

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Name and address of submitting body:

Agriculture Skill Council of India (ASCI)
6th floor, GNG Building, Plot no – 10, Sector-44,
Gurugram, Haryana – 122004

Name and contact details of individual dealing with the submission

Name: Ms Priyanka Prakash

Position in the organisation: Manager

Address if different from above

Tel number(s): 0124-4814659

E-mail address: priyanka@asci-india.com

List of documents submitted in support of the Qualifications File

1. Qualifications Pack of Plant Tissue Culture Technician
2. Career Map of Plant Tissue Culture Technician
3. List of QP/NOS Validating Companies

SUMMARY

Qualification Title	Plant Tissue Culture Technician
Qualification Code	AGR/Q8101
Nature and purpose of the qualification	<p>Nature of the qualification</p> <ul style="list-style-type: none"> - a Qualification Pack (QP) <p>The main purpose of the qualification</p> <ul style="list-style-type: none"> - to train the incumbent for preparing culture media, labeling tubes/specimen containers, inoculating, sub culturing, incubating tissue cultures, hardening plants, maintaining laboratory supplies, cleaning of laboratory equipment utilizing proper cleaning protocols and procedures and maintaining records, under limited supervision
Body/bodies which will award the qualification	Agriculture Skill Council of India (ASCI)
Body which will accredit providers to offer courses leading to the qualification	Agriculture Skill Council of India (ASCI)
Body/bodies which will carry out assessment of learners	Agriculture Skill Council of India (ASCI)
Occupation(s) to which the qualification gives access	Plant Tissue Culture Technician
Licensing requirements	N/A
Level of the qualification in the NSQF	Level 4
Anticipated volume of training/learning required to complete the qualification	200 hours
Entry requirements and/or recommendations	Class 12 (Science background), preferably
Progression from the qualification	Plant Tissue Lab Culture Supervisor (After undergoing training in the course on Plant Tissue Culture Technician and after 1-2 years of experience on the field, the incumbent can progress to the role of Plant Tissue Lab Culture Supervisor)
Planned arrangements for the Recognition of Prior learning (RPL)	RPL assessment will be as per normal ASCI assessment process. (ASCI recognizes that there may be candidates who have prior learning experience in the Agriculture Sector and are desirous of being certified. Such candidates can apply to ASCI for testing and certification of their skills. Training Partners will be responsible for identifying and counselling candidates for RPL through mobilization camps and advertisements. The details of the RPL process have been defined by ASCI under the document- Guidelines for

	Recognition of Prior Learning under PMKVY)
International comparability where known	The course has been compared with courses being offered by Lantra, UK and no matching course has been found.
Date of planned review of the qualification.	20/07/2020

Title of component and identification code.	Formal structure of the qualification			
	Mandatory/ Optional	Estimated size (learning hours: Theory)	Estimated size (learning hours: Practical)	Level
Introduction (Bridge Module)	Mandatory	10	10	4
AGR/N8101 Adhere to sanitation and safety guidelines of the lab	Mandatory	10	30	4
AGR/N8102 Prepare and store culture media	Mandatory	10	30	4
AGR/N8103 Prepare explants for tissue culture, acclimatize plantlets and check for hardening	Mandatory	10	30	4
AGR/N8104 Calibrate equipments and maintain documents	Mandatory	10	20	4
AGR/N9912 Collaborate with team members and work effectively	Mandatory	10	20	4

Please attach any document giving further detail about the structure of the qualification – e.g. a Curriculum or Qualification Pack.

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

1. Qualification Pack Plant Tissue Culture Technician - Annexure 1

SECTION 1

ASSESSMENT

Body / Bodies which will carry out assessment:

If there will be more than one assessment body for this qualification, give details.

ASCI affiliated assessment bodies.

1. Aspiring Minds Pvt Ltd
2. Anant Learning & Development Pvt Ltd
3. Assess People Services India Pvt Ltd
4. Trendsetters Skill Assessors Pvt Ltd
5. Manipal City & Guilds
6. Mettl
7. SP Institute of Workforce Development
8. Multi Skill Assessor Guild

More Assessment Agencies are being empanelled to cover wider geographical area

How will RPL assessment be managed and who will carry it out?

RPL will be based on the same approved Qualification Pack and Assessment Criteria mentioned in the Qualification Pack and will be carried out as per normal ASCI assessment process. The Training Partner or any other authority as prescribed by the Steering Committee will identify and counsel candidates eligible for RPL through mobilization camps and advertisements. The mobilized candidates can be counselled, oriented about the standardized NSQF framework and basis their existing competency will be mapped against the suitable level of the concerned Job role for assessments. The candidates enrolled will be assessed by the Assessment Agency affiliated with the Sector Skill Council on the basis of assessment criteria decided by Sector Skill Council (SSC). The candidate will need to pass in the minimum assessment criteria of a particular QP decided by the SSC. Successfully assessed candidates with a valid Aadhaar or alternate ID (as per process) will be eligible for either "Full Qualification" or "Partial Qualification – NOS based Certification".

Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF:

A robust technology enabled assessment methodology has been designed keeping in mind the geographical/Physical constraints and target segment which assess a trainee's knowledge and skill set through three methods:

- a. An offline Tablet based test through the use of Multiple Choice Text and Picture based questions in vernacular languages
- b. Actual demonstration on the field
- c. Viva

ASCI's assessment strategy:

- Question sets are developed as per the weightage of each NOS of the Qualification Pack.
- Assessment criteria for each Qualification Pack developed, in which each Performance criteria (PC) assigned marks based on NOS
- Question Bank is developed to assess the theoretical and practical knowledge. To ensure the quality, each trainees get different set of question
- Empanelment of subject matter expert as assessor primarily from the Industry to assess trainee specifically on practical skills as per Industry demands

Assessments are preferably conducted on tablets or pen or papers in regional languages according to the requirement.

Please attach any documents giving further information about assessment and/or RPL.

Give details of the document(s) here:

- Assessment criteria is available at the end of the Qualification Pack

ASSESSMENT EVIDENCE

Complete a grid for each component as listed as “Formal structure of the qualification” in the summary.

Note: this grid can be replaced by any part of the qualification documentation which shows the same information – i.e. Learning Outcomes to be assessed, assessment criteria and the means of assessment

Means of assessment 1
Means of assessment 2
Pass / Fail

Title of the Component: Plant Tissue Culture Technician

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role: Plant Tissue Culture Technician

Qualification Pack: AGR/Q8101

Sector Skill Council: Agriculture Skill Council of India (ASCI)

Guidelines for Assessment:

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS, as well as the selected elective NOS/set of NOS.
OR
3. Assessment will be conducted for all compulsory NOS, as well as the selected optional NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
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

Compulsory NOS		Marks Allocation			
Total Marks: 500					
Assessable outcomes	Assessment criteria for outcomes	Total Marks	Out of	Theory	Skills Practical
1. AGR/N8101 Adhere to sanitation and safety guidelines of the lab	PC1. understand the layout of the lab	100	5	2	3
	PC2. identify the requirement of different areas/chambers and equipment		4	1	3
	PC3. ensure personal hygiene by using clean lab coat, gloves, head cap, face masks, goggles, etc. as per the work requirement		5	1	4
	PC4. avoid eating, smoking and drinking inside the lab		4	1	3
	PC5. oversee lab cleaning activities and undertake fumigation as and when required		5	2	3
	PC6. place reagents/chemicals at their designated place alphabetically, in accordance with their properties		5	2	3
	PC7. check and disinfect all tools and equipment before operating them		5	1	4
	PC8. discard contents of a container immediately after completion of an experiment		5	2	3
	PC9. dispose off chipped or broken glassware in specially marked containers		4	1	3
	PC10. clean/wash all the glassware manually or through automatic washing machine in potable water		4	1	3
	PC11. dry and decontaminate the glassware		4	1	3
	PC12. sterilize glassware etc. in hot air oven		4	1	3
	PC13. clean and place tools and equipment at the designated places after use		4	1	3
	PC14. follow work instructions for maintaining required lab environment		5	2	3
	PC15. use personal protective equipment (ppes)		4	1	3
	PC16. handle toxic chemicals with appropriate precaution		5	2	3
	PC17. remove spilled chemicals immediately		5	2	3
	PC18. dispose off chemicals, broken glass, flasks, pipettes etc. in appropriate place		5	1	4
	PC19. follow the safety precautions provided by the manufacturer when operating instruments		5	2	3
	PC20. use the contents of first aid kit		4	1	3
	PC21. use fire extinguisher as & when required		5	1	4
	PC22. perform all procedures and follow work instructions for controlling operational risks		4	1	3
			100	30	70

2. AGR/N8102 Prepare and store culture media	PC1.	read and understand sops for preparing culture media	100	4	1	3
	PC2.	get familiarized with the nature & composition of different kinds of culture medium and their suitability to different types of explants		4	1	3
	PC3.	understand the composition of the required stock solutions for nutrient medium		4	1	3
	PC4.	ensure that the lab chemicals and agar used for preparation of media are of specific grade		4	1	3
	PC5.	ensure that the water used is double glass distilled, ro or demineralised		4	1	3
	PC6.	prepare different stock solutions for nutrient medium of required constituents, strength & volume		5	2	3
	PC7.	ensure availability of the following equipments: <ul style="list-style-type: none"> • deep freezer to store stock solutions • refrigerator to store chemicals, plant materials and short term storage of stock solutions • storage tank for distilled water • other equipments such as electronic weighing balance, hot plates, ph meter 		5	1	4
	PC8.	appropriately label & store/refrigerate the stock solutions at desired temperature		5	2	3
	PC9.	prepare culture medium (white's, ms, b5, n6, nitsch's) with required quantity of sucrose, agar, water and stock solution with the help of hot plate & magnetic stirrer		5	2	3
	PC10.	calibrate medium's ph at required level with ph meter using hcl or naoh solution		4	1	3
	PC11.	dispense medium uniformly into culture bottles/jars either manually or with the help of automatic media dispenser		5	2	3
	PC12.	appropriately label the culture bottles & register the particulars of the same in media register or computer		4	1	3
	PC13.	maintain inventory of all lab chemicals, glass wares, consumables etc.		4	1	3
	PC14.	check bench height and its suitability for work		4	1	3
	PC15.	autoclave the media at the prescribed temperature, pressure and duration in an autoclave		4	1	3
	PC16.	sterilize the syntax filters before use by autoclaving		5	2	3
	PC17.	filter sterilize the stock solutions of heat labile chemicals through a syntax filter		5	2	3

	PC18.	dispense the filter sterilized solution to autoclaved media after cooling under aseptic conditions		5	2	3
	PC19.	transfer the culture bottles to media storage room immediately after autoclaving		4	1	3
	PC20.	observe culture medium three days after autoclaving for any microbial contamination before issue for inoculation		4	1	3
	PC21.	discard the entire lot in case contamination over 3 percent is observed		4	1	3
	PC22.	remove the contaminated bottles immediately for autoclaving		4	1	3
	PC23.	record the particulars of contamination for each batch of media prepared in the media register		4	1	3
				100	30	70
3. AGR/N8103 Prepare explants for tissue culture, carry out shoot multiplication and acclimatize plantlets	PC1.	select the mother plants of crops that can undergo micro propagation such as:	100	3	1	2
		· horticulture crops: fruits and vegetables				
		· ornamental and flowering plants				
		· food grain crops such as wheat and rice				
		· date palms				
		· spices				
	PC2.	ensure that the mother plants are grown in a glasshouse/ greenhouse wherever possible		2	0.5	1.5
	PC3.	expose the plants to suitable light, temperature to improve quality of explants		2	0.5	1.5
	PC4.	carry out watering of plant with filtered water or pretreat with recommended fungicides where possible to prevent bacterial contamination		2	0.5	1.5
	PC5.	select the mother plant which appear healthy and are free from pests, diseases and bacterial infections		2	0.5	1.5
	PC6.	label the mother plant giving ref no/date, name of plant species, variety and location		2	1	1
	PC7.	pack the mother plant appropriately (dry or immersed in water) in cardboard cartons and transport to tissue culture laboratory		2	0.5	1.5
PC8.	maintain the plant in virus free condition until used in tissue culture operation	2	0.5	1.5		
PC9.	select the part of the plant which is to be used as explant for tissue culture purposes such as:	3	1	2		
	· shoot tip					

	· auxillary bud			
	· flower buds/ young inflorescence/ fruit			
	· nodes			
	· leaves			
	· rhizomes etc			
	PC10. remove the part from an intact plant in a sterile condition	2	0.5	1.5
	PC11. ensure that the cutting tools used to remove the plant parts are disinfected	2	0.5	1.5
	PC12. clean the surface of the part by a detergent in running water	2	0.5	1.5
	PC13. sterilize the explant surface with a disinfectant such as "sodium hypochlorite" solution or other prescribed solutions under sterile room conditions	3	1	2
	PC14. rinse the surface thoroughly later in sterile water to remove all traces of the sterilant	2	0.5	1.5
	PC15. ensure that the inoculation room is maintained at the required sterility level	2	0.5	1.5
	PC16. prepare the work space (Laminar Air Flow Cabinet) or lab bench with microscope, by wiping with disinfectant, clean glass ware, tools and equipments	2	0.5	1.5
	PC17. prepare the explants, Inoculate the prepared/ trimmed explant into culture tubes/bottles containing growth medium under aseptic conditions	2	0.5	1.5
	PC18. label the tubes/bottles giving details regarding the plant species, variety, date of transfer	2	1	1
	PC19. cap the tubes/bottles with a sterile cotton plug or other suitable caps and/ or wrap with cling/parafilm to facilitate free exchange of sterile air	3	1	2
	PC20. ensure establishment of primary culture – check for initial contaminations, leachates, phenolics etc, discard the contaminated cultures	3	1	2
	PC21. incubate the inoculated culture tubes for 3-4 weeks, keeping suitable conditions in check such as:			
	· temperature			
	· humidity			
	· light and illumination			
	· other conditions required for proliferation of shoot buds	3	1	2
	PC22. transfer/subculture proliferated shoots to fresh medium for mass multiplication whenever required	3	1	2
	PC23. maintain the job sheet indicating the number of bottles transferred at the	3	1	2

	end of complete transfer of each clone/genotype, indicating the number of bottles, no of subculture etc.			
PC24.	keep the culture tubes in trays or storage racks in the growth room	2	0.5	1.5
PC25.	monitor and measure the temperature of the growth room on a regular basis using temperature sensors	3	1	2
PC26.	maintain the stock cultures in a refrigerator/ controlled conditions for further multiplication	3	1	2
PC27.	maintain the particulars of stock culture in a particular register	2	1	1
PC28.	observe the growth and contaminations at weekly intervals	2	0.5	1.5
PC29.	transfer the shoot buds individually to another nutrient medium specific for shoot elongation and root development	3	1	2
PC30.	observe the development of roots and shoots and record observations	2	0.5	1.5
PC31.	remove the plantlets from culture bottles/tubes after attainment of adequate growth and rooting	2	0.5	1.5
PC32.	wash the plantlets gently to remove any traces of culture media	2	0.5	1.5
PC33.	ensure tissue culture plants are planted in soil/soilrite/sand-micropots for primary hardening	2	0.5	1.5
PC34.	ensure plants are properly labelled and tagged	2	0.5	1.5
PC35.	check the temperature and humidity conditions of the facility and ensure they are right for hardening of the plants	2	0.5	1.5
PC36.	keep a track of water requirement and fertigation schedule of the plants	2	0.5	1.5
PC37.	ensure plants are housed in a green house or shade net facility with controlled micro climatic conditions such as relative humidity, temperature, light intensity and air circulation	2	0.5	1.5
PC38.	keep a check on gradual/progressive hardening for a minimum of six weeks	2	0.5	1.5
PC39.	conduct a routine check of health of plants	2	0.5	1.5
PC40.	ensure plants are transferred to normal pots/larger pots with soil and manure, if they appear healthy with new leaves and well developed roots for secondary hardening	3	1	2
PC41.	observe water requirements and fertigation schedule of the plants on a regular basis	2	0.5	1.5
PC42.	label the plantlets appropriately indicating plant species/variety	2	1	1

	PC43. monitor the plantlets regularly for their growth and presence of any infections		2	0.5	1.5
	PC44. remove dead/decaying plantlets		2	0.5	1.5
			100	30	70
4. AGR/N8104 Calibrate equipment and maintain documents	PC1. read and understand the standard operating procedures for calibration of each equipment	100	5	2	3
	PC2. handle and maintain tools (dead weights, calibrated measuring jars) and reagent (standard solutions) used for calibration of equipment following laboratory procedures and personal protective equipment		5	1	4
	PC3. calibrate equipment in accordance with written instructions and tolerances provided along with supply of equipment		5	2	3
	PC4. label equipment with a sticker indicating the status of calibration-calibrated & not calibrated		5	2	3
	PC5. get the equipment that requires external calibration calibrated by an authorised agency		5	1	4
	PC6. check the working and performance of all equipments on regular basis		5	1	4
	PC7. report any malfunction/repairs to the supervisor		5	2	3
	PC8. inform the supplier/manufacturer on the malfunction/repairs and get it repaired immediately		5	1	4
	PC9. maintain list of all equipments along with the details of annual maintenance contract		5	1	4
	PC10. follow up with the annual maintenance contractor and ensure maintenance of all equipments		5	2	3
	PC11. record all details on lab equipment like performance, faults, repairs, annual maintenance etc. in record books		5	2	3
	PC12. destroy microbes in used culture media following the sop before disposal or cleaning of glassware		4	1	3
	PC13. assist in maintaining lab supplies inventory by checking stock to determine inventory level		5	2	3
	PC14. anticipate needed supplies		4	1	3
	PC15. place and expedite orders for supplies		5	1	4
	PC16. verify receipt of supplies		4	1	3
	PC17. make common stock buffers ,reagents and microbiological media		5	2	3
	PC18. record data in log books and computer spreadsheets		4	1	3
	PC19. record and report lab results systematically		4	1	3
	PC20. assist in performing experiments		5	1	4

	PC21. set up laboratory with required instructional materials and supplies for the research project		5	2	3
			100	30	70
5. AGR/N9912: Collaborate with team members and work effectively	PC1. receive instructions from reporting manager on the work to be carried out	100	6	2	4
	PC2. communicate work done/activities performed to the reporting manager as required		6	2	4
	PC3. elicit feedback on work done		6	2	4
	PC4. rectify actions/procedures based on feedback given		6	2	4
	PC5. escalate any issues and concerns to the reporting manager		6	2	4
	PC6. participate in discussions with reporting manager when required		5	1	4
	PC7. ensure clear and concise communication with the team and colleagues		6	2	4
	PC8. plan work and tasks with team members on a regular basis		6	2	4
	PC9. share knowledge of processes, techniques with the team		6	2	4
	PC10. treat team members with respect and dignity		6	1	5
	PC11. demonstrate responsible and disciplined behaviour		6	1	5
	PC12. adhere to the timeliness of work commitments made to fellow colleagues		5	2	3
	PC13. inform colleagues in advance if unable to carry out work commitments, citing reasons for the same		6	2	4
	PC14. address work related issues among the team		6	2	4
	PC15. participate in team interaction sessions/activities as and when required		6	1	5
	PC16. adhere to organization's policies and procedures for working with colleagues		6	2	4
	PC17. discuss/report any concerns to senior management		6	2	4
			100	30	70

SECTION 2

EVIDENCE OF LEVEL

The job activities are exhaustively studied and their outcomes are evaluated to understand their mapping with the NSQF framework. The same had been reviewed and validated by sector skill council and industry representatives.

OPTION B

Title/Name of qualification/component: Plant Tissue Culture Technician			Level: 4
NSQF Domain	Key requirements of the job role	How the job role relates to the NSQF level descriptors	NSQF Level
Process	A Plant Tissue Culture Technician is responsible for preparing culture media, labeling tubes/specimen containers, inoculating, sub culturing, incubating tissue cultures, hardening plants, maintaining laboratory supplies, cleaning of laboratory equipment utilizing proper cleaning protocols and procedures and maintaining records, under limited supervision.	<p>The job holder is responsible to adhere to sanitation and safety guidelines of the lab, prepare and store culture media, prepare explants for tissue culture, acclimatize plantlets and check for hardening, calibrate equipments and maintain documents, collaborate with team members and work effectively. Since it involves working in a familiar, predictable, routine situation of clear choice, it has been placed at Level 4.</p> <p>Since the job holder is not required to possess well developed skill, with clear choice of procedures in a familiar context, it cannot be placed at Level 5.</p> <p>The job role demands the job holder to work in a familiar, predictable, routine situation of clear choice, for example, ensure personal hygiene by using clean lab coat, gloves, head cap, face masks, goggles, etc. as per the work requirement, check and disinfect all tools and equipments before operating them, dry and decontaminate the glassware, appropriately label & store/refrigerate the stock solutions at desired temperature, ensure that the water used is double glass</p>	4

Title/Name of qualification/component: Plant Tissue Culture Technician			Level: 4
NSQF Domain	Key requirements of the job role	How the job role relates to the NSQF level descriptors	NSQF Level
		<p>distilled, RO or demineralized, dispense medium uniformly into culture bottles/jars either manually or with the help of automatic media dispenser, get familiarized with the nature & composition of different kinds of culture medium and their suitability to different types of explants, pack the mother plant appropriately (dry or immersed in water) in cardboard cartons and transport to tissue culture laboratory, destroy microbes in used culture media following the SOP before disposal or cleaning of glassware, remove the plantlets from culture bottles/tubes after attainment of adequate growth and rooting, wash the plantlets gently to remove any traces of culture media, transfer/subculture proliferated shoots to fresh medium for mass multiplication whenever required, monitor the plantlets regularly for their growth and presence of any infections, remove dead/decaying plantlets.</p> <p>Hence, this role cannot be pegged at Level 3.</p>	
Professional knowledge	The user/individual on the job needs to know effective working relationships and how to work effectively with co- workers, customers and seniors organizational needs and time management, organization methods used for plant tissue culture, documentation system followed by the organization, job responsibilities/duties and standard operating procedures, organization standards, process standards and procedures followed in the organisation.	The job holder is expected to have factual knowledge of field of knowledge or study. For instance, the job holder is required to have knowledge of layout of the lab, standard procedures to operate different equipments in the lab, good lab practices, importance of cleanliness & aseptic condition in the lab, methods of lab cleaning, mopping, use of disinfectants, fumigation of the lab, different chemicals, lab wares, equipments and their use, operation and maintenance of various components/ equipments of the lab, first aid and its use, fundamentals of plant propagation, good laboratory practices, various techniques in plant tissue culture & their applications,	4

Title/Name of qualification/component: Plant Tissue Culture Technician			Level: 4
NSQF Domain	Key requirements of the job role	How the job role relates to the NSQF level descriptors	NSQF Level
		<p>different medium components- macronutrients, micronutrients, vitamins, amino acids, sugar, undefined organic supplements, solidifying agents, growth regulators etc., functions of medium, different types of media like whites, murashige & skoog, gamborg, nitsch etc., preparation of stock solutions for nutrient medium, method of preparation of medium, sterilization & storage of medium, plant growth conditions & micro-climate maintenance, physical screening of contaminants. Hence the job role qualifies for a Level 4 role.</p> <p>Since the job holder is not required to possess knowledge of facts, principles, processes and general concepts, in a field of work or study, it cannot be placed at Level 5.</p> <p>The job role demands the job holder is to possess factual knowledge of field of knowledge or study. For example the job holder is required to understand the composition of the required stock solutions for nutrient medium, ensure that the lab chemicals and agar used for preparation of media are of specific grade, prepare culture medium (White's, MS, B5, N6, Nitsch's) with required quantity of sucrose, agar, water and stock solution with the help of hot plate & magnetic stirrer, calibrate medium's pH at required level with pH meter using HCL or NaOH solution, observe culture medium three days after autoclaving for any microbial contamination before issue for inoculation, select the mother plant which appear healthy and are free from pests, diseases and bacterial infections, ensure that the inoculation room is maintained at the required sterility</p>	

Title/Name of qualification/component: Plant Tissue Culture Technician			Level: 4
NSQF Domain	Key requirements of the job role	How the job role relates to the NSQF level descriptors	NSQF Level
		level, ensure establishment of primary culture – check for initial contaminations, leachates, phenolics etc, discard the contaminated cultures, ensure tissue culture plants are planted in soil/soilrite/sand-micropots for primary hardening, keep a check on gradual/progressive hardening for a minimum of six weeks, conduct a routine check of health of plants, monitor the plantlets regularly for their growth and presence of any infections. Hence this role cannot be pegged at Level 3.	
Professional skill	The Job holder should have professional skills including: Decision making, Planning and Organising, Customer centricity, Problem Solving, Analytical Thinking, and Critical thinking.	The job holder is required to recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts. For example, the job holder is expected make decisions pertaining to calibration frequency and ordering of lab supplies, identify problems that may arise in carrying out tasks and take preventative action following workplace procedures, plan and organize the work order and jobs received from the supervisor, plan and prioritize the work based on the instructions received from the supervisor, plan to utilize time effectively, manage relationship with co-workers and laborers, maintain good relationships with clients, think through the problem, evaluate the possible solution(s) and suggest an optimum /best possible solution(s), identify creative and innovative quick solutions to resolve delays, monitor and maintain the condition of tools and equipment of the lab, apply, analyze, and evaluate the information gathered from observation, experience, reasoning, or communication, as a guide to thought and action, apply domain information about culture techniques and monitor and maintain the	4

Title/Name of qualification/component: Plant Tissue Culture Technician			Level: 4
NSQF Domain	Key requirements of the job role	How the job role relates to the NSQF level descriptors	NSQF Level
		<p>species and equipments, use common sense and make judgments on day to day basis, use reasoning skills to identify and resolve basic problems. Hence the job holder has been placed at Level 4.</p> <p>Since the job holder is not required to demonstrate a range of cognitive and practical skills required to accomplish tasks and solve problems, by selecting and applying basic methods, tools and information, hence it cannot be placed at Level 5.</p> <p>This job requires the job holder to recall and demonstrate practical skill which is routine and repetitive in narrow range of application using appropriate rule and tool, using quality concepts. For example, the job holder is expected to read and understand the standard operating procedures for calibration of each equipment, calibrate equipments in accordance with written instructions and tolerances provided along with supply of equipment, ensure plants are housed in a green house or shade net facility with controlled micro climatic conditions such as relative humidity, temperature, light intensity and air circulation, autoclave the media at the prescribed temperature, pressure and duration in an autoclave, discard the entire lot in case contamination over 3 percent is observed, expose the plants to suitable light, temperature to improve quality of explants, carry out watering of plant with filtered water or pre-treat with recommended fungicides where possible to prevent bacterial contamination, ensure establishment of primary culture – check for initial contaminations, leachates,</p>	

Title/Name of qualification/component: Plant Tissue Culture Technician			Level: 4
NSQF Domain	Key requirements of the job role	How the job role relates to the NSQF level descriptors	NSQF Level
		<p>phenolics etc., discard the contaminated cultures, check the temperature and humidity conditions of the facility and ensure they are right for hardening of the plants, ensure plants are transferred to normal pots/larger pots with soil and manure, if they appear healthy with new leaves and well developed roots for secondary hardening, monitor the plantlets regularly for their growth and presence of any infections, perform all procedures and follow work instructions for controlling operational risks, follow work instructions for maintaining required lab environment.</p> <p>Hence this job role cannot be pegged at Level 3.</p>	
Core skill	The Job holder must have Core Skills which will include: Writing Skills, Reading Skills, Oral and Communication (Listening and Speaking).	<p>The job holder is expected to know language to communicate in written or oral with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social and political environment. For instance, s/he should mention the data which are required for record keeping purpose and maintain the process identification sheet, report problems to the appropriate personnel in a timely manner, be updated about the latest technologies used in tissue culture by reading the newspaper and magazines, keep abreast with the latest knowledge by reading brochures, pamphlets, and product information sheets, read the manual/ SOP for media preparation, maintain effective working relationships, communicate clearly and effectively with others like company representatives, seniors and various other stakeholders, understand information and grasp its meaning, seek advice from seniors. Hence, this role</p>	4

Title/Name of qualification/component: Plant Tissue Culture Technician			Level: 4
NSQF Domain	Key requirements of the job role	How the job role relates to the NSQF level descriptors	NSQF Level
		<p>qualifies for Level 4.</p> <p>Since the job holder is not required to possess desired mathematical skill, understanding of social, political and some skill of collecting and organizing information, communication, it cannot be placed at Level 5.</p> <p>This job role requires the job holder to know language to communicate in written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social, political and natural environment. For example, the job holder is required to report any malfunction/repairs to the supervisor, inform the supplier/manufacturer on the malfunction/repairs and get it repaired immediately, maintain list of all equipments along with the details of annual maintenance contract, follow up with the annual maintenance contractor and ensure maintenance of all equipments, record all details on lab equipment like performance, faults, repairs, annual maintenance etc. in record books, anticipate needed supplies, place and expedite orders for supplies, verify receipt of supplies, record data in log books and computer spreadsheets, record and report lab results systematically, receive instructions from reporting manager on the work to be carried out, communicate work done/activities performed to the reporting manager as required, elicit feedback on work done, rectify actions/procedures based on feedback given, escalate any issues and concerns to the reporting manager, participate in discussions with reporting manager when required, plan work and tasks with team members on a regular</p>	

Title/Name of qualification/component: Plant Tissue Culture Technician			Level: 4
NSQF Domain	Key requirements of the job role	How the job role relates to the NSQF level descriptors	NSQF Level
		<p>basis , share knowledge of processes, techniques with the team, maintain the job sheet indicating the number of bottles transferred at the end of complete transfer of each clone/genotype, indicating the number of bottles, no of subculture etc., handle and maintain tools (deadweights, calibrated measuring jars) and reagent (standard solutions) used for calibration of equipments following laboratory procedures and personal protective equipments.</p> <p>Hence this job role cannot be pegged at Level 3.</p>	
Responsibility	<p>A Plant Tissue Culture Technician is responsible for preparing culture media, labeling tubes/specimen containers, inoculating, sub culturing, incubating tissue cultures, hardening plants, maintaining laboratory supplies, cleaning of laboratory equipment utilizing proper cleaning protocols and procedures and maintaining records, under limited supervision</p>	<p>The job holder is responsible for own work and learning. S/he is a skilled worker who carries out activities such as study basic design and layout of the lab, maintain personal hygiene and lab sanitation, ensure safety at the lab, carry out media preparation, carry out sterilization and storage of media, select and prepare mother plant, prepare explant, inoculate the explant, carry out shoot multiplication, acclimatize plantlets and transfer to pots, check hardening of plants, calibrate and maintain equipment, maintain lab inventory, keep a record of data in log books and assist in experiments/research projects, carry out interactions with reporting manager, ensure teamwork and coordination with colleagues. Hence the job role qualifies for Level 4 role.</p> <p>Since the job holder is not required to hold some responsibility for other’s work and learning, it cannot be placed at Level 5.</p> <p>The job holder is responsible for own work and learning. For example, the job holder is expected to read and</p>	4

Title/Name of qualification/component: Plant Tissue Culture Technician			Level: 4
NSQF Domain	Key requirements of the job role	How the job role relates to the NSQF level descriptors	NSQF Level
		<p>understand SOPs for preparing culture media, get familiarized with the nature & composition of different kinds of culture medium and their suitability to different types of explants, understand the composition of the required stock solutions for nutrient medium, set up laboratory with required instructional materials and supplies for the research project, participate in team interaction sessions/activities as and when required, adhere to organization's policies and procedures for working with colleagues, discuss/report any concerns to senior management, observe the development of roots and shoots and record observations, keep a track of water requirement and fertigation schedule of the plants, observe water requirements and fertigation schedule of the plants on a regular basis, keep a check on gradual/progressive hardening for a minimum of six weeks, conduct a routine check of health of plants, calibrate equipments in accordance with written instructions and tolerances provided along with supply of equipment, understand the layout of the lab, identify the requirement of different areas/chambers and equipments.</p> <p>Hence the role cannot be placed at Level 3.</p>	

SECTION 3

EVIDENCE OF NEED

What evidence is there that the qualification is needed?

While collecting data from the companies for the occupational map, we also took feedback from industry, training institutions which was collected with respect to roles for which qualification packs development, was to be prioritized. This was largely based on volume of people required, quantitative and qualitative shortfall which the industry feels they face. Governing council of ASCI and Occupational Standards Committee which comprises of experts & senior leaders gave final approval and endorsement for the same. So, according to industry interactions held, there is a demand for the role.

There has been an exponential expansion in Indian tissue culture industry, from 4 units in 1988 to 75 in 1996 as well as their production capacity increasing from 5 million plants per annum in 1988 to about 190 million plants in 1996. Considering the vast potential that tissue culture plants offer for supplementing and replacing the conventionally propagated plants for improving agricultural productivity, the potential demand is expected to be significantly higher than the projected figures. The major consumers of tissue culture plants (TCPs) are the State Agriculture Department, Agri Export Zones (AEZs), sugar industry and private farmers. Hence there is significant demand for trained plant tissue culture technicians to cater to the needs of the consumers.

What is the estimated uptake of this qualification and what is the basis of this estimate?

It is difficult to estimate uptake of this qualification at this stage as the sector has no in-depth skill-gap study has been done. The QP has been developed taking feedback from industry for demand though again sample size may not lend to accurate figures. Working closely with NSDA would indicate precise requirements.

What steps were taken to ensure that the qualification(s) does/do not duplicate already existing or planned qualifications in the NSQF?

NSDC list of Approved and Under-Development QPs was checked prior to commissioning the work and also our occupational map/QPs are put on ASCI & NSDC websites.

The QP for this role has been compared with NCVT CTS courses (<http://dget.nic.in/content/innerpage/list-of-cts-courses.php>) and it has been found that there is no NCVT CTS course pertaining to Plant Tissue Culture, whereas ASCI has a separate qualification pack for "Plant Tissue Culture".

The QP has been developed keeping in mind industry requirements.

What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?

- Any institution / individual is welcome to send feedback, which is recorded and considered during next review cycle.
- Communication will be sent for any feedback to all the main stakeholders/users one month prior to the review of the qualifications pack.
- A formal review is scheduled in three years' time

NSQF QUALIFICATION FILE

Version 6: Draft of 08 March 2016

Please attach any documents giving further information about any of the topics above. Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

- List of QP NOS validating companies

NSQF QUALIFICATION FILE

Version 6: Draft of 08 March 2016

SECTION 4

EVIDENCE OF PROGRESSION

What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?

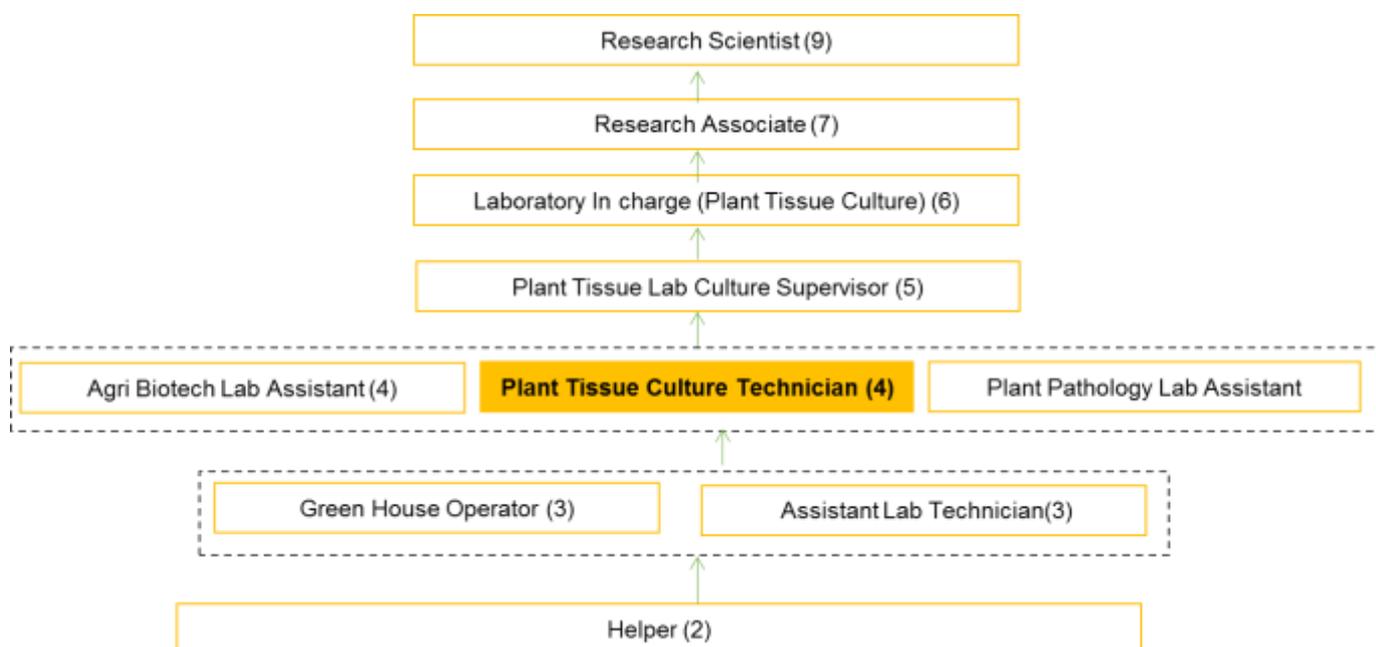
Career path in agri sector is generally in terms of activities done & ownership of responsibility because they are primarily self-wage employment/entrepreneurship roles.

However, there are occupations in the organized segment in which career pathway has been identified as illustrated below (Annexure 1)

Please attach any documents giving further information about any of the topics above. Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

This publication has been produced with the assistance of the European Union. The contents are the sole responsibility of the EU Skills Development Project and can in no way be taken to reflect the views of the European Union.

Annexure 1: Career Map of Plant Tissue Culture Technician



Annexure 2: Qualification Pack of Plant Tissue Culture (separate file)

Annexure 3: List of QP/NOS validating companies (separate file)

NSQF QUALIFICATION FILE

Version 6: Draft of 08 March 2016

ANNEX A

NSQF LEVEL DESCRIPTORS

LEVE L	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
1	Prepares person to/carry out process that are repetitive on regular basis require no previous practice,	Familiar with common trade terminology, instructional words, meanings and understanding.	Routine and repetitive, takes safety and security measures.	Reading and writing; addition, subtraction; personal financing; familiarity with social and religious diversity, hygiene and environment.	No responsibility; always works under continuous instruction and close supervision.
2	Prepares person to/carry out processes that are repetitive, on a regular basis, with little application of understanding, more of practice.	Material, tools and applications in a limited context, understands context of work and quality.	Limited service skills used in limited context; select and apply tools; assist in professional works with no variables; differentiate good and bad quality.	Receive and transmit written and oral messages, basic arithmetic, personal financing, understanding of social, political, and religious diversity, hygiene and environment.	No responsibility; works under instruction and close supervision.
3	Person may carry out a job which may require limited range of activities routine and predictable.	Basic facts, process and principle applied in trade of employment.	Recall and demonstrate practical skill, routine and repetitive in narrow range of application	Communication written and oral, with minimum required clarity, skill of basic arithmetic and algebraic principles, personal banking, basic understanding of social and natural environment.	Under close supervision. Some responsibility for own work within defined limit.

NSQF QUALIFICATION FILE

Version 6: Draft of 08 March 2016

LEVEL	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
4	Work in familiar, predictable, routine, situation of clear choice.	Factual knowledge of field of knowledge or study.	Recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts.	Language to communicate written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment.	Responsibility for own work and learning.
5	Job that requires well developed skill, with clear choice of procedures in familiar context.	Knowledge of facts, principles, processes and general concepts, in a field of work or study.	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information.	Desired mathematical skill; understanding of social, political; and some skill of collecting and organising information, communication.	Responsibility for own work and learning and some responsibility for others' works and learning.
6	Demands a wide range of specialised technical skill, clarity of knowledge and practice in broad range of activity involving standard and non-standard practices.	Factual and theoretical knowledge in broad contexts within a field of work or study.	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study.	Reasonable good in mathematical calculation, understanding of social, political and reasonably good in data collecting organising information, and logical communication.	Responsibility for own work and learning and full responsibility fo other's works and learning.
7	Requires a command of wide-ranging specialised theoretical and practical skills,	Wide-ranging factual and theoretical knowledge in broad contexts within a field	Wide range of cognitive and practical skills required to generate solutions to	Good logical and mathematical skill understanding of social political and natural environment and	Full responsibility for output of group and development.

NSQF QUALIFICATION FILE

Version 6: Draft of 08 March 2016

LEVE L	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
	involving variable routine and non-routine contexts.	of work or study.	specific problems in a field of work of study.	organising information, communication and presentation skill.	
8	Comprehensive, cognitive, theoretical knowledge and practical skills to develop creative solutions to abstract problems. Undertakes self-study; demonstrates intellectual independence, analytical rigour and good communication.			Exercise management and supervision in the context of work/study having unpredictable changes; responsible for the work of others.	
9	Advanced knowledge and skill. Critical understanding of the subject, demonstrating mastery and innovation, completion of substantial research and dissertation.			Responsible for decision making in complex technical activities involving unpredictable work/study situations.	
10	Highly specialised knowledge and problem solving skill to provide original contribution to knowledge through research and scholarship.			Responsible for strategic decisions in unpredictable complex situations of work/study.	

ANNEX B

NSQF LEVEL OUTLINES

NSQF levels related to the labour market

Level 1: Work requiring knowledge, skills and aptitudes at level 1 will be routine, repetitive, and focused on limited tasks carried out under close supervision. In some sectors, people carrying out these job roles may be described as “helpers”.

Individuals in jobs which require level 1 qualifications **may** be expected to be able to read, write, add and subtract, but will not normally be required to have any previous knowledge or skills relating to the work¹.

When employed, they will be instructed in their tasks and expected to learn and use the common terminology of the trade and acquire the basic skills necessary for the work.

Job holders at this level will be expected to carry out the tasks they are given safely and securely and to use hygienic and environmentally friendly practices. This means that they will be expected to take some responsibility for their own health and safety and that of fellow workers.

In working with others, they will be expected to respect the different social and religious backgrounds of their fellow workers.

¹ In practice many workers at this level will have limited literacy and NOS and qualifications at this levels should reflect this – eg in relation to assessment.

NSQF QUALIFICATION FILE

Version 6: Draft of 08 March 2016

Level 2: Work requiring knowledge, skills and aptitudes at level 2 will also be routine and repetitive, and tasks will be carried out under close supervision. The individuals will not be expected to deal independently with variables which affect the carrying out of the work. People carrying out these work roles may be described as “assistants” and the range of tasks they carry out will be limited.

Individuals in jobs which require level 2 qualifications will normally be expected to be able to read and write, add and subtract. Their work may involve taking and passing on messages.

They may also be expected to have some previous experience, knowledge and skills in the occupation. When employed, they will be instructed in their tasks and expected to acquire the practical skills necessary to assist skilled workers and/or give a limited service to customers. They will learn about, and use, the materials, tools and applications required to carry out basic tasks in an occupation. They may have to select the appropriate materials, tools and/or applications to carry out tasks.

They will be expected to understand what constitutes quality in their job role and distinguish between good and bad quality in the context of the tasks they are given. Job holders at this level will be expected to carry out the tasks they are given safely and securely and to use hygienic and environmentally friendly practices. This means that they will be expected to take some responsibility for their own health and safety and that of fellow workers and, where appropriate, customers.

In working with others, they will be expected to respect the different social and religious backgrounds of their fellow workers, but their contribution to team work may be limited.

Level 3: Work requiring knowledge, skills and aptitudes at level 3 will be routine and predictable. Job holders will be responsible for carrying out a limited range of jobs under close supervision. Their work may require the completion of a number of related tasks. People carrying out these job roles may be described as “partly-skilled workers”.

Individuals in jobs which require level 3 qualifications will normally be expected to be able to communicate clearly in speech and writing and may be required to use arithmetic and algebraic processes. They will be expected to have previous knowledge and skills in the occupation and should know the basic facts, processes and principles applied in the trade for which they are qualified and be able to apply the basic skills of the trade to a limited range of straightforward jobs in the occupation.

They will be expected to understand what constitutes quality in their job role and more widely in the sector or sub-sector and to distinguish between good and bad quality in the context of the jobs they are given. Job holders at this level will be expected to carry out the jobs they are given safely and securely. They will work hygienically and in ways which show an understanding of environmental issues. This means that they will be expected to take responsibility for their own health and safety and that of fellow workers and, where appropriate, customers and/or clients.

In working with others, they will be expected to conduct themselves in ways which show a basic understanding of the social environment. They should be able to make a good contribution to team work.

NSQF QUALIFICATION FILE

Version 6: Draft of 08 March 2016

Level 4: Work requiring knowledge, skills and aptitudes at level 4 will be carried out in familiar, predictable and routine situations. Job holders will be responsible for carrying out a range of jobs, some of which will require them to make choices about the approaches they adopt. They will be expected to learn and improve their practice on the job. People carrying out these jobs may be described as “skilled workers”.

Individuals in jobs which require level 4 qualifications should be able to communicate clearly in speech and writing and may be required to use arithmetic and algebraic processes. They will be expected to have previous knowledge and skills in the occupation in which they are employed, to appreciate the nature of the occupation and to understand and apply the rules which govern good practice. They will be able to make choices about the best way to carry out routine jobs where the choices are clear.

They will be expected to understand what constitutes quality in the occupation and will distinguish between good and bad quality in the context of their job roles. Job holders at this level will be expected to carry out their work safely and securely and take full account of the health and safety on colleagues and customers. They will work hygienically and in ways which show an understanding of environmental issues.

In working with others, they will be expected to conduct themselves in ways which show a basic understanding of the social and political environment. They should be able to guide or lead teams on work within their capability.

Level 5: Work requiring knowledge, skills and aptitudes at level 5 will also be carried out in familiar situations, but also ones where problems may arise. Job holders will be able to make choices about the best procedures to adopt to address problems where the choices are clear.

Individuals in jobs which require level 5 qualifications will normally be responsible for the completion of their own work and expected to learn and improve their performance on the job. They will require well developed practical and cognitive skills to complete their work. They may also have some responsibility for others’ work and learning. People carrying out these jobs may be described as “fully skilled workers” or “supervisors”.

Individuals employed to carry out these jobs will be expected to be able to communicate clearly in speech and writing and may be required to apply mathematical processes. They should also be able to collect and organise information to communicate about the work. They will solve problems by selecting and applying methods, tools, materials and information.

They will be expected to have previous knowledge and skills in the occupation, and to know and apply facts, principles, processes and general concepts in the occupation.

They will be expected to understand what constitutes quality in the occupation and will distinguish between good and bad quality in the context of their work. They will be expected to operate hygienically and in ways which show an understanding of environmental issues. They will take account of health and safety issues as they affect the work they carry out or supervise.

In working with others, they will be expected to conduct themselves in ways which show an understanding of the social and political environment.

NSQF QUALIFICATION FILE

Version 6: Draft of 08 March 2016

Level 6: Work requiring knowledge, skills and aptitudes at level 6 will require the use of both standard and non-standard practices. Job holders will carry out a broad range of work which will require a wide range of specialised technical skills backed by clear factual and theoretical knowledge.

Individuals in jobs which require level 6 qualifications will normally be responsible for the completion of their own work and expected to learn and improve their performance on the job. They are likely to have full responsibility for others' work and learning. People carrying out these jobs may be described as "master technicians" and "trainers".

Individuals employed to carry out these job roles will be expected to be able to communicate clearly in speech and writing and may be required to carry out mathematical calculations. They should also be able to collect data, organise information, and communicate logically about the work. They will solve problems by selecting and applying methods, tools, materials and information.

They will be expected to have broad factual and theoretical knowledge applying to practice within the occupation, and a range of practical and cognitive skills. They will be able to generate solutions to problems which arise in their practice.

They will be expected to understand what constitutes quality in the occupation and to distinguish between good and bad quality in the context of all aspects of their work. They will be expected to work in ways which show an understanding of environmental issues. They will take account of health and safety issues as they affect the work they carry out or manage.

In working with others, they will be expected to conduct themselves in ways which show an understanding of the social and political environment.

Level 7: Work requiring knowledge, skills and aptitudes at level 7 will take place in contexts which combine the routine and the non-routine and are subject to variations. Job holders will carry out a broad range of work which requires wide-ranging specialised theoretical and practical skills.

Individuals in jobs which require level 7 qualifications will normally be responsible for the output and development of a work group within an organisation. People carrying out these job roles are likely to be graduates. They may be described as "managers" or "senior technicians".

Individuals employed to carry out these job roles will be expected to be able to communicate clearly in speech and writing and are likely to be required to carry out mathematical calculations as part of their work. They should also be skilful in collecting and organising information to communicate logically about the work.

They will be expected to have wide-ranging factual and theoretical knowledge of practice within the occupation, and a wide range of specialised practical and cognitive skills. They will be able to generate solutions to problems which arise in their work.

They will be expected to understand what constitutes quality in the occupation and distinguish between good and bad quality in all aspects of their work. They will be expected

NSQF QUALIFICATION FILE

Version 6: Draft of 08 March 2016

to work in ways which show a good understanding of environmental issues. They will take account of health and safety issues as they affect the work they carry out and manage.

In working with others, they will be expected to conduct themselves in ways which show a good understanding of the social and political environment.

Level 8: Individuals in jobs which require level 8 qualifications will normally be responsible for managing the work of a team and developing the team. The work will involve dealing with unpredictable circumstances affecting the work.

Their work will require the use of comprehensive knowledge and understanding of the occupational field and a commitment to self-development.

They will normally need an ability to develop creative solutions to problems requiring abstract thought. They will be required to show intellectual independence and a rigorous analytical ability. They will need to be good communicators.

Level 9: Individuals in jobs which require level 9 qualifications will normally be responsible for complex decision-making in unpredictable contexts.

They will have to exercise senior responsibility in an organisation and show mastery of the issues in the occupation and the ability to innovate.

Their work will require the use of advanced knowledge and skill. They may make contributions to knowledge in their field through research.

Level 10: Job Individuals in jobs which require level 10 qualifications will normally be responsible for strategic decision-making. The context of their work will be complex and unpredictable.

They are likely to be responsible for an organisation or a significant division of an organisation. They will have to provide leadership.

Their work will require highly specialised knowledge and problem-solving skills. They may make original contributions to knowledge in their field through research, scholarship or innovative practice.