

SIAS

Apprenticeship standard

Science Industry Maintenance Technician Work Based Learning Guide

September 2015



Purpose of document

This work based learning guide contains the detailed specification of the level of skills, knowledge and behaviours required to achieve occupational competence in the development phase of the Science Industry Maintenance Technician apprenticeship.

The work based learning guide has been developed by employers and will be maintained to reflect any future changes that are needed to maintain world class levels of quality and ensure that the credibility and consistency of the apprenticeship outcome is maintained. The apprenticeship outcome is described in the Science Industry Maintenance Technician apprenticeship standard.

The mandatory assessment process that leads to the apprenticeship award is available from info@siasuk.com

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CORE COMPETENCES	
Stnd Ref	Competences that need to be achieved by anyone being trained for the occupation. All elements are mandatory except those marked as specialisms, which should be included only when required for a specific job role or sector.
S1	Work safely in a science manufacturing environment, understanding personal responsibility for Health, Safety and the Environment and principles of risk management.
S2	Understand and follow quality procedures to meet the requirements of quality standards relevant to the workplace.
S3	Understand the internal and external regulatory environment pertinent to the sector and the employer and comply with regulations proficiently.
General workplace Health and Safety	
1	Understand and comply with foundations of health and safety including responsibility for health and safety under the HASWA
2	Understand the procedures for first aid relevant to your workplace
3	Understand and comply with risk assessment & control
4	Appropriate use of personal protective equipment e.g. respirators, breathing air hoods, PVC suits
5	Understand and practise site/plant safety requirements including for example <ul style="list-style-type: none"> • Fire • COSHH • Working at Height • COMAH • Confined Spaces • Permits to work
Process Safety	
6	Understand the foundations of process safety
7	Understand the safe operating conditions of the plant

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8	Work safely in a process environment or in a bio-manufacturing environment
9	Describe common risks and control measures
10	Understand systems to prevent loss of containment within your area of responsibility
11	Carry out key plant integrity checks within own area of responsibility
12	Understand and comply with emergency response procedures participating in exercises pertinent to role
13	Understand hazardous area classification & DSEAR regulations and how they apply within area of responsibility
Environmental & Resource Management	
14	Understand the foundations of environmental management
15	Understand the principles of control of emissions
16	Understand management and control of waste
17	Understand environmental risk assessments (impact assessment)
18	Understand the concepts of resource efficiency applied to energy, water and waste
19	Identify, organise and use resources effectively to complete tasks, with consideration for cost, quality, safety and environmental impact
20	Operate and act responsibly, taking account of the need to progress environmental, social and economic outcomes simultaneously
Product Quality	
21	Maintain product quality throughout manufacture
22	Understand management of change principles and the impact of change on product quality
Regulatory Environment	

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23	Understand the internal regulations pertinent to the employer & relative specialism in which they operate
24	Understand the external regulatory environment pertinent to the employer & relative specialism in which they operate (e.g. COMAH, NII, MHRA)
25	Demonstrate compliance with internal and external regulations pertinent to the employer & relative specialism in which they operate
26	Work reliably and effectively without close supervision, to the appropriate codes of practice
S4	Understand and apply problem solving techniques.
27	Demonstration of one or more problem solving techniques
28	Address routine and non-routine problems with equipment, plant, systems and components, within defined areas
29	Identify problems and apply appropriate methods to identify causes and achieve satisfactory solutions
S5	Participate in continuous performance improvement.
30	Demonstrate the application of principles of continuous improvement to own performance
31	Participate in improving systems and processes within your work environment or demonstrate where you have personally improved and become more efficient
S6	Understand the business environment in which the company operates including personal role within the organisation, ethical practice and codes of conduct.
32	Understand the business environment (customers, competitors etc.) in which the company operates
33	Understand personal role in the company and industry and those of others
S7	Safely use all necessary equipment, following the appropriate engineering techniques, procedures and methods of relevance to complete the maintenance activity.
34	Demonstrate the safe use of engineering hand tools and tools and equipment specific to each trade
35	Use engineering knowledge and understanding to apply technical and practical skills
36	Use appropriate scientific, technical or engineering principles
37	Manage and apply safe systems of work

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S8	Prepare the work area for maintenance of plant, systems or components.
38	Prepare work areas for maintenance in line with Standard Operating Procedures
39	Determine and undertake equipment preparation, ensuring the security of tools and equipment that are used
S9	Carry out planned routine and non-routine maintenance activities, effectively, efficiently and safely.
40	Confirm and define the condition of the engineering products or assets in accordance with specifications
41	Carry out maintenance activities in line with Standard Operating Procedures
42	Decontaminate plant equipment where appropriate
43	Accept responsibility for work of self or others
44	Accept, allocate and supervise, as appropriate, technical and other tasks
S10	Understand and apply the practices and procedures for planning to maintain systems and equipment, relevant to a single specialist discipline or a number of disciplines (mechanical, electrical, instrumentation) as required by the job role whilst following applicable codes and standards.
45	Understand and apply the principles of planned maintenance and routine calibration in asset care
46	Understand the principles of change management
S11	Understand and apply techniques to identify faults in plants, systems and components to achieve satisfactory solutions.
47	Identify problems and apply diagnostic methods to identify causes and achieve satisfactory solutions
S12	Reinstate the work area after completing the maintenance of plant, systems and components.
48	Restore the work areas to a safe condition in accordance with agreed requirements and schedules
49	Update maintenance management systems

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S13	Conduct safe and effective exchange of plant and equipment to others and accept and confirm responsibility for the plant and equipment within the work area.
50	Carry out handover of process engineering plant and equipment
51	Understand permit to work systems and demonstrate compliance with local system
S14	Manufacture or assemble components within skill set.
52	Use engineering tools, appliances and equipment to manufacture items and components to specification
S15	Understand how to identify obsolescence and end-of-life issues.
53	Identify components that are worn, broken and that have no further use
54	Discard components in line with local rules and environmental guidelines
S16	Understand and apply information extracted from engineering drawings, specification diagrams and maintenance manuals and/or computer database systems including accurate data input.
55	Use appropriate documentation in planned maintenance activities, during fault finding and for ordering replacement components and parts
56	Prepare and update drawings and diagrams as per trade discipline
57	Display clear understanding of electrical, mechanical and instrumentation diagrams
58	Demonstrate basic knowledge of relevant software packages e.g. Microsoft Word, Excel, LIMS where appropriate to role
S17	Understand and apply technical knowledge relevant to a single specialist discipline or a number of disciplines (mechanical, electrical, instrumentation) as required by the job role.
59	Understand and apply technical knowledge relevant to a single specialist discipline or a number of disciplines (mechanical, electrical, instrumentation) as required by the job role.

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60	Demonstrate cross discipline knowledge where required by organisation	
S18	Develop and apply theoretical knowledge of engineering and its application to the required sector & job role. This should be acquired through a qualification set at level 3 (or above) that is approved by a licensed professional engineering institution.	
61	Undertake and successfully complete a technical qualification relative to trade and approved by professional engineering institution	
S19	Demonstrate the required attitudes, behaviours and interpersonal skills associated with the professional workplace.	
SPECIALISMS		
Std Ref S	Spec. ref	In addition to the core competences these are specific to a work context and need to be achieved by anyone being trained for a job role in that work context
In the context of the science industry and all three specialist pathways below, the following equipment and assets may be included:		
		<ul style="list-style-type: none"> • Actuators • Distribution systems • Cabling systems • Circuit boards • Circuit protection • Components of process or manufacturing systems • Compressors • Conveyers • Electrical panels • Flow devices • Gear boxes • Heat exchangers • HVAC systems • Hydraulic systems • Level devices • Lighting systems • Motors (AC/DC) • Pipework systems • Plant items • Pneumatic systems • Pumps • Pressure devices • Pressure vessels • Protection devices • Rotating equipment • Temperature devices • Transmission systems • Turbines • Valves
	A	Electrical
7	A1	Understand and safely use hand tools and associated trade tools
10	A2	Adjust electrical plant and equipment to meet operating requirements

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14	A3	Assemble components of electrical plant and equipment
9	A4	Carry out planned maintenance procedures on electrical plant and equipment
11	A5	Diagnose and correct electrical faults (plant)
11	A6	Diagnose and determine the causes of faults in electrical plant and equipment
9	A7	Dismantle electrical plant and equipment
13	A8	Establish that an engineering maintenance process has been completed to specification
9,10	A9	Inspection, testing and commissioning of electrical installations (plant)
9,10	A10	Monitor the performance and condition of electrical plant and equipment
9,10	A11	Position and install electrical plant and equipment
9,10	A12	Remove components from electrical plant and equipment
9,10	A13	Repair components of electrical plant and equipment to operational condition
9,10	A14	Replace components in electrical plant and equipment
9,10	A15	Review effectiveness of condition monitoring activities
	B	Mechanical
7	B1	Understand and safely use hand tools and associated trade tools
10	B2	Adjust mechanical plant and equipment to meet operating requirements
9	B3	Analyse the test results relating to the tested mechanical plant and equipment
9,10	B4	Assess the performance and condition of mechanical plant and equipment
9	B5	Carry out planned maintenance procedures on mechanical plant and equipment to meet operating requirements
11	B6	Diagnose and determine the causes of faults in mechanical plant and equipment
9	B7	Dismantle mechanical plant and equipment
13	B8	Hand over or take control of mechanical plant and equipment
9	B9	Maintaining mechanical equipment
9,10	B10	Monitor the performance and condition of mechanical plant and equipment
9,10	B11	Remove components from mechanical plant and equipment
9,10	B12	Replace components in mechanical plant and equipment
9,10	B13	Review effectiveness of condition monitoring activities
9,10	B14	Test the performance and condition of mechanical plant and equipment
	C	Instrumentation
7	C1	Understand and safely use hand tools and associated trade tools
10	C2	Adjust instrument and control systems to meet operating requirements
14	C3	Assemble components of instrument and control systems

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9,10	C4	Assess the performance and condition of instrument and control systems
9	C5	Carry out planned maintenance procedures on instrument and control systems
9	C6	Carry out maintenance on instrumentation and control equipment
11	C7	Determine the feasibility of repair of components from instrument and control systems
11	C8	Diagnose and determine the causes of faults in instrument and control systems
9	C9	Dismantle instrument and control systems
9	C10	Maintain instrumentation and control systems
9,10	C11	Monitor the performance and condition of instrument and control systems
9,10	C12	Perform asset condition monitoring
9,10	C13	Position and install instrument and control systems
9,10	C14	Remove components from instrument and control systems
9,10	C15	Repair components of instrument and control systems to operational condition
9,10	C16	Replace components from instrument and control systems
9,10	C17	Review effectiveness of condition monitoring activities
9,10	C18	Test the performance and condition of instrument and control systems

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Behaviours Evaluation Assessment Criteria

	Does not meet Expectation <i>Apprentice failed to demonstrate an acceptable level of behaviour. Improvement is required</i>	Meets Expectation <i>Apprentice demonstrated acceptable level of behaviour and meets the minimum level of behaviour expected</i>	Exceeds Expectation <i>Apprentice demonstrated consistent and positive behaviours in this area that reflect those expected of outstanding apprentices</i>
Personal Responsibility:	<i>Demonstrate personal responsibility towards safety systems (incl. risk management and environment)</i>		
Assessment criteria	Little evidence of personal responsibility to safety systems.	Good personal responsibility towards safety systems.	Exhibits high standards of personal responsibility toward safety systems. Seeks to influence the behaviour of others.
	Tries to play down incidents in which they are involved.	Responds positively to suggestions for own improvements in personal responsibility for safety issues.	Actively monitor the safety of self and others, challenging and making suggestions where appropriate.
Communication:	<i>Communicate effectively using a full range of skills: speaking; listening; writing; body language; presentation</i>		
Assessment criteria	Misinterprets or is slow to comprehend oral and/or written instructions.	Readily comprehends oral and/or written instructions when first presented.	Superior comprehension of oral and/or written instructions. Checks back to avoid any misunderstanding.
	Communications are vague or poorly written or spoken. Difficulty conveying meaning to others.	Passes on information both verbal and written, in a way that is easily understood	Is able to adapt both verbal and written communication to be understood by different audiences (e.g. peer, supervisor, senior manager and visitor).
	Will not ask questions and demonstrates little willingness to listen.	Listens and will question and challenge appropriately to enhance own understanding.	Listens and questions to enhance own and others understanding. Supports and acknowledges contributions from others.

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	Does not meet Expectation <i>Apprentice failed to demonstrate an acceptable level of behaviour. Improvement is required</i>	Meets Expectation <i>Apprentice demonstrated acceptable level of behaviour and meets the minimum level of behaviour expected</i>	Exceeds Expectation <i>Apprentice demonstrated consistent and positive behaviours in this area that reflect those expected of outstanding apprentices</i>
	Unable to effectively present personal viewpoint.	Able to effectively present personal viewpoint.	Able to influence others to see personal viewpoint.
	Unwilling to see other people’s point of view.	Receptive to other people's point of view.	Ability to reason from different points of view.
Team Work	<i>Work and interact effectively within a team</i>		
Assessment criteria	Unwilling to contribute during team discussions/problem solving.	Makes a useful contribution during team discussions/problem solving.	Contributes and willing to lead team based discussions/problem solving.
	Can reduce morale and enthusiasm within the team.	A good team member gets on well with colleagues.	Builds working relationships between team and other groups. Seeks to diffuse conflict situations where they arise.
	Exhibits negative behaviour concerning team/organisational mission.	Demonstrates knowledge and understanding of team/organisational mission.	A strong team player helps bind the team together to achieve team/organisational mission.
	Does not accept responsibility for own impact on team performance.	Works cooperatively with others to achieve overall team goals.	Puts team goals ahead of personal achievement and recognition.
Independence and Responsibility:	<i>Work independently and take responsibility for initiating and completing tasks</i>		
Assessment criteria	Inclined to wait for direction on work tasks. Regularly needs to be told what to do or how to do it.	Normally does not need to be told what to do next, can be trusted to complete tasks. Identifies obstacles to achieving work assigned and escalates.	Looks ahead and progresses work in areas of the job. Will seek to resolve obstacles to achieving work assigned themselves before escalating.

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	Does not meet Expectation <i>Apprentice failed to demonstrate an acceptable level of behaviour. Improvement is required</i>	Meets Expectation <i>Apprentice demonstrated acceptable level of behaviour and meets the minimum level of behaviour expected</i>	Exceeds Expectation <i>Apprentice demonstrated consistent and positive behaviours in this area that reflect those expected of outstanding apprentices</i>
	Supervision required to progress work.	Can be relied on to manage their work with little supervision.	Holds themselves accountable for their own performance.
	Over reliance on supervisor for motivation.	Self-motivated and deals with work/learning balance in a positive way.	Maintains motivation and encourages others to do the same.
Impact of work:	<i>Understand impact of work on others, especially where related to diversity and equality</i>		
Assessment criteria	Others feel the need to recheck their work or have to finish off the job after them. Work rarely makes a contribution to team quality.	Works to the required standard of accuracy, neatness and thoroughness. Often makes valued contributions to team quality.	Has a reputation within the work group for doing jobs right first time, every time. Consistently makes a valued contribution to team quality.
	Little respect for the values of others.	Respects the value of others.	Actively encourages work group to respect the values of others
	Has difficulty being tactful, considerate and respectful in dealing with others.	Usually tactful, considerate and respectful in dealing with others.	Always tactful, considerate and respectful in dealing with others.
Time management	<i>Accepts responsibility for managing own time and workload within a given plan to complete work to schedule</i>		
Assessment criteria	Does not deliver consistently and can waste time on non-essentials.	Continually demonstrates efficient use of work time.	Continuously strives for improved productivity.

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	Unreliable timekeeping	Timekeeping complies with company protocols.	Encourages others to comply with company timekeeping protocols.
	Not fully prepared in advance holds up group activities.	Always prepares in advance ready to participate in group activities.	Encourages others to prepare in advance for group activities
Change Management:	<i>Ability to handle change and respond to change management processes</i>		
Assessment criteria	Has difficulty adjusting to changes in workload or assignments.	Is flexible, willing and able to respond to changes in work situations and/or learn new skill.	Capable of supporting others with change in work situations and/or learning new skill.
	Resists change or innovation or takes a “wait and see” approach.	Works hard to implement successful change in areas of responsibility as directed by supervisor.	Recommends changes to improve own work and work of others and implements as agreed with supervisor.
	Does not value own contribution.	Able to demonstrate examples of situations when they have changed practice or personal behaviour.	Evidence of influencing change of practice or personal behaviour by others.