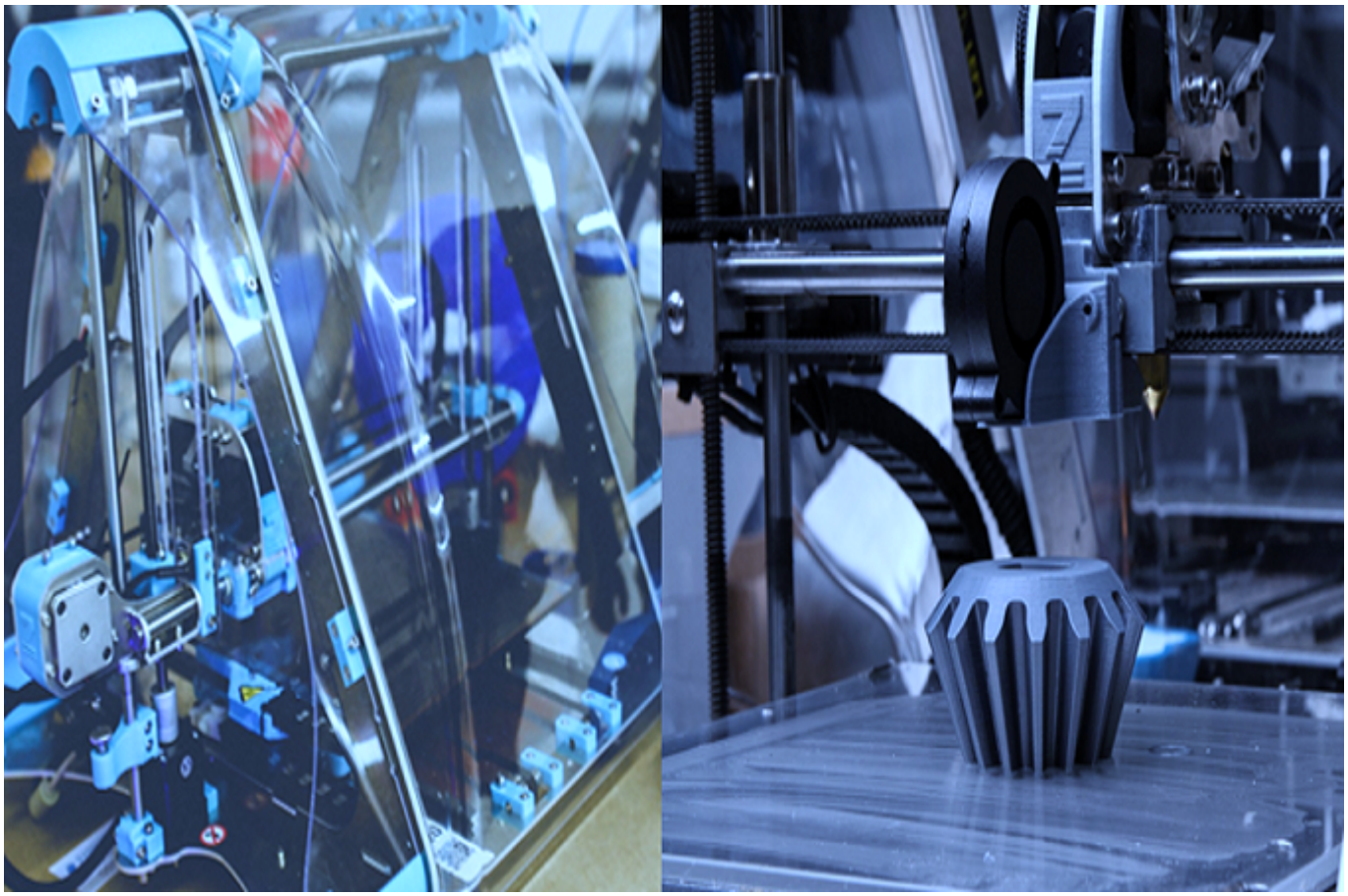
Qualification Pack



Additive Manufacturing (3D Printing)

QP Code: IAS/Q5602

Version: 3.0

NSQF Level: 4

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Qualification Pack

IAS/Q5602: Additive Manufacturing (3D Printing)

Brief Job Description

The technician is responsible for installing a 3D Printer, configuring the hardware and software, calibrating it and successfully demonstrating its operation to the customer.

Personal Attributes

The individual should be multi-skilled, organized, team-oriented, customer-centric and should have the ability to work in unfamiliar surroundings. He/she must pay attention to details, have an eye for quality, have the ability to identify defects and their root cause/s. He/she should be able to resolve problems with the help of experts.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. IAS/N5607: Maintain and provide technical support for 3D printer
2. IAS/N5606: Install a 3D printer
3. IAS/N5608: Operate and optimise 3D printing for additive manufacturing
4. IAS/N9001: Work effectively with teams
5. IAS/N9002: Health and safety in workplace
6. DGT/VSQ/N0102: Employability Skills (60 Hours)

Qualification Pack (QP) Parameters

Sector	Instrumentation
Sub-Sector	Instrumentation & Automation
Occupation	Installation and Commissioning
Country	India
NSQF Level	4
Credits	13

Qualification Pack

Aligned to NCO/ISCO/ISIC Code	NCO-2015/NIL
Minimum Educational Qualification & Experience	10th grade pass plus 1-year NTC/ NAC (in relevant field) OR 10th grade pass with 1 Year of experience relevant field OR 11th grade pass (Pursuing regular schooling) OR Completed 1st year of 3-year diploma (after 10th) and pursuing regular diploma OR Previous relevant Qualification of NSQF Level (NSQF Level 3) with 1 Year of experience
Minimum Level of Education for Training in School	Not Applicable
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	NA
Next Review Date	26/05/2027
NSQC Approval Date	26/05/2022
Version	3.0
Reference code on NQR	2022/EHW/IASC/06504
NQR Version	3

IAS/N5607: Maintain and provide technical support for 3D printer

Description

This unit is about performing routine maintenance of 3D printer and providing technical support when required.

Scope

The scope covers the following :

- Perform preventive maintenance of 3D Printer
- Provide post installation technical support

Elements and Performance Criteria

Perform preventive maintenance of 3D printer

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

PC1. perform periodic maintenance as recommended by the manufacturer

PC2. clean the build plate (hot bed/printing platform) for any residue causing uneven surface

PC3. remove filament (material) from the machine using the method as specified in the instruction manual

PC4. clean the filament feeder using the method as specified

PC5. lubricate the axis mechanisms periodically without over lubricating and using recommended oil or grease

PC6. follow the precautions necessary for maintenance of printer

Provide post installation technical support

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

PC7. verify that all details of the printer settings, print jobs performed and filament material used are as per standards and record any deviations

PC8. identify actual and potential causes by analysing the issue as well as the related systems, referring to the troubleshooting guide provided by the manufacturer under categories such as material and feed related, print-head related, quality of print related, software related, etc.

PC9. implement the suggested solution or contact the technical support team of the manufacturer to resolve the issue

PC10. order material and parts to ensure their replenishment according to plan

PC11. keep the customer informed of actions and expected time frame for finding a solution

PC12. resolve the matter as per customer satisfaction and complete closure process or escalate the matter as per the defined process if no resolution is found

PC13. perform hardware and software upgrades, customisations etc. as per company policies and notifications

PC14. perform periodic configurations and calibration

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organisation's policies on customer care
KU2. organisation's code of conduct
KU3. organisation's culture and typical customer profile
KU4. organisation's reporting structure
KU5. organisation's documentation policy
KU6. escalation matrix and procedures for reporting work and employment related issues
KU7. operation, maintenance and technical support of 3D printers
KU8. technologies, capabilities and working of 3D printer models
KU9. materials used to print 3d objects for the model
KU10. reason and process for making adjustments, calibration, performance and improvement of printers
KU11. details of material fed into the printer head and its process
KU12. process to clean the printer platform and the print head
KU13. preventive maintenance of 3D printers
KU14. steps to get technical support from the manufacturer
KU15. process to perform hardware and software upgrades

Generic Skills (GS)

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

GS1. complete forms such as work orders, invoices and maintenance records
GS2. note problems and details of work done on job sheet
GS3. write emails and messages about site related issue
GS4. read warnings, instructions and other text material on product labels, components as well as the manuals
GS5. read and correctly interpret organisation's information about working practices at the site
GS6. read product and module serial numbers and interpret details such as make, date and availability
GS7. receive and ask for clarifications from supervisor on the job requirement
GS8. describe site conditions and issues to co-workers and supervisor
GS9. communicate in local language
GS10. communicate to the management in meetings about site issues
GS11. interact with co-workers and gather information related to process and site conditions
GS12. educate on precautions to be taken in order to avoid recurrence of problem
GS13. prioritise daily activities for the upkeep of calibration operation by ensuring availability of the calibration setup and its components
GS14. maintain personal grooming
GS15. be polite, patient and courteous under all circumstances, with all types of customers
GS16. decide on the spot on whether interaction of customer with superior is necessary or not

GS17. maintain proper etiquette such as keeping appropriate physical distance from customer during conversation, not entering bedroom without permission, etc.

GS18. put customer at ease and generate the customer's confidence

GS19. identify real needs of the customer and suggest most appropriate solution

GS20. seek inputs to assess the problems

GS21. evaluate the possible solution(s) to a problem and suggest an optimum solution

GS22. identify immediate or temporary solutions to resolve delays

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Perform preventive maintenance of 3D printer	**16**	**17**	**-**	**5**
PC1. perform periodic maintenance as recommended by the manufacturer	3	3	-	1
PC2. clean the build plate (hot bed/printing platform) for any residue causing uneven surface	2	2	-	1
PC3. remove filament (material) from the machine using the method as specified in the instruction manual	3	3	-	1
PC4. clean the filament feeder using the method as specified	2	2	-	1
PC5. lubricate the axis mechanisms periodically without over lubricating and using recommended oil or grease	3	3	-	1
PC6. follow the precautions necessary for maintenance of printer	3	4	-	-
Provide post installation technical support	**24**	**33**	**-**	**5**
PC7. verify that all details of the printer settings, print jobs performed and filament material used are as per standards and record any deviations	3	4	-	-
PC8. identify actual and potential causes by analysing the issue as well as the related systems, referring to the troubleshooting guide provided by the manufacturer under categories such as material and feed related, print-head related, quality of print related, software related, etc.	3	3	-	1
PC9. implement the suggested solution or contact the technical support team of the manufacturer to resolve the issue	3	4	-	-
PC10. order material and parts to ensure their replenishment according to plan	3	3	-	1
PC11. keep the customer informed of actions and expected time frame for finding a solution	3	5	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. resolve the matter as per customer satisfaction and complete closure process or escalate the matter as per the defined process if no resolution is found	3	5	-	1
PC13. perform hardware and software upgrades, customisations etc. as per company policies and notifications	3	5	-	1
PC14. perform periodic configurations and calibration	3	4	-	1
NOS Total	**40**	**50**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	IAS/N5607
NOS Name	Maintain and provide technical support for 3D printer
Sector	Instrumentation
Sub-Sector	Instrumentation & Automation
Occupation	Installation and Commissioning(Instrumentation and Automation)
NSQF Level	4
Credits	2
Version	2.0
Last Reviewed Date	NA
Next Review Date	26/05/2027
NSQC Clearance Date	26/05/2022

IAS/N5606: Install a 3D printer

Description

This OS unit is about installing and commissioning 3D printer, which includes unpacking the printer, inspecting it, switching it on, configuring, calibrating the axes, loading material and taking test print. It also includes adjustment of mechanical and software settings to get the desired print quality.

Scope

The scope covers the following :

- Prepare for installation
- Install and configure the 3D Printer
- Calibrate and run test prints

Elements and Performance Criteria

Prepare for installation

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

PC1. verify the shipping details, along with the printer model, BOQ, etc. against the order. In case of damage or deficiency, record and communicate the same to the customer or manufacturer/supplier/ service centre as per recommended procedure

PC2. identify the printer manual and software to be installed

PC3. ensure availability of printing raw material, tools, accessories and consumables in the acceptable forms, for e.g., filament and powder

Install and configure the 3D printer

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

PC4. verify if the expected power-on routing is followed. Expected routing: such as internal self-tests, appropriate display messages, X, Y, Z axes mechanisms and the printer head moving to their initial positions, etc.

PC5. install and set all the parameters required for configuration

PC6. execute corrective action for any errors reported during installation/configuration based on the installation manual

Calibrate and run test prints

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

PC7. observe the test print result carefully to make note of deficiency, if any

PC8. verify that the printer prints the specified material(s) in the format as per acceptable standards including resolution, and there are no discontinuities, jagged edges or undesirable marks or protrusions on the surface

PC9. make necessary adjustments to address print quality issues, repeat the test print and verify quality again

PC10. ensure that the printing speed is within the specified limits

PC11. prepare installation report and get it signed by the customer

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organisation's policies on customer care
KU2. organisation's code of conduct
KU3. organisation's culture and typical customer profile
KU4. organisation's reporting structure
KU5. organisation's documentation policy
KU6. organisation's sales and after-sales policy
KU7. organisation's website, contact personnel and related details
KU8. installation of commonly used computer hardware and software
KU9. how to communicate with customers in order to put them at ease
KU10. operation of the printer and technical support that can be provided to the end user
KU11. 3D printing technologies, advantages and shortcomings
KU12. commonly recognised 3D printer manufacturers
KU13. popular materials used to print 3D objects
KU14. popular 3D modelling software
KU15. how to make adjustments, calibration and performance improvement of printers
KU16. process to feed material into the printer head
KU17. process of working with multi head printers
KU18. process to clean the printer platform and the print head
KU19. preventive maintenance of 3d printers
KU20. process to get technical support from the manufacturer
KU21. open source software related to 3d printing, modelling and additive printing

Generic Skills (GS)

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

GS1. complete forms such as work orders, invoices, maintenance records, etc
GS2. note problems and details of work done on job sheet
GS3. write emails and messages about site related issue
GS4. read warnings, instructions and other text material on product labels, components as well as the manuals
GS5. read and correctly interpret organisational information about working practices at the site
GS6. read product / module serial numbers and interpret details such as make, date and availability
GS7. receive and ask for clarifications from supervisor about the job requirement
GS8. describe site conditions and issues to co-workers and supervisor
GS9. communicate in local language
GS10. communicate to the management in meetings about site issues

GS11. interact with co-workers and gather information related to process and site conditions
GS12. educate on precautions to be taken in order to avoid recurrence of problem
GS13. follow standard operating procedures while making decisions
GS14. work with supervisor and co-workers to achieve smooth workflow
GS15. work with superiors and co-workers to share knowledge and learning
GS16. maintain personal grooming
GS17. be polite, patient and courteous under all circumstances, with all types of customers
GS18. decide on the spot on whether interaction of customer with superior is necessary or not
GS19. maintain proper etiquette such as keeping appropriate physical distance from the customer during conversation, not entering bedroom without permission, etc.
GS20. put customer at ease and gain customer's confidence
GS21. seek inputs to assess the problems
GS22. evaluate the possible solution(s) to a problem and suggest an optimum solution
GS23. use the existing information to arrive at the course of actions
GS24. undertake and express new ideas and initiatives to others
GS25. improve work processes
GS26. anticipate problems, risks and opportunities and utilise these for mitigation and business optimisation

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare for installation	**12**	**12**	**-**	**3**
PC1. verify the shipping details, along with the printer model, BOQ, etc. against the order. In case of damage or deficiency, record and communicate the same to the customer or manufacturer/supplier/ service centre as per recommended procedure	4	4	-	1
PC2. identify the printer manual and software to be installed	4	4	-	1
PC3. ensure availability of printing raw material, tools, accessories and consumables in the acceptable forms, for e.g., filament and powder	4	4	-	1
Install and configure the 3D printer	**12**	**13**	**-**	**3**
PC4. verify if the expected power-on routing is followed. Expected routing: such as internal self-tests, appropriate display messages, X, Y, Z axes mechanisms and the printer head moving to their initial positions, etc.	4	4	-	1
PC5. install and set all the parameters required for configuration	4	5	-	1
PC6. execute corrective action for any errors reported during installation/configuration based on the installation manual	4	4	-	1
Calibrate and run test prints	**16**	**25**	**-**	**4**
PC7. observe the test print result carefully to make note of deficiency, if any	4	4	-	1
PC8. verify that the printer prints the specified material(s) in the format as per acceptable standards including resolution, and there are no discontinuities, jagged edges or undesirable marks or protrusions on the surface	4	4	-	1
PC9. make necessary adjustments to address print quality issues, repeat the test print and verify quality again	4	4	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. ensure that the printing speed is within the specified limits	2	7	-	-
PC11. prepare installation report and get it signed by the customer	2	6	-	1
NOS Total	**40**	**50**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	IAS/N5606
NOS Name	Install a 3D printer
Sector	Instrumentation
Sub-Sector	Instrumentation & Automation
Occupation	Installation and Commissioning(Instrumentation and Automation)
NSQF Level	4
Credits	2
Version	2.0
Last Reviewed Date	NA
Next Review Date	26/05/2027
NSQC Clearance Date	26/05/2022

IAS/N5608: Operate and optimise 3D printing for additive manufacturing

Description

This unit covers the design and optimisation of 3D CAD drawings and operation of 3D printer for prototyping or additive manufacturing, including post processing, maintaining and installing software/hardware upgrades.

Scope

The scope covers the following :

- The individual will be responsible for the following:
- Optimize CAD model and drawing file for 3D printing
- Perform 3D printing and post-processing

Elements and Performance Criteria

Optimise CAD model and drawing file for 3D printing

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

PC1. verify the material, design for the part to be printed and part resolution so that these are compatible with the printer

PC2. check the 3D model created by the user in CAD software

PC3. implement 3D printing simulation, if available, and make changes if needed

PC4. connect the 3D printer to the CAD design software through LAN or other supported interface

PC5. import file for 3D printing in a format compatible with the printer e.g. STL or OBJ

Perform 3D printing and post- processing

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

PC6. confirm that the printer is powered from UPS and operating environment conditions are met

PC7. import the model design through available interfaces in the correct format on the machine

PC8. load the required input material i.e., resin, plastic or metal

PC9. unload the printed model using recommended tool (e.g., spatula) after checking that the system is adequately cooled

PC10. perform any post printing operation required, i.e., removing supports, polishing, painting, etc.

PC11. provide suggestions to optimise the printer parameters to the model designer for optimisation of model

PC12. clean the build tray/platform as recommended

PC13. perform the recommended shut down procedure at the end of the batch/day's operation

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organisation's policies on customer care
KU2. organisation's policies on code of conduct
KU3. organisation's culture and typical customer profile
KU4. organisation's reporting structure
KU5. organisation's documentation policy
KU6. effect of additive manufacturing on the company
KU7. popular CAD software (Autodesk, Solid works, etc.)
KU8. how to load, view and edit 3D design on the CAD software that the user has created
KU9. import, export and convert file in different formats for 3D printing
KU10. how to configure software, load material and do printing, cleaning for all installed printers
KU11. materials supported on the installed printers, their characteristics and the design criteria for using these materials in modelling
KU12. how to assess printed object for quality and trouble shoot
KU13. working with 3D printers and filament / materials
KU14. load the filament or material into the 3D printer
KU15. calibration of the X, Y and Z axis
KU16. post processing techniques

Generic Skills (GS)

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

GS1. complete forms such as work orders, invoices and maintenance records
GS2. note problems and details of work done on job sheet
GS3. write emails and messages about site related issue
GS4. read warnings, instructions and other text material on product labels, components as well as the manuals
GS5. read and correctly interpret organisation's information about working practices at the site
GS6. read product and module serial numbers and interpret details such as make, date and availability
GS7. receive and ask for clarifications from supervisor on the job requirement
GS8. describe site conditions and issues to co-workers and supervisor
GS9. communicate in local language
GS10. communicate to the management in meetings about site issues
GS11. interact with co-workers and gather information related to process and site conditions
GS12. educate on precautions to be taken in order to avoid recurrence of problem
GS13. plan, prioritise and sequence work operations as per requirement
GS14. organise and analyse information relevant to work
GS15. focus on customer's requirement
GS16. respond to customer's queries in a timely and appropriate manner
GS17. seek inputs to assess the problems

GS18. evaluate the possible solution(s) to a problem and suggest an optimum solution

GS19. identify immediate or temporary solutions to resolve delays

GS20. undertake and express new ideas and initiatives to others

GS21. analyse and evaluate the information gathered from observation, experience, reasoning or communication, as a guide for thought and action

GS22. anticipate problems, risks and opportunities and utilise these for mitigation and business optimisation

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Optimise CAD model and drawing file for 3D printing	**15**	**22**	**-**	**3**
PC1. verify the material, design for the part to be printed and part resolution so that these are compatible with the printer	3	5	-	-
PC2. check the 3D model created by the user in CAD software	3	5	-	-
PC3. implement 3D printing simulation, if available, and make changes if needed	3	4	-	1
PC4. connect the 3D printer to the CAD design software through LAN or other supported interface	3	4	-	1
PC5. import file for 3D printing in a format compatible with the printer e.g. STL or OBJ	3	4	-	1
Perform 3D printing and post- processing	**25**	**28**	**-**	**7**
PC6. confirm that the printer is powered from UPS and operating environment conditions are met	3	3	-	1
PC7. import the model design through available interfaces in the correct format on the machine	3	4	-	1
PC8. load the required input material i.e., resin, plastic or metal	3	4	-	1
PC9. unload the printed model using recommended tool (e.g., spatula) after checking that the system is adequately cooled	3	4	-	1
PC10. perform any post printing operation required, i.e., removing supports, polishing, painting, etc.	4	5	-	1
PC11. provide suggestions to optimise the printer parameters to the model designer for optimisation of model	3	2	-	-
PC12. clean the build tray/platform as recommended	3	3	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. perform the recommended shut down procedure at the end of the batch/day's operation	3	3	-	1
NOS Total	**40**	**50**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	IAS/N5608
NOS Name	Operate and optimise 3D printing for additive manufacturing
Sector	Instrumentation
Sub-Sector	Instrumentation & Automation
Occupation	Installation and Commissioning(Instrumentation and Automation)
NSQF Level	4
Credits	2
Version	2.0
Last Reviewed Date	NA
Next Review Date	26/05/2027
NSQC Clearance Date	26/05/2022

IAS/N9001: Work effectively with teams

Description

This NOS unit is about building relationships and working with people and groups inside and outside the organization, using skills and habits, to achieve the team goals and objectives.

Scope

The scope covers the following :

- Work as per organisational team environment
- Communicate effectively
- Co-operate with team members and superiors
- Respect customes / preferences and gender / ability differences "

Elements and Performance Criteria

Work as per the organisational team environment

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

PC1. identify team objectives and goals, team members by name, their role and responsibilities, greet them appropriately and respond to their greetings

PC2. comply with organisation’s policies and procedures for working with team members within and outside the organisation—especially related to privacy, confidentiality and security

PC3. work as per the environment to build trust and mutual respect

PC4. participate in decision making by providing facts and figures, give / accept constructive suggestions, take initiatives to help team members arrive at workable decisions and meet the goals

PC5. accept decisions professionally and support even if they do not match suggestions and personal views

Communicate effectively

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

PC6. communicate professionally as per organisation's protocols, using appropriate mode of communication—verbal, written, mail, phone or text—and clearly articulate the message to ensure that the receiver understands the message

PC7. listen to team members attentively, respond promptly, seek / provide clarifications if required

PC8. share important information with the team timely and refrain from overloading them with unnecessary and unsolicited information

Co-operate with team members and superiors

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

PC9. perform own role, receive inputs from others and make adjustments within permissible rules as per requirement, to produce output in time for other team members to follow

PC10. help team members to perform their role effectively and provide any clarifications/support they need, including tools /equipment / common resources as well as resolve any contentious issues amicably, involving the team lead or the supervisor if needed

PC11. let team members know in good time if commitments cannot be carried out, explaining the reasons, and provide alternate solutions, if any; let the team lead know about this

PC12. act in the interest of the team and the organisation, take initiative to correct the wrong, seek help or escalate if needed to ensure that things do not 'fall through the gap' and team goals are achieved

Respect customs / preferences and gender / ability differences

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

PC13. follow organisation's policies and statutory guidelines w.r.t seeking information about others' customs / preferences, making references or comments on social customs / preferences, and refrain from hurting sentiments

PC14. accommodate team members' preferences to the extent feasible, and in case they come in the way of fulfilling team goals, discuss with the supervisor/ team leader

PC15. ensure personal behaviour, conduct and communication styles, taking gender and disability of the person into consideration

PC16. list the different types of disabilities with their respective issues and ways to help them overcome challenges

PC17. use inclusive language, verbal as well as non-verbal, irrespective of the disability and the gender of the person

PC18. ensure equal treatment for all clients, colleagues and co-workers while respecting their personal space

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. Organisation's policies on dress code , workplace behaviour , performance management,incentives,delivery standards,information security,etc.

KU2. Organisation's hierarchy and escalation matrix

KU3. importance of the individual's role in the workflow

KU4. work area inspection procedures and practices

KU5. different types of information that colleagues might need and the importance of providing this information when it is required

KU6. deeper understanding of actions and consequences of gender based behaviour

KU7. knowledge of gender based concepts, issues and legislation

KU8. organisation standards and guidelines to be followed for PwD and knowledge about laws, acts and provisions defined for PwD by the statutory bodies and the right way to use them including various medical conditions associated with PwD

KU9. health and safety requirements at workplace for PwD and information about various institutes working for PwD to enable in providing livelihood opportunities for PwD

KU10. rights and duties at workplace with respect to PwD and various government / private schemes and benefits available for PwD

KU11. process of recruiting people for a particular job profile w.r.t PwD and gender including rights and duties at workplace with respect to gender sensitivity

Generic Skills (GS)

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

GS1. complete forms such as work orders, invoices and maintenance records

GS2. fill up appropriate forms,activity logs and attendance sheets as per the organisation's format in English and/or local language

GS3. write basic accident or incident report as witnessed in an appropriate format to the relevant authority

GS4. read warnings, instructions and other text material on product labels, components, etc.

GS5. read relevant signage, warnings, labels or descriptions on equipment, etc. while carrying out work activities

GS6. listen effectively and orally communicate information

GS7. ask for clarification and advice from the concerned person

GS8. make decisions on a suitable course of action or response keeping in view resource utilisation while meeting

GS9. plan and organise work to achieve targets and deadlines

GS10. understand needs of the customer, suggest most appropriate solution and support them whenever needed

GS11. match symptoms of the fault noticed to the cause of the problem

GS12. anticipate and avoid hazards that may occur during repairs because of tools, materials used or repair processes

GS13. spot process disruptions and delays

GS14. practice and acceptance of gender and its concepts

GS15. develop empathy across genders and towards PwD

GS16. reflect on own gender identity, gender roles and PwD issues

GS17. engage and participate in discussions to end gender and disability discrimination

GS18. improve and modify work practices

GS19. maintain positive and effective relationships with colleagues and customers

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Work as per the organisational team environment	**15**	**8**	**-**	**5**
PC1. identify team objectives and goals, team members by name, their role and responsibilities, greet them appropriately and respond to their greetings	4	4	-	-
PC2. comply with organisation's policies and procedures for working with team members within and outside the organisation—especially related to privacy, confidentiality and security	4	-	-	2
PC3. work as per the environment to build trust and mutual respect	2	-	-	1
PC4. participate in decision making by providing facts and figures, give / accept constructive suggestions, take initiatives to help team members arrive at workable decisions and meet the goals	4	4	-	1
PC5. accept decisions professionally and support even if they do not match suggestions and personal views	1	-	-	1
Communicate effectively	**6**	**10**	**-**	**1**
PC6. communicate professionally as per organisation's protocols, using appropriate mode of communication—verbal, written, mail, phone or text—and clearly articulate the message to ensure that the receiver understands the message	2	6	-	1
PC7. listen to team members attentively, respond promptly, seek / provide clarifications if required	2	-	-	-
PC8. share important information with the team timely and refrain from overloading them with unnecessary and unsolicited information	2	4	-	-
Co-operate with team members and superiors	**8**	**18**	**-**	**1**
PC9. perform own role, receive inputs from others and make adjustments within permissible rules as per requirement, to produce output in time for other team members to follow	2	6	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. help team members to perform their role effectively and provide any clarifications/support they need, including tools /equipment / common resources as well as resolve any contentious issues amicably, involving the team lead or the supervisor if needed	-	6	-	1
PC11. let team members know in good time if commitments cannot be carried out, explaining the reasons, and provide alternate solutions, if any; let the team lead know about this	2	-	-	-
PC12. act in the interest of the team and the organisation, take initiative to correct the wrong, seek help or escalate if needed to ensure that things do not 'fall through the gap' and team goals are achieved	4	6	-	-
Respect customs / preferences and gender / ability differences	**11**	**14**	**-**	**3**
PC13. follow organisation's policies and statutory guidelines w.r.t seeking information about others' customs / preferences, making references or comments on social customs / preferences, and refrain from hurting sentiments	2	4	-	-
PC14. accommodate team members' preferences to the extent feasible, and in case they come in the way of fulfilling team goals, discuss with the supervisor/ team leader	2	-	-	1
PC15. ensure personal behaviour, conduct and communication styles, taking gender and disability of the person into consideration	2	6	-	1
PC16. list the different types of disabilities with their respective issues and ways to help them overcome challenges	1	-	-	1
PC17. use inclusive language, verbal as well as non-verbal, irrespective of the disability and the gender of the person	2	4	-	-
PC18. ensure equal treatment for all clients, colleagues and co-workers while respecting their personal space	2	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
NOS Total	**40**	**50**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	IAS/N9001
NOS Name	Work effectively with teams
Sector	Instrumentation
Sub-Sector	Instrumentation & Automation
Occupation	Generic
NSQF Level	4
Credits	1
Version	4.0
Last Reviewed Date	NA
Next Review Date	26/05/2025
NSQC Clearance Date	26/05/2022

IAS/N9002: Health and safety in workplace

Description

This OS unit is about following adequate safety procedures to make work environment safe

Scope

The scope covers the following :

- Adhere to standard safety procedures of the company
- Maintain good health and posture
- Effective waste management/recycling practices
- Adopt learning and self-direction
- Develop system thinking in problem solving
- Material/Resources conservation practices

Elements and Performance Criteria

Adhere to standard safety procedures of the company

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

PC1. comply with general safety procedures and those for handling an equipment, hazardous material or tool, followed in the company

PC2. remove finger rings or any other metal objects likely to interfere with the work before working on the unit

PC3. use of safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.

PC4. escalate the issue about hazardous materials or things found in the premises or any breach of safety procedure in the company

PC5. ensure zero accidents at work

PC6. avoid damage of components due to negligence in ESD procedures or any other loss due to safety negligence

PC7. participate regularly in fire drills or other safety related workshops organised by the company

Maintain good health and posture

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

PC8. maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials

PC9. participate in company organised health sessions such as yoga, physiotherapy or games

PC10. handle heavy and hazardous materials with care, while maintaining appropriate posture, using suitable tools and handling equipment such as trolleys, jacks and ladders

Effective waste management/recycling practices

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

PC11. identify recyclable and non-recyclable, and hazardous waste generated to be segregated accordingly

PC12. dispose non-recyclable waste and hazardous waste as per recommended processes

PC13. deposit recyclable and reusable material at identified location

Adopt learning and self-direction

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

PC14. understand importance of skill advancement and develop mastery

PC15. adapt product / service to meet success criteria

PC16. understand accountability for timely completion of tasks

PC17. manage to express emotions in appropriate ways at workplace and understand the cause for the emotions

Develop system thinking in problem solving

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

PC18. analyse the problem accurately and communicate different possible solutions to the problem

PC19. manage to estimate the cause of the problem and validate

Material/Resources conservation practices

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

PC20. identify ways to optimize usage of material including water and electricity / energy in various tasks/activities/processes

PC21. check for spills/leakages in various tasks/activities/processes and plug them or escalate to appropriate authority

PC22. carry out routine cleaning of tools, machines and equipment

PC23. check if the equipment/machine is functioning normally before commencing work and rectify wherever required and report malfunctioning (fumes/sparks/emission/vibration/noise) or any lapse in maintenance of equipment

PC24. ensure electrical equipment and appliances are properly connected and turned off when not in use

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. company's policies on incentives,delivery standards, and personnel management

KU2. company occupational safety and health policy

KU3. company emergency evacuation procedure

KU4. Company's medical policy

KU5. how to maintain the work area safe and secure

KU6. how to handle hazardous materials, tools and equipment

KU7. procedures to be followed during emergencies such as fire accidents, electrocution, etc.

KU8. long term value of good posture and use of appropriate handling equipment

KU9. electrical grounding practices

KU10. safety regulations and standards and how to apply these

KU11. common sources of pollution and ways to minimize it

KU12. categorisation of waste into dry, wet, recyclable, non-recyclable and items of single-use plastics

KU13. usage of different colours of dustbins
KU14. waste management and methods of waste disposal
KU15. organisation's procedures for minimizing mistakes
KU16. strategies pertinent to their field (such as internet searches, asking peers and managers, enrolling for courses and certifications, etc.) that can be used to pursue an advancement in their skills
KU17. one should be able to identify the key performance indicators for the new tasks
KU18. seek feedback from supervisor and deal in constructive manner
KU19. understand that emotions are accompained by a physical state, thought and feeling
KU20. one should be able to interpret timelines and goals set by the manager and break them into sub-goals and tasks
KU21. importance of quality and timely delivery of the product/service
KU22. potential hazards, risks and threats based on the nature of work
KU23. ways of efficiently managing material and water in the process
KU24. layout of the workstation and electrical and thermal equipment used
KU25. efficient and inefficient utilization of material and water
KU26. basics of electricity and prevalent energy efficient devices
KU27. ways to recognize common electrical problems
KU28. common practices of conserving electricity

Generic Skills (GS)

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

GS1. fill up appropriate forms, activity logs and attendance sheets as per organisation's format in English and/or local language
GS2. write basic accident or incident report as witnessed in appropriate format to relevant authority
GS3. read/listen and interpret information correctly from relevant instruction documents, manuals, health and safety instructions, memos, etc. applicable to the job, in English and/or local language
GS4. read relevant signage, warnings, labels or descriptions on equipment, etc. while carrying out work activities
GS5. question co-workers in order to understand the safety and health issues
GS6. inform co-workers about safety and health issues
GS7. report issues and problems relating to safety and health to managers in clear terms
GS8. make decisions pertaining to safety and health issues at workplace
GS9. plan and organise work conforming to the safety and health norms of the company
GS10. make decisions about escalating safety and health issues at workplace to managers
GS11. discuss problems related to safety and health, evaluate the possible solution(s) and arrive at optimum /best possible solution(s) in consultation with concerned people
GS12. use the existing information to arrive at actionable decision points
GS13. use the existing information for improving customer satisfaction

GS14. use the existing information to optimise solution and company business

GS15. analyse problems and identify causes and possible solutions

GS16. apply, analyse and evaluate the information gathered from observation, experience, reasoning, or communication, as a guide to thought and action

GS17. anticipate problems, risks and opportunities and utilise these for mitigation and business optimisation

GS18. communicate with colleagues on the significance of greening of jobs

GS19. identify cause and effect of greening of jobs

GS20. record data on waste disposal at workplace

GS21. demonstrate commitment towards self, and initiative to advance skills levels by exploring various pathways to expand one's own learning

GS22. incorporate feedback into one's mental model of task, and bring it into practice

GS23. be punctual, utilize time and manage workload efficiently

GS24. evaluate strategies to maintain, enhance or reduce the intensity of heightened emotional response

GS25. test a hypothesis about the cause of the problem

GS26. identify and ask significant questions to clarify the various points of view on the problem to better understand the problem

GS27. record data on waste disposal at workplace

GS28. make timely decisions for efficient utilization of resources

GS29. complete statutory documents relevant to safety and hygiene

GS30. read Standard Operating Practices (SOP) documents

GS31. communicate with colleagues on the significance of greening of jobs

GS32. complete tasks efficiently and accurately within stipulated time

GS33. work with supervisors/team members to carry out work related tasks

GS34. identify cause and effect of greening of jobs

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Adhere to standard safety procedures of the company	**13**	**12**	**-**	**5**
PC1. comply with general safety procedures and those for handling an equipment, hazardous material or tool, followed in the company	2	2	-	1
PC2. remove finger rings or any other metal objects likely to interfere with the work before working on the unit	2	4	-	-
PC3. use of safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.	4	2	-	1
PC4. escalate the issue about hazardous materials or things found in the premises or any breach of safety procedure in the company	1	1	-	-
PC5. ensure zero accidents at work	1	1	-	1
PC6. avoid damage of components due to negligence in ESD procedures or any other loss due to safety negligence	1	1	-	1
PC7. participate regularly in fire drills or other safety related workshops organised by the company	2	1	-	1
Maintain good health and posture	**6**	**8**	**-**	**1**
PC8. maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials	2	3	-	1
PC9. participate in company organised health sessions such as yoga, physiotherapy or games	2	1	-	-
PC10. handle heavy and hazardous materials with care, while maintaining appropriate posture, using suitable tools and handling equipment such as trolleys, jacks and ladders	2	4	-	-
Effective waste management/recycling practices	**4**	**5**	**-**	**1**
PC11. identify recyclable and non-recyclable, and hazardous waste generated to be segregated accordingly	2	1	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. dispose non-recyclable waste and hazardous waste as per recommended processes	1	3	-	-
PC13. deposit recyclable and reusable material at identified location	1	1	-	-
Adopt learning and self-direction	**4**	**5**	**-**	**1**
PC14. understand importance of skill advancement and develop mastery	1	1	-	1
PC15. adapt product / service to meet success criteria	1	2	-	-
PC16. understand accountability for timely completion of tasks	1	1	-	-
PC17. manage to express emotions in appropriate ways at workplace and understand the cause for the emotions	1	1	-	-
Develop system thinking in problem solving	**2**	**2**	**-**	**1**
PC18. analyse the problem accurately and communicate different possible solutions to the problem	1	1	-	-
PC19. manage to estimate the cause of the problem and validate	1	1	-	1
Material/Resources conservation practices	**11**	**18**	**-**	**1**
PC20. identify ways to optimize usage of material including water and electricity / energy in various tasks/activities/processes	2	2	-	-
PC21. check for spills/leakages in various tasks/activities/processes and plug them or escalate to appropriate authority	1	2	-	-
PC22. carry out routine cleaning of tools, machines and equipment	3	6	-	-
PC23. check if the equipment/machine is functioning normally before commencing work and rectify wherever required and report malfunctioning (fumes/sparks/emission/vibration/noise) or any lapse in maintenance of equipment	3	4	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC24. ensure electrical equipment and appliances are properly connected and turned off when not in use	2	4	-	1
NOS Total	**40**	**50**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	IAS/N9002
NOS Name	Health and safety in workplace
Sector	Instrumentation
Sub-Sector	Instrumentation & Automation
Occupation	Generic
NSQF Level	4
Credits	1
Version	2.0
Last Reviewed Date	NA
Next Review Date	11/08/2025
NSQC Clearance Date	11/08/2020

DGT/VSQ/N0102: Employability Skills (60 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Career Development & Goal Setting
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

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

PC1. identify employability skills required for jobs in various industries

PC2. identify and explore learning and employability portals

Constitutional values – Citizenship

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

PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.

PC4. follow environmentally sustainable practices

Becoming a Professional in the 21st Century

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

PC5. recognize the significance of 21st Century Skills for employment

PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life

Basic English Skills

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

PC7. use basic English for everyday conversation in different contexts, in person and over the telephone

PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English

PC9. write short messages, notes, letters, e-mails etc. in English

Career Development & Goal Setting

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

PC10. understand the difference between job and career

PC11. prepare a career development plan with short- and long-term goals, based on aptitude

Communication Skills

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

PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings

PC13. work collaboratively with others in a team

Diversity & Inclusion

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

PC14. communicate and behave appropriately with all genders and PwD

PC15. escalate any issues related to sexual harassment at workplace according to POSH Act

Financial and Legal Literacy

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

PC16. select financial institutions, products and services as per requirement

PC17. carry out offline and online financial transactions, safely and securely

PC18. identify common components of salary and compute income, expenses, taxes, investments etc

PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation

Essential Digital Skills

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

PC20. operate digital devices and carry out basic internet operations securely and safely

PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively

PC22. use basic features of word processor, spreadsheets, and presentations

Entrepreneurship

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

PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research

PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion

PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

Customer Service

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

PC26. identify different types of customers

PC27. identify and respond to customer requests and needs in a professional manner.

PC28. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

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

PC29. create a professional Curriculum vitae (Résumé)

PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively

PC31. apply to identified job openings using offline /online methods as per requirement

PC32. answer questions politely, with clarity and confidence, during recruitment and selection

PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills and different learning and employability related portals

KU2. various constitutional and personal values

KU3. different environmentally sustainable practices and their importance

KU4. Twenty first (21st) century skills and their importance

KU5. how to use English language for effective verbal (face to face and telephonic) and written communication in formal and informal set up

KU6. importance of career development and setting long- and short-term goals

KU7. about effective communication

KU8. POSH Act

KU9. Gender sensitivity and inclusivity

KU10. different types of financial institutes, products, and services

KU11. how to compute income and expenditure

KU12. importance of maintaining safety and security in offline and online financial transactions

KU13. different legal rights and laws

KU14. different types of digital devices and the procedure to operate them safely and securely

KU15. how to create and operate an e- mail account and use applications such as word processors, spreadsheets etc.

KU16. how to identify business opportunities

KU17. types and needs of customers

KU18. how to apply for a job and prepare for an interview

KU19. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

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

GS1. read and write different types of documents/instructions/correspondence

GS2. communicate effectively using appropriate language in formal and informal settings

GS3. behave politely and appropriately with all
GS4. how to work in a virtual mode
GS5. perform calculations efficiently
GS6. solve problems effectively
GS7. pay attention to details
GS8. manage time efficiently
GS9. maintain hygiene and sanitization to avoid infection

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction to Employability Skills	**1**	**1**	**-**	**-**
PC1. identify employability skills required for jobs in various industries	-	-	-	-
PC2. identify and explore learning and employability portals	-	-	-	-
Constitutional values – Citizenship	**1**	**1**	**-**	**-**
PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC4. follow environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	**2**	**4**	**-**	**-**
PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
Basic English Skills	**2**	**3**	**-**	**-**
PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
Career Development & Goal Setting	**1**	**2**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. understand the difference between job and career	-	-	-	-
PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
Communication Skills	**2**	**2**	**-**	**-**
PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
PC13. work collaboratively with others in a team	-	-	-	-
Diversity & Inclusion	**1**	**2**	**-**	**-**
PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
Financial and Legal Literacy	**2**	**3**	**-**	**-**
PC16. select financial institutions, products and services as per requirement	-	-	-	-
PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
Essential Digital Skills	**3**	**4**	**-**	**-**
PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Entrepreneurship	**2**	**3**	**-**	**-**
PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
Customer Service	**1**	**2**	**-**	**-**
PC26. identify different types of customers	-	-	-	-
PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-
PC28. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	**2**	**3**	**-**	**-**
PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC31. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0102
NOS Name	Employability Skills (60 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	31/01/2024
Next Review Date	31/01/2027
NSQC Clearance Date	31/01/2024

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down a proportion of marks for Theory and Skills Practical for each PC.

2. The assessment for the theory part will be based on the knowledge bank of questions created by the SSC.

3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below).

5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on this criterion.

6. To pass the Qualification Pack, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
IAS/N5607.Maintain and provide technical support for 3D printer	40	50	-	10	100	30
IAS/N5606.Install a 3D printer	40	50	-	10	100	20
IAS/N5608.Operate and optimise 3D printing for additive manufacturing	40	50	-	10	100	20
IAS/N9001.Work effectively with teams	40	50	-	10	100	10
IAS/N9002.Health and safety in workplace	40	50	-	10	100	10
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	0	0	50	10
Total	**220**	**280**	**0**	**0**	**550**	**100**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.