2	2	-	-
<i>Quality Assurance and Feedback</i>	8	8	-	-
PC21. Verify that all components meet the specified quality standards before integration.	2	2	-	-
PC22. Conduct a final systems check to ensure all parts function together correctly.	2	2	-	-
PC23. Review and analyze test results to identify any discrepancies or malfunctions.	2	2	-	-
PC24. Provide recommendations for improvements based on testing and feedback.	2	2	-	-
NOS Total	48	52	-	-



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National Occupational Standards (NOS) Parameters

NOS Code	ELE/N7123
NOS Name	Fundamentals of Robotronics
Sector	Electronics
Sub-Sector	
Occupation	Engineering-I&A
NSQF Level	2.5
Credits	7
Minimum Educational Qualification & Experience	9th Class with NA of experience OR 8th grade pass and pursuing continuous schooling with NA of experience
Version	1.0
Last Reviewed Date	27/08/2024
Next Review Date	27/08/2027
NSQC Clearance Date	27/08/2024
Reference code on NQR	NG-2.5-EH-02975-2024-V1-ESSC
NQR Version	1.0
CCN Category	1