SEMEM406

Undertake engineering research

Overview

This standard identifies the competences you need to be able to undertake research of engineering products or processes, in accordance with approved procedures. You will be required to carry out specific research, in accordance with established research principles. In addition, you will be required to monitor, analyse and disseminate the research results to the appropriate people.

Your responsibilities will require you to comply with organisational policy and procedures for carrying out successful research, and to report any problems that you cannot personally resolve to the relevant authority. You will be expected to work unsupervised, either on your own or as part of a team, which you may lead or direct, taking full responsibility for your actions and, possibly, for the work of colleagues or subordinates.

Your underpinning knowledge will provide a good understanding of general and discipline-specific engineering principles and processes, and you will also be fully conversant with organisational procedures and systems. You will understand engineering research principles and process, data analysis methods, patent, copyright and intellectual property issues, project planning and research design methodology, in sufficient depth to enable you to carry out the research activities to the required standard.

You will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks applicable to your area of responsibility. You will be required to ensure that safe working practices are maintained throughout, and will understand the responsibility you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. apply the research methods into the engineering products or processes according to established research principles
3. ensure that the correct amount of accurate data is collected as specified in the research methodology
4. ensure that the research results are recorded and collated accurately in the appropriate formats
5. ensure that the research results are analysed using valid methods
6. monitor the progress of the research against plans and budgets
7. identify any problems with the research as soon as practicable and determine the appropriate actions to take
8. disseminate relevant information on the research to the appropriate people according to agreed procedures

Knowledge and understanding

You need to know and understand:

1. the specific health and safety issues that relate to the areas being researched
2. how to obtain the research proposal from company systems/records
3. the research methods that should be used
4. how to select the most appropriate research method
5. how to monitor and record the results of the research
6. the amount and types of data that should be collected for different types of research
7. the formats that should be used for recording data
8. the methods available for analysing the results of the research
9. how to select the most appropriate method(s) for analysing the research data
10. how to obtain details of the plans and budgets available for the research
11. how to obtain the resources specified in the research proposal
12. the types of problem that could occur during the research
13. the actions that should be taken to deal with different types of problem
14. who requires information on the research, and the procedures for informing them
15. the extent of your own authority, and to whom you should report if you have problems that you cannot resolve

Scope/range related to performance criteria

1.

Carry out **all** of the following activities whilst undertaking the engineering research:

1.1 obtain the aims and objectives from the research proposal
1.2 ensure that all facilities and resources are available
1.3 carry out and monitor the research activities
1.4 record the results of the research, using the appropriate formats
1.5 resolve or recommend appropriate actions to problems, as they occur
1.6 disseminate information on the research activities to the appropriate people

2.

Carry out the research, taking into account **all** of the following:

2.1 aims and objectives
2.2 schedule
2.3 potential benefits and risks
2.4 budget available
2.5 methodology
2.6 legislative considerations
2.7 design constraints
2.8 risk analysis
2.9 resource requirements
2.10 timescales

3.

Implement the research using the necessary resources, including **three** of the following:

3.1 materials
3.2 facilities
3.3 manpower
3.4 hardware and/or software
3.5 equipment
3.6 location/site facilities
3.7 monitoring equipment/system
3.8 contracts
3.9 finances

4.

Monitor and record the research process, using **two** of the following methods:

4.1 audio and/or video recording
4.2 observation
4.3 sampling
4.4 computer-aided data collection
4.5 manual data collection
4.6 mechanical or electronic sensing
4.7 comparative analysis

5.

Record and communicate details of the research to the appropriate people, using:

5.1 a verbal report

plus **one** from the following:

2. electronic mail
3. computer generated report
4. computer-based presentation
5. specific company form
6. other appropriate media

1.

Ensure that the research methodology complies with **three** of the following:

1.1 organisational guidelines and codes of practice
1.2 recognised compliance agency/body's standards
1.3 equipment manufacturer's operating specification/range
1.4 customer standards and requirements
1.5 health, safety and environmental requirements
1.6 British, European or International standards or directives

Behaviours

Additional Information

You will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as:

- strong work ethic
- positive attitude
- team player
- dependability
- responsibility
- honesty
- integrity
- motivation
- commitment

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