



O2 Identification of relevant areas report



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1 Introduction

The situation in the chemical and pharmaceutical industries with stiff international competition requires a highly skilled workforce to secure quality and productivity. The sector represents a major part of the European process industry and where the industrial production employs 3,3 million Europeans in 94.000 enterprises with a multibillion turnover (2014: 1 078 billion \in). This turnover is continually challenged by investments in the development of new products, the fact that patents are time limited, down to 10 years, with immediate releases of "copy products" from other parts of the world, intensifies the need for qualified staff rapidly taking on new tasks and challenges.

Laboratory functions and process operation are responding to new requirements as concerns complexity and a safe and sustainable production. This is partly due to new methods and technologies, new types of equipment and respective operational procedures, but over the last years also the emphasis on safety and security in the processes and strict environmental and sustainability criteria.

To be competitive in a fast developing market, the training quality, the relevance and flexibility of training provision between schools and work based learning is of utmost importance. Laboratory personnel and process operators with their skills and competences– tacit and tangible –represent a core part of the industry's intellectual capital.

This implies also that critical skills and crucial tacit knowledge acquired in workplace settings are central in the project. Video recordings of these performance based competences will be directly linked to the respective learning outcomes in the ECVET based multilingual qualification matrixes in Skillsbank.

To meet the requirements linked to the shared responsibility between schools and companies in the securing of compatible standards between the training providers and in the work based learning, the ECVET principles are basis. Using learning outcomes carefully defined and organised in logical units, the core qualification criteria will be operationally defined. For transparency purposes these qualification definitions will be developed transnationally and in multilingual versions. They will be supported by video clips as best practice examples as well as for the documentation of individual learners' performance towards certification and employability.

A standard ECVET implementation is relying on precise definitions of learning outcomes organised in structured units. When the differentiation between Competence / Responsibility and Autonomy), Skills and Knowledge is activated in the description of individual LOs, certain elements of skills and competence documentation may be lacking. These characteristics are technically labelled as tacit knowledge – "silent knowledge" which forms the parts of a learning outcome which can only be seen, experienced and documented through practical performance.

In the context of the priorities of the Erasmus+ programme, the horizontal one "Transparency and recognition of skills and qualifications", is directly mirroring the project ambitions. With the focus on work based learning the idea is to update and develop in-school training through close

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interaction with the industry itself. This should secure the relevance aspect, and with the video recording of individual learners' performance as well as best practice examples the quality aspect are covered as well. This is clearly asked for in the European VET priorities "Developing VET business partnerships aimed at promoting work-based learning in all its forms" and "increasing the quality of VET provision, the establishment of feedback loops to adapt VET provision based on outcomes, including by setting up or testing graduate tracking arrangements as part of quality assurance systems in line with the EQAVET recommendation".

This project pursues the following key objectives:

- Improvement of training quality and relevance implementing video technology linked to ECVET oriented learning outcomes in the chemical and pharmaceutical sector;
- Enhancing the ECVET defined learning outcomes with inclusion of tacit knowledge as documentation of performance of critical skills among process operators and laboratory technicians uploaded in the Skillsbank system;
- Develop VET institutions and enhancement of VET-industry cooperation through work based learning;
- Promoting recognition of work based learning, including prior learning independent of arena of experience, for permeability, flexible training pathways and alternative career options within the industry.

The partnership comprises 10 partners from 7 countries (AT, CZ, DE, FR, IT, NO, SK).

2 Identification of relevant areas in European VET, EQF level 4 - Tacit knowledge and critical skills

The intellectual output O2 is described, as an identification of relevant areas in European VET, EQF level 4 where performance of tacit knowledge and critical skills are essential in the laboratory and the process operation.

This IO will identify core activities requiring critical skills and tacit knowledge in chemical and pharmaceutical laboratories and process operation as they are observed by the partners, including the associate industry partners. The primary sources for this are the CREDCHEM, ChemPharmVET and PileUp qualification matrixes and the related assessment procedures.

2.1 The primary sources

2.1.1 CREDCHEM methodology to define units of learning outcomes

This document contains an explanation of the method to identify units based on working tasks and to identify the knowledge, skills and competence that the VET systems should enable learners to develop in order to be able to carry out these tasks. (CREDCHEM – Entwicklung und Erprobung eines Leistungspunktesystems zur Verbesserung der Mobilität im Chemiesektor, Final Report, 2012)



SBG Gute Bildung. Beste Chancen.

O2 Identification of relevant areas

2.1.2 PileUp Process Industry LEarning Unit Project

The aim of the Pile Up project was to develop common European units of learning outcomes that can be used to gain insight into and assess the skills and competences of workers in the chemical industry. This should enable them to PILE them UP to reach a higher level of qualification and consequently increase the chances of mobility of the workforce within Europe.

PILE UP aims at upgrading skilled workers by implementing units of learning outcomes in VET (Vocational Education and Training). This was achieved by innovating existing job profiles for Chemical Operator level 4 and Maintenance Technician level 4.

In the process first a common understanding of competence profiles in various European countries was generated, then leading to the construction of new units of learning outcomes and assessment tools. (PileUp Process Industry LEarning Unit Project, Final Report, 2013)

After that these outcomes were theoretically and practically tested in the VET sector and Process Industry.

2.1.3 ChemPharmVet

The ChemPharmVET project was based on previous achievements towards key competences for operators in the chemical industry with the overall objective to develop innovation in vocational education and training.

The project was based on the units of learning outcomes developed in the PILE UP project with the target of developing curricula for the training of operators in the chemical and pharmaceutical industry on EQF level 4.

With the further development of the PILE UP project with units of learning outcomes tested by stakeholders around Europe, a new European model curriculum and training programmes for VET providers for the training of operators in the chemical and pharmaceutical industry was created.

The main project outcomes of ChemPharmVET are the development of the Pile Up matrix extensions, including additional units of learning outcomes for operators in the chemical industry;

- a similar matrix of learning outcome units for operators in the pharmaceutical industry
- VET curricula, based on the matrixes, for the chemical and pharmaceutical industries;
- the pedagogical concept to implement VET model program in the different target countries;
- a new learning outcome based European model for VET that can be used for country specific curricula;
- tools for recognition of prior learning.

Through this delivery the project has addressed the challenges recognised by the social partners at EU and national levels in VET and has contributed to:

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- make it easier for young people to get the right competences (skills, knowledge and general aptitudes) and to use them in appropriate jobs contribute to employment by equipping people with the right skills for the jobs of today and tomorrow in the chemical and pharmaceutical industry.
- give employees the ability to acquire required qualifications in order to adapt to change and possible shifts in their career. In doing so, the project has facilitated to meet industrial, economic and technological changes in the chemical and pharmaceutical industry and enabling future mobility and development of the workforce
- improve quality and relevance in VET for operators in the chemical and pharmaceutical industries, hereby improving their employability; improve attractiveness of the vocational education and training among young people by providing up-to-date VET programmes with perspectives of mobility
- enhance creativity and innovation of VET by promotion of partnerships between the world of VET and the labour market; support effectiveness of the labour market through the future supply of highly qualified and competitive specialists and decreasing the mismatch of qualifications.
- improve practical skills of VET learners by involving employers in the process of VET, facilitating work based learning. (ChemPharm VET Final Report, 2017)

2.2 Basis for the identification of relevant areas

Basis for the analysis are the units of learning outcomes (ULO), which were developed in the ChemPharm project. The ULOs reflect the work flow of the chemical and pharmaceutical operator, like it is conducted in the process industries and were developed by analysing real work tasks and national curriculae.

2.2.1 Units of learning outcomes

The work flow of the chemical and pharmaceutical operator was divided into four units, as followed:



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2.2.2 The designing of units of learning outcomes - the Matrix

On the basis of the analysed work tasks all learning outcomes of a unit will be generalized in a matrix. Thus the matrix describes the vocational competences which are to be acquired in this unit. The learning outcomes are described as follows: levels of competences, knowledge and skills.

As can be seen in the tablet of an ULO are bundled together and describing the knowledge, skills and competences that are necessary for this unit.

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ULO·3·¤	<u>Title-of-the-unit</u> :-Partic	cipate-in-quality-control¤	Date:∙03/06/2016¶ Version:∙#1¤	α
Work·tasks:¤	1.→Taking·samples¶ 2.→Sample·analysis¶ 3.→Participating·in·qu	ality-control-¤		¤
Technological· context¤	Taking samples, meth	nods of analysis, quality management, ¤		α
				¤
Learning Outo	<u>:omes:</u> ¤			
Learning-Outo Knowledge (theore Scientific Context	<u>comes:</u> ¤ stical·+·factual)¶ Theoretical·context¤	Skills·(·practical·+·cognitive·(=·use·of· knowledge)¤	Competence (Role and level of responsibility and autonomy)¤	¤
Learning-Outc Knowledge (theore Scientific Context → define various n preparing samp control and final	comes:¤ etical++factual)¶ Theoretical-context¤ nethods-of-taking-and- les-for-in-process -product-check¤	Skills ·(·practical·+·cognitive·(=·use·of·knowledge)¤ • → distinguish ·processes ·for taking ·and·preparing ·samples ·for ·in ·process ·control·und ·final ·product ·check¤	Competence (Role and level of responsibility and autonomy)¤ • → assume responsibility for choosing the right sampling method ¤	a a
Learning-Outc Knowledge (theore Scientific Context → define various n preparing samp control and final → recognize the co method for takin	comes:¤ atical·+·factual)¶ Theoretical·context¤ nethods·of·taking·and- les·for·in·process· ·product·check¤ prrect·process·specific- ig·samples¤	Skills ·(·practical·+·cognitive·(=·use·of·knowledge)¤ •→ distinguish ·processes ·for ·taking ·and·preparing ·samples ·for ·in ·process ·control·und ·final ·product ·check¤ •→ select ·and ·give ·reasons ·for ·the ·required·method ·for ·sample ·taking¶ ¤	Competence (Role and level of responsibility and autonomy)¤ • → assume responsibility for choosing the right-sampling method ¤ • → assume responsibility for choosing the right-sampling method ¤	a a a
Learning-Outc Knowledge (theor Scientific Context → define various m preparing samp control-and final → recognize the co method for takin → identify possibili suitable for the and tested mate	comes:¤ atical++factual)¶ Theoretical context¤ nethods-of-taking-and- les-for-in-process- l-product-check¤ orrect-process-specific- ig-samples¤ ties-for-taking-samples- respective-equipment- rials¤	 Skills (-practical + cognitive (= use of knowledge)¤ → distinguish processes for taking and preparing samples for in process controlund final product check¤ ⇒ select and give reasons for the required method for sample taking¶ ⇒ prepare samples und sampling devices as well as pay attention to specifics of the equipment and safety regulations¤ 	Competence (Role and level of responsibility and autonomy)¤ → assume responsibility for choosing the right sampling method¤ → assume responsibility for choosing the right sampling method¤ → assume responsibility for choosing the right sampling method¤ → assume responsibility for choosing the right sampling method¤ → takes responsibility for abiding by safety regulations¤	
Learning-Outc Knowledge (theore Scientific Context: -→ define various n preparing samp control-and finai -→ recognize the co method for takir -→ identify possibili suitable for the -i and tested mate -→ explain methods	comes: atical-+-factual)¶ Theoretical-context nethods-of-taking-and- les-for-in-process- l-product-check product-check prrect-process-specific- ig-samples samples ties-for-taking-samples- respective-equipment- rials 3-of-sampling	 Skills ·(·practical·+·cognitive·(=·use·of·knowledge)¤ → distinguish ·processes ·for·taking·and·preparing·samples·for·in·process ·control·und·final·product·check¤ → select·and·give·reasons ·for·the·required·method·for·sample·taking¶ ¤ → prepare·samples·und·sampling·devices·as·well·as·pay·attention·to·specifics·of·the-equipment·and·safety·regulations¤ → take·samples·correctly¤ 	Competence (Role and level of responsibility and autonomy)¤ • → assume responsibility for choosing the right sampling method¤ • → assume responsibility for choosing the right sampling method¤ • → takes responsibility for abiding by safety regulations¤ • → autonomously take samples from the	





2.2.3 Common and specific competences

For the identifying of the relevant areas the competences are divided into two new sorts of competences.

2.2.3.1 Common competences

Some of the competences that are described in the ULOs are common to all chemical and pharmaceutical operators. For example, most of the quality control analyses are defined by standards and are therefore the same for all operators.

2.2.3.2 Specific competences

Competences needed for specific equipment, technical plant or company organisation and regulations that are not common to all operators.

2.2.3.3 Classification of the ULOs

For the following identification of relevant areas the ULOs were classified to specific or common competences. In both competence areas, contents of the four ULOs can be found. More contents for specific competences are in ULO 1 "perform operational logistic" and ULO 2 "conduct processes" on the other hand in ULO 3 "participate in quality control" and ULO 4 "participate in maintenance and repairs" more common competences could be found. The picture below symbolizes the classification.



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3 Tacit Knowledge

3.1 Definition of tacit knowledge

"We can know more that we can tell". - Michael Polanyi (1966)1

The term "tacit knowing" or "tacit knowledge" is attributed to Michael Polanyi in 1958 in Personal Knowledge. In his later work The Tacit Dimension he made the assertion that "we can know more than we can tell." (Polanyi, 1966) He states not only that there is knowledge that cannot be adequately articulated by verbal means, but also that all knowledge is rooted in tacit knowledge.

Tacit knowledge can be defined as skills, ideas and experiences that people have but are not codified and may not necessarily be easily expressed (Chugh, 2015). With tacit knowledge, people are not often aware of the knowledge they possess or how it can be valuable to others. Effective transfer of tacit knowledge generally requires extensive personal contact, regular interaction and trust. This kind of knowledge can only be revealed through practice in a particular context and transmitted through social networks. To some extent it is "captured" when the knowledge holder joins a network or a community of practice.

Some examples of daily activities and tacit knowledge are: riding a bike, playing the piano, driving a car, hitting a nail with a hammer and putting together pieces of a complex jigsaw puzzle, interpreting a complex statistical equation (Chugh, 2015).

In the field of knowledge management, the concept of tacit knowledge refers to a knowledge which cannot be fully codified. Therefore, an individual can acquire tacit knowledge without language. Apprentices, for example, work with their mentors and learn craftsmanship not through language but by observation, imitation, and practice.

The key to acquiring tacit knowledge is experience. Without some form of shared experience, it is extremely difficult for people to share each other's thinking processes.

Tacit knowledge has been described as "know-how" – as opposed to "know-that" (facts). This distinction is usually taken to date back to a paper by Gilbert Ryle, given to the Aristotelian society in London in 1945. In this paper Ryle argues against the (intellectualist) position that all knowledge is knowledge of propositions ("know-that"), and the view that some knowledge can only be defined as "know-how" has therefore, in some contexts, come to be called "anti-intellectualist". There are further distinctions: "know-why" (science), or "know-who" (networking). Tacit knowledge involves learning and skill but not in a way that can be written down. On this account knowing-how or embodied knowledge is characteristic of the expert, who acts, makes judgments, and so forth without explicitly reflecting on the principles or rules involved. The expert works without having a theory of his or her work; he or she just performs skilfully without deliberation or focused attention. Embodied knowledge represents a learned capability of a human body's nervous and endocrine systems (Sensky, 2002).

¹ Michael Polanyi (11 March 1891 – 22 February 1976) was a Hungarian-British polymath, who made important theoretical contributions to physical chemistry, economics, and philosophy. He argued that positivism supplies a false account of knowing, which if taken seriously undermines humanity's highest achievements.





Tacit knowledge vs. explicit knowledge: although it is possible to distinguish conceptually between explicit and tacit knowledge, they are not separate and discrete in practice. The interaction between these two modes of knowing is vital for the creation of new knowledge. (Wikipedia, 2019)

In summary, tacit learning can be described as deeply personal experience, aptitudes, perceptions, insights, and know-how that are implied or indicated but not actually expressed — it resides in individuals and teams.





The picture of the "iceberg" shows that the sum of tacit knowledge a person have is much bigger than the explicit knowledge. Tacit learning therefore represents a high potential for training in terms of vocational training. The ChemTube project is founded to make tacit learning tangible with the help of visualization.

3.2 Identification of relevant areas for tacit knowledge

To show how the relevant areas for tacit knowledge could be identified the ULO 3 "participate in quality control" was chosen as an example. The content of ULO 3 has more common competences than specific ones.

3.2.1 Example for tacit knowledge as common competence in ULO 3

For this analysis the matrix of ULO 3 was taken to find a common competence. Next step is to find work tasks for this competence. At last, in the work task examples for tacit knowledge could be found.

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Pharmaceutical Pro	ocess Operator		
ULO 3	Title of the unit: Parti	cipate in quality control	Date: 03/06/2016 Version: #1
Work tasks:	 Taking samples Sample analysis Participating in qu 	uality control	
Technological context	Taking samples, met	hods of analysis, quality management,	
Learning Outc	omes:		
Knowledge (theore Scientific Context 1	tical + factual) Theoretical context	Skills (practical + cognitive (= use of knowledge)	Competence (Role and level of responsibility and autonomy)
 define various m preparing sample control and final 	ethods of taking and es for in process product check	 distinguish processes for taking and preparing samples for in process control und final product check 	assume responsibility for choosing the right sampling method
 recognize the co method for taking 	rrect process specific g samples	 select and give reasons for the required method for sample taking 	 assume responsibility for choosing the right sampling method
 identify possibiliti suitable for the re and tested mater 	ies for taking samples espective equipment ials	 prepare samples und sampling devices as well as pay attention to specifics of the equipment and safety regulations 	 takes responsibility for abiding by safety regulations
explain methods	of sampling	 take samples correctly 	 autonomously take samples from the
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Autonomously execute analyses is one of the common competences that are described in ULO 3.

Survey of available work tasks made for the PileUp project:

ULO3-2.1.1 Determination of the temperature in the absorber liquids	
ULO3-2.2.1 Determining densities via areometers in various solutions	
ULO3-2.2.2 Determining densities of solids via pycnometer	
ULO3-2.3.1 Checking conductivity of fluids	
ULO3-2.4.1 Measuring pH-values in waste water samples	
ULO3-2.6.1 Analysing smell, color tint and turbidity of process water	
ULO3-2.9.1 Analysing sediment volume according to DIN 38409 H9	
ULO3-2.10.1 Bacteriological examination of water in the technical center	

Out of survey of available work tasks for this common competence was investigated according to contents of tacit knowledge. In "ULO3-2.2.1 Determining densities via areometers in various solutions" a typical example for tacit knowledge could be found.

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Practical Knowledge		Exp	ertise of the work system
workflow	skills/abilities	scientific context	technological context
The operator analyses the current task schedule.	Reflecting on the acquired knowledge. Planning the work steps.		
Providing an aerometer, measuring cylinder and the samples to be measured.	Choosing the right devices.		
Researching safety regulations concerning the solutions that are to be measured.	Identifying the potential risk. Abiding by the respective safety regulations.	Potential risks of chemical and biological substances according to GHS.	
Filling the sample into the measuring cylinder. Heating the contents to 20 °C via thermostat.	Conduction the partitioning of samples. Tempering samples.		Areometer is calibrated to 20°C
Comparing the measurement with in- built resistance thermometers.	Determining the temperature on the resistance thermometer by converting resistance into temperature.	Temperature dependence of resistance in posistors.	
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Using the test spindle to determine the right areometer spindle.	Recognizing the range of density of the fluid and choosing the right aerometer spindle.	Buoyancy of the spindle depending in the density of the fluid.	
Handling the areometer spindle technically correct and determine the respective density.	Using the spindle and recognize the density.		
Cleaning the spindle.			
Documentation of the result of measurement.	Presenting the result of measurement.		

"Handling the aerometer spindle technically correct and determine the respective density" was identified as an example for tacit knowledge. The way to put the spindle into the liquid and to spin it, cannot adequately articulated by verbal means. The required skills for measuring the density with the areometer can only be conveyed practically and must be shown accordingly. At this point, the project idea of the ChemTube project takes effect and presents the required competence in a film.

3.2.2 Example for tacit knowledge as specific competence in ULO 3

The example of a specific competence was also found in ULO3. Although the numbers of common competences are higher, several specific competences can be found in this ULO. Analogous to the procedure for the example of the common competences, the matrix of ULO3 is analysed. After the analysis, the corresponding work tasks are examined according to content with tacit knowledge.

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Sächsische Bildungsgesellsch Umweltschutz und Chemieber Dresden mbH Gutenbergstraße 6, 01307 Dresd Tel: 0351 4445-612 E-Mail: into@sbgdd.de Home: www.sbgdd.de Pharmaceutical Process Operat	tt für ie	Chempharm VET Erasmus+
ULO 3 <u>Title of the</u>	nit: Participate in quality control	Date: 03/06/2016 Version: #1
Work tasks: 1. Taking s 2. Sample 3. Participa	mples nalysis ing in quality control	
Technological Taking sam	les, methods of analysis, quality manageme	nt,
Learning Outcomes:		
Knowledge (theoretical + factual) Scientific Context Theoretical con	Skills (practical + cognitive (= use knowledge)	of Competence (Role and level of responsibility and autonomy)
 define various methods of taking preparing samples for in process and final product check 	 distinguish processes for taking ar preparing samples for in process of final product check 	nd entrol und entrol assume responsibility for choosing the right sampling method
 recognize the correct process sp method for taking samples 	 recognize the correct process specific method for taking samples identify possibilities for taking samples suitable for the respective equipment and tested materials select and give reasons for the required method for sample taking prepare samples und sampling devices as well as pay attention to specifics of the equipment and safety regulations 	
 identify possibilities for taking sa suitable for the respective equip tested materials 		
explain methods of sampling	take samples correctly	autonomously take samples from the process correctly
Sei, 6/3/2016	Page 1 of 3	DRAFT

"Autonomously take samples from the process correctly" is found as an example for specific competences that are described in ULO 3.

Survey of available work tasks made for the PileUp project:

ULO3-1.2.1 Taking and conserving samples	
ULO3-1.2.2 Work task from production: Taking samples from tanks	
ULO3-1.2.3 Work task from production: Taking samples from a tub	
ULO3-3.1 Investigation of prepared food samples for residues of pesticides by LC- MS/MS, maintenance of the analyzers; implementation and documentation of quality assurance measures	

Out of survey of available work tasks for this specific competence was investigated according to contents of tacit knowledge. In "ULO3-1.2.1 Taking and conserving samples" a typical example for tacit knowledge could be found.

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Task: LEE3-1.2.1 Taking	g and conserving sample	Eve	ntico		
Characterization of the workflow		Expertise Characterization of the work system			
workflow	skills/abilities	scientific context	technological context		
The operator analyses the current work plan.	Reflecting about the acquired knowledge. Planning the working process.				
Planning the sampling, distinguishing between single, mixed, collected or average samples.	Applying gathered information from the requirements given in the work plan.	Theory of taking samples. Statistical connection of single and average samples.			
Choice and preparation of sampling vessels.	Choosing the sampling vessels that are needed for the task. Cleaning the vessels technically correct.	Dependence of choice of material of sampling vessel on the parameters that are to be measured.	Determining the volume that is needed for the analysis depending on the number of analyses and the nature of parameters.		
Choosing the correct sampling device according to application range. Taking samples.	Application of the task specific sampling device.		Specifics of the equipment.		
Labelling and documentation of the sample.	Technically correct labelling of the sample, as well as documentation of sampling.	Comprehensibility of sampling.			
Conserving the samples.	Deducing technically correct conservation according to the parameters that are to be analysed.	Influence of external factors (e.g.: air, light, temperature, bacteria etc.)			
ii, 14.11.2012	Seite 1 vo	n 1	DRAF		

"Application of the task specific sampling device" was identified as an example for tacit knowledge, which is specific for the sampling tools and the technical equipment that been used. Therefor a film of the handling of the sampling device could only be used for an example of this competence. This film is only suitable for vocational training if the same tools and technical equipment are used.

3.3 Summary and identification of relevant areas for tacit knowledge

- For the identification of relevant areas for tacit knowledge the competences, as described in the units of learning outcome, are divided into common and specific competences.
- The competences of the ULOs were analysed for contents containing parts of tacit knowledge.
- The competences found are assigned corresponding work tasks.
- The work tasks were analysed to identify tacit knowledge.

On the following pages the results of identification of relevant areas are shown. The **common competences** in orange, the **specific competences** in blue.

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harmaceutical Proc	ig. Beste Chancen	Chempharm VE				
UI O 1	Title of the unit: F	Perform operational logistics	Date: 13/03/2019			
Work tasks:	Prepare, execute	e and monitor a logistic plan	Version: #1			
Technological context						
Learning Outcomes:						
Knowledge (the Scientific Contex context	eoretical + factual) xt Theoretical	Skills (practical + cognitive (= use of knowledge)	Competence (Role and level of responsibility and autonomy)			
Prepare, execute	and monitor		-			
 knowledge of 2nd 	ª language	 understand /compare the required specification for supplies and products 				
 knowledge of us 	ed software systems	 consults others where necessary (colleagues, supervisor) 	 instruct a team on all necessary work steps needed to provide raw material of the right quelity autonomously 			
 explain about dif (Just in time, Ma stock, push and 	fferent logistic systems ake to order, make to pull, <u>fifo</u> , <u>lifo</u>)	maintain accurate records and documentation report deviations correctly and inform the involved departments/colleagues/customers	 monitor that the (safety) instructions concerning the transportation and preparation of raw material are followed by all members of a team 			
 understand the p of now products 	planning of introduction	 liaise with suppliers to ensure supplier has adoquate back up stock lovels 	assume responsibility of his/her own safety and of a			
Sei,05.04.2019	2	Page 1 of 2	DRAF			
Sel,05.04.2019	G ig. Beste Chancen	Page 1 of 2	DRAF			
Sel,05.04.2019 SBC Gute Bildun • describe the fun Safety Data She	G g. Beste Chancen ction of Material vets	Page 1 of 2	DRAF			
Sel,05.04.2019 SBC Gute Bildun • describe the fun Safety Data She • recognise differe systems (ISO)	G ig. Beste Chancen ction of Material sets	Page 1 of 2	DRAF			
 describe the fun Safety Data She describe the fun Safety Data She recognise differe systems (ISO) explain safety ru explain safety ru define the pharm motorisit 	G Beste Chancen ction of Material eets ent kind of quality nental rules and ules naceutical specifics of	Page 1 of 2	DRAF			
explain environm recognise differe systems (ISO) explain safety rule explain safety ru explain safety ru define the pharm materials explain vorking explain process	G	Page 1 of 2 manage hazards including handling and safe disposal according to environmental rules and procedures carry out /ensure quality checks prior to supplies being used or products being dispatched respond to safety and environmental requirements within the task read and understand the plan of production schedules in relation to customer demand	DRAF			
explain working explain working explain mores explain safety networking explain safety ru define the pharm materials explain mores explain safety ru define the pharm	G Beste Chancen ction of Material refs ent kind of quality nental rules and tiles naceutical specifics of instructions diagrams (P&ID) mary and secondary	Page 1 of 2 Additional and the plan of production schedules in relation to customer demand test, evaluate, document and make mandatory labeling	DRAF			
 explain environm materials explain safety parts explain process describe the prim packaging recognise and explain sports 	G gg. Beste Chancen Ction of Material bets ant kind of quality nental rules and tiles naceutical specifics of instructions diagrams (P&ID) mary and secondary xplain the storage and ystems, like vessels, nker, silo, tube lelines	Page 1 of 2 Page 1 Page 1 of 2 Page 1 Page 1 of 2 Page 1 Page 1	Coordinate his/her own work schedule and of a schedule of a team of a schedule of a team efficiency of the works executed by a team and optimises hand on tool times monitor that the team provides the right raw material of the right quality for the production process report on team work progress autonomously selecting the right packaging materials of potimise work processes through open communication with operators, maintenance team members, contractor team members, management, suppliers and (internal) customers			
explain calculatio explain calculatio	Geste Chancen ction of Material ets ent kind of quality nental rules and ets naceutical specifics of instructions diagrams (P&ID) mary and secondary xplain the storage and ystems, like vessels, nker, silo, tube elines ons and mass balance	Page 1 of 2 Page 1 Page 1 of 2 Page 1 Page	Coordinate his/her own work schedule and of a schedule of a team coordinate his/her own work schedule and of a schedule of a team coordinate his/her own work schedule and of a schedule of a team coordinate his/her own work schedule and of a schedule of a team coordinate his/her own work schedule and of a schedule of a team coordinate his/her own works executed by a team and optimises hand on tool times monitor that the team provides the right raw material of the right quality for the production process coordinate reading materials coordinate work progress autonomously selecting the right packaging materials coordinate reading optimise work processes through open communication with operators, maintenance team members, contractor team members, management, suppliers and (internal) customers propose and assume responsibility of improvement the initiatives and projects			
explain calculati explain calculation exp	Geste Chancen ction of Material ets ets ets ets ets ets ets ets	Page 1 of 2 Page 1 Page 1 of 2 Page 1 Page	DRAF			

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Gute Bildur	G Ig, Beste Chancen	کی د در داد در داد در داد در داد در داد در داد در دار در دار دار در دار در دام دار دار دار دار دار دار دار دار دار دار	Erasmus+	-
Pharmaceutical Pro	ocess Operator			
ULO 2	Title of the unit: Conduct processes		Date: 13/03 Version: #1	8/2019
Work tasks: Conduct physical processes (thermal, mechanical, EI&C) Conduct chemical processes Conduct biological processes Conduct pharmaceutical processes				
Technological	Proparation of the proc	and handling of machinery control of the working		
context		ess, nandling of machinery, control of the working	ng process	
Learning Outcom Knowledge (theor	es: es: etical + factual) Scientific sal context	Skills (practical + cognitive (= use of knowledge)	Competence (Role and level of responsibility and autonomy)	
Learning Outcom Knowledge (theoi Context Theoretic 1) Preparation o	etical + factual) Scientific al context	Skills (practical + cognitive (= use of knowledge)	g process Competence (Role and level of responsibility and autonomy)	
Knowledge (theor Context Theoretic 1) Preparation o • outline fundame planning (includ work safety, qua GMP)	es: etical + factual) Scientific al context f the process: ntal basics of production ing process optimization, lity management and	 Skills (practical + cognitive (= use of knowledge) evaluate the task schedule/work plan according to the current situation of the plant 	Competence (Role and level of responsibility and autonomy) autonomously execute all steps adapted work plan/ task schedul	of the le

	Gute Bildung. Beste Chancen	Chempharm VET		Erasmus+
•	express fundamentals of the respective production process.	 select respective instrumentation according to the process being conducted 	•	autonomously instruct their team on the instrumentation to use after consulting the piping and instrumentation diagram
•	name equipment that is needed to conduct the process	 clarify equipment parts and describe their function correctly 	•	take responsibility for the correct installation of the equipment used by the team
•	explain the operation mode of the respective equipment			
•	describe the equipment set up correctly	install the respective equipment correctly	•	take responsibility for the correct installation of the equipment used by his team
•	have knowledge of the operation mode and set up of the equipment			
•	relate specific operational needs that have to be kept in mind when preparing the equipment	 execute specific operational needs according to the process that is to be conducted handle equipment correctly 	•	instructs team on the correct preparation of the equipment
•	describe processes and explain operating software systems	 describe and explain processes and their visualization on the screen 	•	take responsibility for the processes and the operating software systems
•	relate standard operating procedures (sop)	 work accurately and precisely 	•	executes and controls respective process preparation autonomously and verifies quality and safety of the process
•	define the options for microbiological contamination and eliminate it	 perform and check of decontamination according to predetermined standards 	•	autonomously implementation and testing of decontamination measures
•	describe the options for sterile manufacturing and packaging of	 perform and check of the sterile preparation according to prescribed 	•	autonomously implementation and testing of sterile manufacturing and

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4	Gute Bildung. Beste Chancen		Chempharm VET		Erasmus+
	medicines		standards		packaging
•	describe fundamentals of process control and instrumentation technologies	•	recognize the hazard potential of the process	•	assume responsibility for fellow workers
•	explain the operation mode of scales				
•	describe possible ways to fill the equipment vessels with raw material.	•	fill the vessels technically correct with raw materials and takes equipment specifics into account	•	autonomously fill of raw material into the vessels according to the equipment specifics.
•	explain fundamentals of transferring materials taking into account safety regulations	•	fills vessels technically correct, abiding by safety regulations	•	considered autonomously, the correct filling and compliance with safety regulations.
•	research features and safety regulations (such as h/p phrases) of deployed chemicals and biologically hazardous substances	•	choose and uses the respective preventive measures and personal protective equipment	•	self-observance of the safety and use of the correct personal protective equipment
•	describe characteristics and regulations of medical products				
•	name properties of raw material and their pharmaceutical properties				
•	name important preparation measure for raw material	•	prepare the raw material according to process needs weigh in the required amount of raw material according to the specific situation	•	autonomously initiate weighing in of raw material and take responsibility for the correct weighing
•	describe fundamentals of process control				

Gute Bildung. Beste Chancen	Chempharm VET	Erasmus+
define values and relate their importance in the context	 calculate required values by applying theoretical rules to the operation specifics 	take responsibility for the calculation of the required values.
 name theoretical rules for calculations of required values/ determination of setting 	choose necessary parameters	take responsibility for the proper execution
 identify symbols and their meaning in a piping and instrumentation diagram 	 read the piping and instrumentation diagram 	take responsibility for the proper execution
 name rules concerning the compilation of a piping and instrumentation diagram 	 compile an instrumentation and piping diagram abiding by the used standards into a given matrix 	take responsibility for the proper execution
 identify points of measurement in a given piping and instrumentation diagram 	 marks points of measurement in a piping and instrumentation diagram abiding the used standards 	take responsibility for the proper execution
 relate ways of obtaining information about the operation mode 	 researches information about the operation mode of the points of measurement in the equipment he is currently using 	take responsibility for the proper execution
 name regulations on marking E/I & C technology in a piping and instrumentation diagram. 	 enter standardized points of measurement into a piping and instrumentation diagram correctly 	takes responsibility for the proper execution
 explain principles of adjusting controllers and relate their mode of operation 	 adjust the controller abiding by the aforementioned principles correctly 	take responsibility for the proper execution
 relate important values and why they are measured 	 record respective values and export results into respective software 	take responsibility for the proper execution
	 evaluate recorded data by help of the compilation of trend graphs 	

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SBG Gute Bildung. Beste Chancen	Chempharm VET	Erasmus+
2) Handling of machinery:		
 fundamentally understand the basics of production planning (including process optimization, work safety, quality management etc.) outline the process and name the task steps explain basics of process balancing 	 carry out the task schedule as it is intended. 	 instruct team on the correct handling of chemicals and equipment/laboratory techniques according to safety regulations take responsibility for the task schedule being carried out by the team according to his specifications
express fundamentals of the production process and its ideal conduct	 estimate requirements for material against suppliers stock levels to ensure production targets 	 supervise autonomously adjust equipment settings to situational needs of the process and instructs co-workers in the process
 identify basic operations and basic functions of the software 	 use correct materials and hardware according to situation 	 autonomously decide on ramifications to start and stop the process safely instruct fellow workers on these ramifications assume responsibility for his and his colleagues' safety
identify specific conditions of the start process according to current situation	 handle machinery manually (and via screen) according to process specifications operate it-equipment like pcs, touch screens, joy sticks, printers 	 autonomously decide on ramifications to start and stop the process safely instruct fellow workers on these ramifications assume responsibility for safety.
emptying the vessels technically correct		
 explain how to search for information about the prescribed way of operating equipment 	 derive from available documentation and information sources the prescribed way of operating the equipment for particular applications 	 instruct team on the prescribed way of operation of the equipment supervise that the equipment is used in the prescribed way

	Gute Bildung. Beste Chancen	Chempharm VET	Erasmus+
•	explain the operation mode of the equipment and know how to shut it down appropriately name production standards and relate the importance of clean equipment to reach these standards define Clean-in-place (CIP), Wash-in-place (WIP) and Stenilisation-in-place (SIP) technology describe the setup of the equipment explain how to safely transfer and add raw material into the equipment describe solid, semisolid and liquid medicines regarding the pharmaceutical peculiarities	 write an appropriate protocol containing all results correctly dismantle and reinstall the equipment clean the equipment correctly and accurately abiding by safety regulations and plant intern standards handle chemicals and equipment according to safety regulations transfer/ add the raw material into the equipment correctly, taking specific safety regulations into account estimate requirements for material against supplier's stock levels to ensure production targets 	 take responsibility for the documentation autonomously instruct his team on the in plant standards regarding the cleanliness of the equipment supervise that these standards are maintained by his team take responsibility for the keeping of respective in plant standards instruct his team on the correct handling of chemicals
•	explain how and why to purify/ finish the product name possible by-products and contaminants for specific reactions describe possible ways for packaging the products explain requirements on the container according to respective stored product	 purify/ finish the product correctly package the product technically correct according to product specifications and required regulations choose the right container for the respective product, abiding by work place 	 autonomously instruct team on how to purify the products correctly take responsibility for the correct and accurate purification of products and the resulting quality autonomously package the product according to the type of product and equipment specifics autonomously instruct team on the right containers for respective products
•	describe the proper disposal of chemical and biological waste	 classify the waste according to the specified rules 	dispose waste correctly and autonomously
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SBG Gute Bildung. Beste Chancen	د ب د ب د ب د ب د د د د د د د د د د د د	Erasmus+
 distinguish between normal operation and emergency situations identify important measuring values that describe how well the process runs plan how to record data in a useful way Calculate required values using given equations (chemical and mathematical equations) Explain how to compile characteristic curves Describe experimental setups that are to be tested Explain the influence of experiment specific factors on the experimental process Describe fundamentals of evaluating characteristic values 	 point out unsafe situations and malfunctions in the production process (also by help of automatically generated details) and deal with them adequately respond to faults which can cause safety and/or environmental problem record data according to specified plan Calculate required values taking equipment specifics into account Conduct the experiment carefully and accurately Record the required data Compile a characteristic curve Adjust experiment specific parameters Take safety measures into account Evaluate the respective data and compile a characteristic curve in form of a graph using calculation software 	 supervise a team in adjusting processes according to respective specification assume responsibility for the quality of the product. Autonomously evaluate required values taking theoretical foundations into account and thereby control the process Autonomously evaluate required values taking theoretical foundations into account and thereby control the process Autonomously determine the ideal parameters for the experiment Take safety regulations into account Autonomously instruct team on the respective parameters
SEE, 13/03/2019 SBBG Gute Bildung. Beste Chancen	Page 7 of 10	Erasmus+
See. 13/03/2019 SBBG Gute Bildung. Beste Chancen 3) Control of the working process:	Page 7 of 10	DRAFT
See 13/03/2019 See 2019 See 2	Page 7 of 10 Page 7 of 10 Make a production plan deliver products that full fills plant intern standards monitor and assess the process and recognize faults and problems during the process complete log sheets, sample results, product quality certificates, maintenance request forms, reports and any other written form required by the day to day running of the plant start emergency procedures and call authoritative / supervisory staff identify a basic approach for a solution to react to a hazardous problem change and adjust the production depending on faults detected establish the deviations from the desired specifications, possible causes and the solutions for improving the faults use operating and emergency procedures as a guide to take the correct actions until authoritative assistance arrives report clearly and accurately on the process fault monitor and direct all operations in hazardous situations concerning the setafulty	Erasmus+ take responsibility for the delivered products to maintain plant intern standards take responsibility for the delivered products to maintain plant intern standards take responsibility for the delivered products to maintain plant intern standards take responsibility for the delivered products to maintain plant intern standards autonomously check the assessment of the working process by his colleagues on the basis of his experience instruct team on these standards decide on improvement action autonomously after consulting with his team evaluate the deviations from the desired specifications, possible causes and the solutions for improving the faults autonomously ad take responsibility for their success monitor and direct all operations in hazardous situations concerning the safety of the plant, personnel and environment, taking responsibility for the success of

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•	describe and explain the importance of	•	of the plant, personnel and environment until authoritative assistance arrives fill in and update necessary documentation about the process, products and safety instructions correctly take samples operating the respective	•	supervise the correct logging and writing of necessary documentation about the process, products and safety instructions
•	taking samples and how to take them	ľ	sampling devices	ľ	take samples and thereby control the production process, relating the importance of this practice to his team
•	identify fundamental parameters that define process quality	•	measure the required values.	•	supervise the process of sample taking and evaluate the respective results autonomously
•	have knowledge of factors influencing the process	•	adjust parameters according to the requirements	•	supervise the process of sample taking and evaluate the respective results autonomously
•	explain when and why to measure respective values	•	end the process if a certain value is reached	•	supervise the process of sample taking and evaluate the respective results autonomously
•	dennihe required values	•	determine the need for optimization	•	supervise the process of sample taking and evaluate the respective results autonomously
•	determine required values as well as the importance and principles of optimal parameter settings	ľ	maintain/reach optimal parameter settings	ľ	optimization and implement all necessary measures
•	define the respective values and means of their determination correctly explain the use of the values in quality	•	determine the respective value correctly operate the laboratory techniques correctly	•	autonomously use methods for process control autonomously use methods for process
•	control	- T	operate the laboratory techniques concerny	1-	autonomously use methods for process
• Sei	explain mode of operation of e/i & c technology	•	check the <i>e/i</i> & c technology correctly and evaluate their functioning Page 9 of 10	•	control autonomously use methods for process control DRAFT
• Sei	explain mode of operation of e/i & c technology , 13/03/2019	•	check the <i>eli</i> & c technology correctly and evaluate their functioning Page 9 of 10	·	control autonomously use methods for process control DRAFT
• Sei	explain mode of operation of e/i & c technology , 13/03/2019	•	check the e/i & c technology correctly and evaluate their functioning Page 9 of 10	•	control autonomously use methods for process control DRAFT
• Sei	explain mode of operation of e/i & c technology , 13/03/2019 SBBG Gute Bildung, Beste Chancen specify the importance of test series at the set value and explain how to conduct it explain how to evaluate data by help of reference data	•	check the e/i & c technology correctly and evaluate their functioning Page 9 of 10		control autonomously use methods for process control DRAFT
• Sei	explain mode of operation of e/i & c technology , 13/03/2019 SBBG Gute Bildung: Beste Chancen specify the importance of test series at the set value and explain how to conduct it explain how to evaluate data by help of reference data explain mathematical basics of determining corrective factors	• • •	check the e/i & c technology correctly and evaluate their functioning Page 9 of 10	•	control autonomously use methods for process control DRAFT

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DRAFT

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harmaceutical Pro	ocess Operator	د کې Chemp	harm YET Erasmus+
ULO 3	Title of the unit: Parti	cipate in quality control	Date: 03/06/2016
Work tasks:	1. Taking samples 2. Sample analysis 3. Participating in gu	iality control	Version. #1
Technological context	Taking samples, met	hods of analysis, quality management,	
Learning Out	comes:		
Knowledge (theor Scientific Context	etical + factual) Theoretical context	Skills (practical + cognitive (= use of knowledge)	Competence (Role and level of responsibility and autonomy)
 define various r preparing samp control and fina 	nethods of taking and bles for in process I product check	 distinguish processes for taking and preparing samples for in process control und final product check 	 assume responsibility for choosing the right sampling method
 recognize the c method for taking 	orrect process specific ng samples	 select and give reasons for the required method for sample taking 	 assume responsibility for choosing the right sampling method
 identify possibil suitable for the and tested mate 	ities for taking samples respective equipment erials	 prepare samples und sampling devices as well as pay attention to specifics of the equipment and safety regulations 	 takes responsibility for abiding by safety regulations
		Page 1 of 3	DRAFI
SBG Gute Bildung, B	este Chancen.	Page 1 of 3	
SBG Gute Bildung. B explain method	este Chancen. S of sampling	• take samples correctly	herm VIT • autonomously take samples from the
SBG Gute Bildung, B explain method have knowledge packed and sto	este Chancen. s of sampling e how the samples are red	take samples correctly pack and store samples correctly	Erasmus+ autonomously take samples from the process correctly autonomously store samples correctly
SBG Gute Blidung, B explain method have knowledge packed and sto explain method preparation, tak	este Chancen. s of sampling e how the samples are red s for sample ing and storage	take samples correctly pack and store samples correctly compile a documentation for the samples	autonomously take samples from the process correctly autonomously store samples correctly ausume responsibility for the correct documentation
SBG Cute Bildung, B explain method have knowledge packed and sto explain method preparation, tak have knowledge guidelines for a	este Chancen. s of sampling e how the samples are red s for sample ing and storage e about plant internal nalysis of samples	take samples correctly pack and store samples correctly compile a documentation for the samples organize and document the transfer of samples to the lab	autonomously take samples from the process correctly autonomously store samples correctly autonomously store samples correctly assume responsibility for the correct documentation assume responsibility for transfer of samples
 explain method have knowledge packed and sto explain method have knowledge guidelines for a identify chemica microbiological needed for quai according to gui 	este Chancen. s of sampling e how the samples are red s for sample ting and storage e about plant internal nalysis of samples al, physical and/or parameters that are lity assessment idelines	take samples correctly pack and store samples correctly compile a documentation for the samples organize and document the transfer of samples to the lab interpret decisive characteristics for quality	autonomously take samples from the process correctly autonomously store samples correctly autonomously store samples correctly assume responsibility for the correct documentation assume responsibility for transfer of samples assume responsibility for transfer of samples
 explain method have knowledge packed and sto explain method have knowledge guidelines for a identify chemica microbiological needed for quai according to gui describe method determining par 	este Chancen. s of sampling e how the samples are red s for sample ting and storage e about plant internal nalysis of samples al, physical and/or parameters that are lity assessment idelines ds of analysis for rameters	take samples correctly pack and store samples correctly compile a documentation for the samples organize and document the transfer of samples to the lab interpret decisive characteristics for quality execute analyses at production process level	Autonomously take samples from the process correctly autonomously store samples correctly autonomously store samples correctly assume responsibility for the correct documentation assume responsibility for transfer of samples assume responsibility for transfer of samples autonomously execute analyses
 explain method have knowledge packed and sto explain method have knowledge guidelines for a identify chemica microbiological needed for qual according to gu describe metho determining par determine the rest 	este Chancen. s of sampling a how the samples are red s for sample ing and storage a about plant internal nalysis of samples al, physical and/or parameters that are lity assessment idelines ds of analysis for 'ameters esults of the analysis	take samples correctly pack and store samples correctly compile a documentation for the samples organize and document the transfer of samples to the lab interpret decisive characteristics for quality execute analyses at production process level present and evaluate results of an analysis	Autonomously take samples from the process correctly autonomously take samples from the process correctly autonomously store samples correctly autonomously store samples correctly assume responsibility for the correct documentation assume responsibility for the correct documentation assume responsibility for transfer of samples autonomously execute analyses autonomously execute analyses evaluate results of the analyses
 explain method have knowledge packed and sto explain method have knowledge guidelines for a identify chemica microbiological needed for qual according to gu describe method determining par determine the re detine required standards of the 	este Chancen. s of sampling a how the samples are red s for sample ing and storage a about plant internal nalysis of samples al, physical and/or parameters that are lity assessment idelines ds of analysis for ameters esults of the analysis specifications and/or a product	 take samples correctly pack and store samples correctly compile a documentation for the samples organize and document the transfer of samples to the lab interpret decisive characteristics for quality execute analyses at production process level present and evaluate results of an analysis deduce characteristics for quality of the product 	autonomously take samples from the process correctly autonomously take samples from the process correctly autonomously store samples correctly autonomously store samples correctly assume responsibility for the correct documentation assume responsibility for the correct documentation assume responsibility for transfer of samples autonomously execute analyses autonomously execute analyses evaluate results of the analyses take responsibility for the evaluation of the results
 explain method have knowledge packed and sto explain method have knowledge guidelines for a identify chemica microbiological needed for qual according to gu describe method determining par determine the r define required standards of the identify possible 	este Chancen. s of sampling e how the samples are red ing and storage e about plant internal nalysis of samples al, physical and/or parameters that are lity assessment idelines ds of analysis for arameters esults of the analysis specifications and/or e product e deviations	 take samples correctly take samples correctly pack and store samples correctly compile a document ation for the samples organize and document the transfer of samples to the lab interpret decisive characteristics for quality execute analyses at production process level present and evaluate results of an analysis deduce characteristics for quality of the product evaluate deviations depending on the qualitative goal 	Autonomously take samples from the process correctly autonomously take samples from the process correctly autonomously store samples correctly autonomously store samples correctly assume responsibility for the correct documentation assume responsibility for transfer of samples assume responsibility for transfer of samples autonomously execute analyses evaluate results of the analyses take responsibility for the evaluation of the results supervise the working process
 explain method have knowledge packed and sto explain method have knowledge guidelines for a identify chemica microbiological needed for quai according to gui describe methon determining par determine the r define required standards of the identify possible describe the res- assessment 	este Chancen. s of sampling e how the samples are red s for sample ing and storage e about plant internal nalysis of samples al, physical and/or parameters that are lify assessment idelines ds of analysis for ameters esults of the analysis specifications and/or a product a deviations sults of quality	 Page 1 of 3 Page 1 of 3 take samples correctly pack and store samples correctly compile a documentation for the samples organize and document the transfer of samples to the lab interpret decisive characteristics for quality execute analyses at production process level present and evaluate results of an analysis deduce characteristics for quality of the product evaluate deviations depending on the qualitative goal present measured results in technically correct for 	Autonomously take samples from the process correctly autonomously take samples from the process correctly autonomously store samples correctly autonomously store samples correctly assume responsibility for the correct documentation assume responsibility for transfer of samples assume responsibility for transfer of samples autonomously execute analyses evaluate results of the analyses take responsibility for the evaluation of the results supervise the working process take responsibility for the documentation of results

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SBG Gute Bildung. Beste Chancen.	ې پې د د د د د د د د د د د د د د د د د د د	phorm VET
 describe results of analyses 	 report on the results and the respective conclusions 	proactively inform the involved team
 define possibilities to minimize deviations 	 execute adjustments of equipment parameters 	autonomously execute task
 recognize and check further quality criteria 	 evaluate interventions on the equipment by taking and analysing samples again 	supervise the working process
 describe deviations in a complex situation 	 report deviations and started actions to supervisors 	 take responsibility for passing on information
 recognize and define possibilities to improve quality 	 deduce possibilities to improve quality specifically for the process together with colleagues 	 autonomously supervise the working process and recognize potential for optimization
 describe the possibilities for the development and optimization of drugs 	 select the necessary equipment and the required auxiliaries expertly use the required measuring devices 	autonomous carry out the tests, detect and evaluate the results
 explain important models and methods of process development and optimization (e.g.: GMP, GLP) 	 apply models and methods of process development and optimization (GMP, GLP) 	apply models and methods of process development and optimization autonomously
 name quality specifications, working conditions and regulations regarding safety and environmental protection 	integrate regulations into the process	 autonomously integrate regulations into the process
		<u> </u>

Gute Bildung.	Beste Chancen.	Chempharn	n VET Era	asmus+
Pharmaceutical Pr	ocess Operator			
ULO 4	Title of the unit:	Participating in maintenance and repairs		Date: 13/03/2019 Version: #1
Work tasks:	1. Working perm 2. Lock out and 3. Maintenance	nits tag out of installation or repair		
Technological	Chemical Proces	is Industry		
1. Working permits	;			
express knowledge	ge of 2 nd language ge of used software	understand /compare the required documentation of machinery and working permits	 instruct and monitor the of a work permit are fo a team 	at the (safety) instructions llowed by all members of
 express knowledge systems explain process description 	iagrams (P&ID)	 consult others when necessary (colleagues, maintenance) 	 assume responsibility of a team 	of his/her own safety and
 express knowledge systems explain process d explain environmer regulations 	iagrams (P&ID) ental rules and	 consult others when necessary (colleagues, maintenance) consult others when necessary (colleagues, maintenance) 	 assume responsibility of of a team monitor the quality of the team 	he work executed by a

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SBG Gute Bildung. Beste Chancen.	နိုင်ငံ နေရိုင်ငံ Chempharn	n VET Erasmus+
 describe how the equipment is prepared for maintenance check and explain whether the optimal personal protective equipment is used describe safety rules during maintenance work explain used tools in relation to methods 	 use the correct personal protective equipment Apply operating, control and emergency procedures and other management measures for preventing dangerous situations, especially in working with hot equipment parts and in narrow spaces identify and use proper personal safety 	 propose and assume responsibility for improvement initiatives and projects
personnel safety material and equipment.	material and equipment	
2. Lock out and tag out of installation		
 demonstrate knowledge of technical condition of machinery explain maintenance instructions explain process diagrams (P&ID) 	 shut down, isolate and prepare process units or production equipment for maintenance maintain accurate records and documentation report deviations correctly and inform the involved departments/colleagues monitor own or contractor maintenance work and identify unsafe and improper working procedures and conditions read and understand the plan of maintenance schedules 	 instruct autonomously a team on all necessary work steps for shutting down, isolating and preparing process units for maintenance supervise documentation of maintenance preparation assume responsibility of his/her own safety and of a team report deviations proactively and correctly and inform the involved departments/colleagues report on team work progress optimise work processes through open communication with operators, maintenance team members, contractor team members, management and suppliers
Sei 05.04.2019	Seite 2 von 3	DRAFT
SBG Gute Bildung. Beste Chancen.	နှင့် နေ့ Chemphari	m VET Erasmus+



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www.sbg-dresden.de





4 Critical skills

4.1 Definition of critical skills

Critical skills as a concept, refers to the demand for an element of the practical, foundational or reflexive competence that allows for specialization within roles/professions or occupations and includes specific "top-up' skills. Particular specialization "top-up skills for roles/professions or occupations 'top-up' might have arisen as a result of changing technology or new forms of work Organization. (https://www.agriseta.co.za/downloads/agm_presentations/Department_of_Labour_definitions.pdf, 2006)

Larry Kim, CEO of MobileMonkey. Founder of WordStream defined the critical skills that been needed for the year 2020 in the following picture:



(https://www.inc.com/larry-kim/10-critical-skills-you-ll-need-to-succeed-at-work-in-2020.html, 2019)

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Similarly, the Cefic project "Skills for innovation the European chemical industry" names three critical skills for chemical engineers: Communication, team work and problem solving.

Critical skills	For engineers	For scientists
Business	Project management Innovation management Understanding customers & suppliers	IPR Innovation management Understanding customers & suppliers
Personal	Communication Team work Problem solving	Creative thinking Team work Communication
Scientific and technical	PROCESS MODELLING & INDUSTRIAL BIOTECHNOLOGY MANOTE POLYMER CHEMISTRY COST PARTICLE SCIENCE & TECHNOLOGY PR	SIMULATION MATERIAL ENGINEERING CHNOLOCY ADVANCED FLUIDS DYNAMICS CATALYSIS HEALTH, SAFETY'& ENVIRONMENT ENGINEERING PRODUCT DEVELOPMENT HOTOCHEMISTRY PROCESS CONTROL AND OPTIMIZATION
	Because innovation of at the interface of dis scientific interdiscipli and the future of the	ciplines, and for innovation narity is key for innovation chemical industry

(CEFIC, 2014)

The critical skills could only be described by specific competences, competences needed for specific equipment, technical plant or company organisation and regulations that are not common to all operators.

4.2 Identification of relevant areas for critical skills

Analog to the procedure of identification of tacit knowledge, the contents of the ULOs that representing critical skills can be identified.

4.2.1 Example for critical skills in ULO 4

In ULO 4 "participating in maintenance and repairs" the following competence could be found as an example for critical skills.

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 prepared for maintenance check and explain whether the optimal personal protective equipment is used describe safety rules during maintenance work explain used tools in relation to methods explain used tools in relation to personnel safety material and equipment. 	 use the correct personal protective equipment Apply operating, control and emergency procedures and other management measures for preventing dangerous situations, especially in working with hot equipment parts and in narrow spaces identify and use proper personnel safety material and equipment 	 propose and assume responsibility for improvement initiatives and projects
2. Lock out and tag out of installation		
 demonstrate knowledge of technical condition of machinery explain maintenance instructions explain process diagrams (P&ID) 	 shut down, isolate and prepare process units or production equipment for maintenance maintain accurate records and documentation report deviations correctly and inform the involved departments/colleagues monitor own or contractor maintenance work and identify unsafe and improper working procedures and conditions read and understand the plan of maintenance schedules 	 instruct autonomously a team on all necessary work steps for shutting down, isolating and preparing process units for maintenance supervise documentation of maintenance preparation assume responsibility of his/her own safety and of a team report deviations proactively and correctly and inform the involved departments/colleagues report on team work progress optimise work processes through open communication with operators, maintenance team members, contractor team members, management and suppliers propose and assume responsibility of
Sei 10 04 2019	Seite 2 von 3	DRAF

"Instruct autonomously a team on all necessary work steps for shutting down, isolating and preparing process units for maintenance" is an example for visualization of critical skills. Therefore, this competence is a typical specific competence, this could be an example how lock and tag out of installation should be done.

4.3 Summary and identification of relevant areas for critical skills

- For the identification of relevant areas for critical skills in the the competences, as described in the units of learning outcome, are divided into common and specific competences.
- The competences of the ULOs were analysed for contents containing parts of critical skills.
- The competences found are assigned corresponding work tasks.
- The work tasks were analysed to identify critical skills.

On the following pages the results of identification of relevant areas are shown. The **critical skills** are in green.





Com Chemieberut Gutenbergstra Tel.: 0351 Fax: 0351 E-Mail: info@ Home: www	hutz und fe Dresden mbH ße 6, 01307 Dresden I 4445-60 I 4445-612 ©sbgdd.de r,sbgdd.de	Chempharm VET	Erasmus+
Pharmaceutical Pro	cess Operator		
ULO 1	Title of the unit: F	Perform operational logistics	Date: 03/06/2016 Version: #1
Work tasks:	Prepare, execute	and monitor a logistic plan	
Technological context			
Learning Outo	comes:		
Knowledge (theo Scientific Context context	oretical + factual) Theoretical	Skills (practical + cognitive (= use of knowledge)	Competence (Role and level of responsibility and autonomy)
Prepare, execute an	nd monitor		
 knowledge of 2nd la 	anguage	 understand /compare the required specification for supplies and products 	
knowledge of used	l software systems	consults others where necessary (colleagues, supervisor)	 instruct a team on all necessary work steps needed to provide raw material of the right quality autonomously.
 explain about diffe (Just in time, Make stock, push and pu 	rent logistic systems e to order, make to ull, <u>fifo, lifo</u>)	maintain accurate records and documentation report deviations correctly and inform the involved departments/colleagues/customers	 monitor that the (safety) instructions concerning the transportation and preparation of raw material are followed by all members of a team
	anning of introduction	 liaise with suppliers to ensure supplier has 	 assume responsibility of his/her own
 understand the pla of new products 		adequate back up stock levels	safety and of a team
understand the pla of new products describe the functi Safety Data Sheet Sei,11.04.2019	on of Material s	 adequate back up stock levels manage hazards including handling and safe disposal according to environmental rules and Page 1 of 2 	safety and of a team coordinate his/her own work schedule and of a schedule of a team DRA
understand the pla of new products describe the function Safety Data Sheet Sei,11.04.2019 Sachsische E für Umwellsc Chemieberür Getenbergetrat Fac. 0351	on of Material S S S S S S S S S S S S S S S S S S S	adequate back up stock levels manage hazards including handling and safe disposal according to environmental rules and Page 1 of 2 	coordinate his/her own work schedule and of a schedule of a team DRA
understand the pla of new products describe the function Safety Data Sheet Sei,11.04.2019 Sächsische E für Umweltsc Chemieberuf Guenbergstrat Tel: 0351 EMaik infog Home: www	Sildungsgesellschaft thutz und 6 6 60 1307 Dresden 4 6 6 00 1307 Dresden 4 6 40 1307 Dresden 4 6 4445-612 29bgdd de zabgdd de	adequate back up stock levels • manage hazards including handling and safe disposal according to environmental rules and Page 1 of 2 • Chempharm VET	coordinate his/her own work schedule and of a schedule of a team DRA
understand the pla of new products describe the function Safety Data Sheet Sei,11.04.2019 Siacheische E für Umweltsc Chemieberuf Gutebergsfar Tel: 0351 CHITRUM Fac 0351 EMait: info Home: www recognise different systems (ISO)	on of Material s Sildungsgesellschaft hutz und te Dreaden mbH Se 6, 01307 Dresden 4445-60 445-60 445-60 4445-60 4445-60 4445-60 45-60 45	adequate back up stock levels • manage hazards including handling and safe disposal according to environmental rules and Page 1 of 2 Page 1 of 2 procedures • carry out /ensure quality checks prior to supplies being used or products being dispostbod	asity and of a team coordinate his/her own work schedule and of a schedule of a team DRA Erasmus+ assume responsibility of the cost efficiency of the works executed by a team and of the works executed by a team and
understand the pla of new products describe the functi Safety Data Sheet Sei,11.04.2019 Saichsische E für Umweltsc Chemieberuf duetbergstat: Informer resultations explain environme regulations explain safety rule: define the pharman materials	Sildungsgesellschaft thutz und e Dresden mbH be 6, 01307 Dresden 14445-80 284964 de rsbgdd de rsbgdd de t kind of quality ntal rules and s ceutical specifics of	adequate back up stock levels • manage hazards including handling and safe disposal according to environmental rules and Page 1 of 2 Page 1 of 2 procedures • carry out /ensure quality checks prior to supplies being used or products being dispatched • respond to safety and environmental requirements within the task	adity and of a team coordinate his/her own work schedule and of a schedule of a team DRA DRA
understand the pla of new products describe the function Safety Data Sheet Sei,11.04.2019 Sachsische E für Umweltsc Chemeberuf Gentreum Erecognise different systems (ISO) explain environme regulations explain safety rule define the pharmac materials explain process di	anning of introduction on of Material s 3ildungsgesellschaft hutz und e Dresden mbH Be 6, 01307 Dresden 1 4445-60 2 abpdd de rabpdd de rabpdd de t kind of quality ntal rules and s ceutical specifics of structions agrams (P&ID)	adequate back up stock levels • manage hazards including handling and safe disposal according to environmental rules and Page 1 of 2 Page 1 of 2 procedures • carry out /ensure quality checks prior to supplies being used or products being dispatched • respond to safety and environmental requirements within the task • read and understand the plan of production schedules in relation to customer demand	exactly and of a team coordinate his/her own work schedule and of a schedule of a team DRA DRA Erasmus+ exactly and of a team exactly and of a team DRA
understand the pla of new products describe the functi- Safety Data Sheet Sei,11.04.2019 Sachsische E fur Umweltsc Chemieberd Guenbergstrat Tel: 0351 Fac: 0	aning of Material on of Material s	adequate back up stock levels manage hazards including handling and safe disposal according to environmental rules and Page 1 of 2 procedures chempharm VET procedures carry out /ensure quality checks prior to supplies being used or products being dispatched requirements within the task requirements within the task requirements within the plan of production schedules in relation to customer demand tables to subplies read and understand the plan of production schedules in relation to customer demand tables	experimental end of a team coordinate his/her own work schedule and of a schedule of a team DRA DRA DRA Coordinate his/her own work schedule and of a schedule of a team DRA DRA Coordinate his/her own work schedule and of a schedule of a team DRA DRA Coordinate his/her own work schedule and of a schedule of a team DRA Coordinate his/her own work schedule and of a schedule of a team DRA Coordinate his/her own work schedule and of a schedule of a team DRA Coordinate his/her own work schedule and of a schedule of a team DRA Coordinate his/her own work progress autonomously selecting the right packaging materials
understand the pla of new products describe the function Safety Data Sheet Sei,11.04.2019 Safety Data Sheet Sei,11.04.2019 Sachsische E für Umweltsc Chemieberr Gatebergstar Tel: 0351 Chemieberr Faait 0351 EMait Info forme: www recognise different systems (ISO) explain environme regulations explain environme regulations explain norking ins explain process dil describe the prima packaging recognise and exp transport, bunker, : and pipelines	Sildungsgesellschaft thutz und e Dresden mbH be 6, 01307 Dresden 14445-672 Bebodd de rabodd de t kind of quality ntal rules and s ceutical specifics of structions agrams (P&ID) ry and secondary lain the storage and ems, like vessels, air silo, tube systems	adequate back up stock levels manage hazards including handling and safe disposal according to environmental rules and Page 1 of 2 procedures carry out /ensure quality checks prior to supplies being used or products being dispatched respond to safety and environmental requirements within the task read and understand the plan of production schedules in relation to customer demand test, evaluate, document and make mandatory labeling arrange and manage deliveries arrange and manage deliveries respond to changes in the planned logistic schedule	adotate responsibility of the cost efficiency of the works executed by a team and optimises hand on tool times monitor that the team provides the right raw material of the right quality for the production process executed by a team and optimises hand on tool times monitor that the team provides the right raw material of the right quality for the production process executed by a team and optimises control the team provides the right raw material of the right quality for the production process executed by a team and optimise work progress autonomously selecting the right packaging materials optimise work processes through open communication with operators, maintenance team members, contractor team members, management, suppliers and (internal) customers
understand the pla of new products describe the function Safety Data Sheet Sei,11.04.2019 Said States Said S	animg of introduction on of Material s 3ildungsgesellschaft hutz und e Dresden mbH Be 6, 01307 Dresden 1445-60 sebgdd de t kind of quality it kind	adequate back up stock levels manage hazards including handling and safe disposal according to environmental rules and Page 1 of 2 procedures carry out /ensure quality checks prior to supplies being used or products being dispatched respond to safety and environmental requirements within the task read and understand the plan of production schedules in relation to customer demand test, evaluate, document and make mandatory labeling arrange and manage deliveries arrange and manage deliveries respond to changes in the planned logistic schedule deals cost- consciously with materials and products	coordinate his/her own work schedule and of a schedule of a team Coordinate his/her own work schedule and of a schedule of a team DRA Coordinate his/her own work schedule and of a schedule of a team DRA Coordinate his/her own work schedule and otimises hand on tool times monitor that the team provides the right raw material of the right quality for the production process autonomously selecting the right packaging materials optimise work processes through open communication with operators, maintenance team members, contractor team members, management, suppliers and (internal) customers propose and assume responsibility of improvement the initiatives and projects

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CENTRUM E-Mail: inf Home: ww	ocess Operator		
ULO 2	Title of the unit: Conduct processes		Date: 03/06/2016 Version: #1
Work tasks:	Conduct physical proc Conduct chemical pro Conduct biological pro Conduct pharmaceution	esses (thermal, mechanical, EI&C) cesses cesses cal processes	
Technological context	Preparation of the pro	cess, handling of machinery, control of the workin	ng process
Learning Outcome	<u>s:</u>		
Knowledge (theore Context Theoretics	etical + factual) Scientific al context	Skills (practical + cognitive (= use of knowledge)	Competence (Role and level of responsibility and autonomy)
1) Preparation of	the process:		
 outline fundamer planning (includir work safety, qual GMP) 	ital basics of production ng process optimization, ity management and	 evaluate the task schedule/work plan according to the current situation of the plant 	autonomously execute all steps of the adapted work plan/ task schedule
		 adapt the work plan to task specific needs (taking into account the optimization of processes, work safety regulations and 	 autonomously instruct their team on the adapted work plan and monitor that all steps are being carried out
<u>Sei</u> , 03/06/2016		product quality) Page 1 of 10	
Sei, 03/06/2016	e Bildungsgesellschaft schutz und	product quality) Page 1 of 10	
Sei, 03/06/2016 Sachsische für Umwelt Chemieber Gutenbergst Fel: 03 Fax: 03 Fax: 03 Fax: 03 Fax: 03 Fax: 04 Fax: 04 Fax: 05 Fax: 05 Fa	e Bildungsgesellschaft schutz und ufe Dresden mbH rafe 6, 01307 Dresden 51 4445-60 51 4445-612 ogebpdd de ww.sbgdd de	product quality) Page 1 of 10	Erasmus+
Sei, 03/06/2016 Sachsische für Umwelt Chemieber Jell: 03 Fax: 04 Fax:	e Bildungsgesellschaft schutz und ufe Dresden mbH rade 6, 01307 Dresden 51 4445-60 51 4445-612 ogsbydd.de wy sbydd.de wy sbydd.de sntals of the respective SS.	product quality) Page 1 of 10	Erasmus+ autonomously instruct their team on the instrumentation to use after consulting the piping and instrumentation diagram
Sei, 03/06/2016 Sachsische für Umwelt Chemiebergs Tel: 03 Fax: 04 Fax: 04 Fax	e Bildungsgesellschaft schutz und ufe Dresden mbH raße 6, 01307 Dresden 51 4445-60 ogsebgd.de with should de entals of the respective ss. that is needed to conduct	product quality) Page 1 of 10 Page 1 of 10 Select respective instrumentation according to the process being conducted Clarify equipment parts and describe their function correctly	erasmus+ erasmus+ autonomously instruct their team on the instrumentation to use after consulting the piping and instrumentation diagram take responsibility for the correct installation of the equipment used by the team
Sei, 03/06/2016 Sachsische Grunnwelt Chemieber Guenbergs Tel: 03 Fax: 03 Eduals int Home: was express fundame production proce name equipment the process explain the operat respective equip	e Bildungsgesellschaft schutz und ufe Dresden mbH arabe, 6, 0130 / Dresden 51 4445-60 51 4445-61 63 51 4445-61 0 @sbgdd.de wr sbgdd.de wr sbgdd.de stals of the respective ss. that is needed to conduct that is needed to conduct this node of the ment	product quality) Page 1 of 10	autonomously instruct their team on the instrumentation to use after consulting the piping and instrumentation diagram take responsibility for the correct installation of the equipment used by the team
Sei, 03/06/2016 Sachsische Gemeinser Guennerger Fel: 03 Fax: 10 Fax: 03 Fax: 10 Fax:	E Bildungsgesellschaft schutz und ufe Dresden mbH 51 444-50 51 444-512 wijsbydd de wit sbydd de entals of the respective ss. that is needed to conduct ation mode of the ment ipment set up correctly	product quality) Page 1 of 10 Region 1	erasmus+ autonomously instruct their team on the instrumentation to use after consulting the piping and instrumentation diagram take responsibility for the correct installation of the equipment used by the team take responsibility for the correct installation of the equipment used by his team
Sei, 03/06/2016 Science 2016 Sachsische für Umwelt Chemiebergs Fal: 03 Fal: 03	e Bildungsgesellschaft schutz und ufe Dresden mbH raße 6, 01307 Dresden 51 4445-612 ogebegd.de wr.sbydd.de entals of the respective ss. that is needed to conduct ation mode of the ment ipment set up correctly of the operation mode equipment	product quality) Page 1 of 10 each o	eautonomously instruct their team on the instrumentation to use after consulting the piping and instrumentation diagram take responsibility for the correct installation of the equipment used by the team take responsibility for the correct installation of the equipment used by his team
Sei, 03/06/2016 Sachsische Green Sachsische Green Sachsische G	Bildungsgesellschaft schutz und ure Dresden mbH rate 6, 01307 Dresden 51 4445-612 wesbydd de entals of the respective ss. that is needed to conduct tion mode of the ment ipment set up correctly of the operation mode equipment erational needs that have d when preparing the	product quality) Page 1 of 10 Page 1 of 10 select respective instrumentation according to the process being conducted clarify equipment parts and describe their function correctly install the respective equipment correctly execute specific operational needs according to the process that is to be conducted handle equipment correctly	eautonomously instruct their team on the instrumentation to use after consulting the piping and instrumentation diagram take responsibility for the correct installation of the equipment used by the team take responsibility for the correct installation of the equipment used by his team installation of the equipment used by his team
Sei, 03/06/2016 Sachsische Grumberg Gentruly Centreberg Sachsische Grumberg Gentruly Sachsische Grumberg Gentruly Sachsische Chemieberg Outenbergs Tel: 03 Fax: 03 E-Mait int Home: with the process • expless fundame production proce • name equipment • describe the equipment • describe the equipment • describe process software system	E Bildungsgesellschaft schutz und ufe Dresden mbH rade 6, 0137 Dresden 51 4445-60 51 4445-612 ogebejdd de wr.sbgdd de antals of the respective SS. that is needed to conduct that is needed to conduct tion mode of the ment ipment set up correctly of the operation mode equipment erational needs that have d when preparing the res and explain operating s	product quality) Page 1 of 10 Page 1 of 10 select respective instrumentation according to the process being conducted clarify equipment parts and describe their function correctly install the respective equipment correctly execute specific operational needs according to the process that is to be conducted handle equipment correctly describe and explain processes and their visualization on the screen	autonomously instruct their team on the instrumentation to use after consulting the piping and instrumentation diagram take responsibility for the correct installation of the equipment used by the team take responsibility for the correct installation of the equipment used by his team instructs team on the correct preparation of the equipment take responsibility for the processes and the operating software systems
Sei, 03/06/2016 Sci, 03/06/2016 Sachsische Chemieber	Bildungsgesellschaft Bildungsgesellschaft Schutz und urfe Dresden mbH Trade 6,0130 Dresden St 4445-612 St 445-612 S	product quality) Page 1 of 10 Page 1 of 10 select respective instrumentation according to the process being conducted clarify equipment parts and describe their function correctly install the respective equipment correctly execute specific operational needs according to the process that is to be conducted handle equipment correctly describe and explain processes and their visualization on the screen work accurately and precisely	autonomously instruct their team on the instrumentation to use after consulting the piping and instrumentation diagram take responsibility for the correct installation of the equipment used by the team take responsibility for the correct installation of the equipment used by his team take responsibility for the correct preparation of the equipment take responsibility for the processes and the operating software systems executes and controls respective process preparation autonomously and verifies quality and safety of the process

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	Sachsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Gutenbergstraße 6, 01307 Dresden Tei: 0351 4445-60 Fax: 0351 4445-612 Fax: 0351 4445-612 Fax: 0351 4445-612 Fax: 0351 4445-612	Chempharm VET		Erasmus+	
	manufacturing and packaging of medicines	preparation according to prescribed standards		testing of sterile manufacturing and packaging	
•	describe fundamentals of process control and instrumentation technologies	 recognize the hazard potential of the process 	•	assume responsibility for fellow workers	
•	explain the operation mode of scales				
•	describe possible ways to fill the equipment vessels with raw material.	 fill the vessels technically correct with raw materials and takes equipment specifics into account 	•	autonomously fill of raw material into the vessels according to the equipment specifics.	
•	explain fundamentals of transferring materials taking into account safety regulations	 fills vessels technically correct, abiding by safety regulations 	•	considered autonomously, the correct filling and compliance with safety regulations.	
•	research features and safety regulations (such as h/p phrases) of deployed chemicals and biologically hazardous substances	choose and uses the respective preventive measures and personal protective equipment	•	self-observance of the safety and use of the correct personal protective equipment	
•	describe characteristics and regulations of medical products				
•	name properties of raw material and their pharmaceutical properties				
•	name important preparation measure for raw material	 prepare the raw material according to process needs weigh in the required amount of raw material according to the specific situation 	•	autonomously initiate weighing in of raw material and take responsibility for the correct weighing	
•	describe fundamentals of process control				
00	<u>)ei</u> , 03/06/2016	Page 3 of 10		DF	RAFT

CENTRUM Home: www.sbgdd.de	Chempharm VET	Erasmus+
define values and relate their importance in the context	 calculate required values by applying theoretical rules to the operation specifics 	take responsibility for the calculation of the required values.
 name theoretical rules for calculations of required values/ determination of setting 	choose necessary parameters	take responsibility for the proper execution
 identify symbols and their meaning in a piping and instrumentation diagram 	 read the piping and instrumentation diagram 	take responsibility for the proper execution
 name rules concerning the compilation of a piping and instrumentation diagram 	 compile an instrumentation and piping diagram abiding by the used standards into a given matrix 	take responsibility for the proper execution
 identify points of measurement in a given piping and instrumentation diagram 	 marks points of measurement in a piping and instrumentation diagram abiding the used standards 	take responsibility for the proper execution
 relate ways of obtaining information about the operation mode 	 researches information about the operation mode of the points of measurement in the equipment he is currently using 	take responsibility for the proper execution
 name regulations on marking E/I & C technology in a piping and instrumentation diagram. 	 enter standardized points of measurement into a piping and instrumentation diagram correctly 	 takes responsibility for the proper execution
 explain principles of adjusting controllers and relate their mode of operation 	 adjust the controller abiding by the aforementioned principles correctly 	take responsibility for the proper execution
 relate important values and why they are measured 	 record respective values and export results into respective software 	take responsibility for the proper execution
	 evaluate recorded data by help of the compilation of trend graphs 	

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Commencement Development Commencement Commencement CENTRUM CENTRUM CENTRUM	Chempharm VET	Erasmus+
2) Handling of machinery:		
 fundamentally understand the basics of production planning (including process optimization, work safety, quality management etc.) outline the process and name the task steps explain basics of process balancing express fundamentals of the production process and its ideal conduct 	 carry out the task schedule as it is intended. estimate requirements for material against suppliers stock levels to ensure production 	 instruct team on the correct handling of chemicals and equipment/laboratory techniques according to safety regulations take responsibility for the task schedule being carried out by the team according to his specifications supervise autonomously adjust equipment settings to
	targets	situational needs of the process and
 identify basic operations and basic functions of the software 	 use correct materials and hardware according to situation 	autonomously decide on ramifications to start and stop the process safely instruct fellow workers on these ramifications assume responsibility for his and his colleagues' safety
 identify specific conditions of the start process according to current situation 	 handle machinery manually (and via screen) according to process specifications operate it-equipment like pcs, touch screens, joy sticks, printers 	 autonomously decide on ramifications to start and stop the process safely instruct fellow workers on these ramifications assume responsibility for safety.
 identify possible ways of filling and emptying the vessels technically correct 		
 explain how to search for information about the prescribed way of operating equipment 	 derive from available documentation and information sources the prescribed way of operating the equipment for particular applications 	 instruct team on the prescribed way of operation of the equipment supervise that the equipment is used in the prescribed way
 explain the operation mode of the 	 write an appropriate protocol containing all 	 take responsibility for the documentation
equipment and know how to shut it down Sei, 03/06/2016	Page 5 of 10	DRA
equipment and know how to shut it down	Page 5 of 10	DRA
equipment and know how to shut it down Set 03/06/2016 Sachsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Gutenbergstate 6, 01307 Dresden Tel: 0351 4445-60 Fax: 0351 4445-612 Ekklai: intolgisbgdd de Home: www.sbgdd.de	Page 5 of 10	Erasmus+
equipment and know how to shut it down Sei: 03/06/2016 Sachsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Gutenbergstrate 6, 01307 Dresden Tel: 031 1445-612 Fax: 0331 145 Fax: 03	Page 5 of 10	Erasmus+
equipment and know how to shut it down Sei: 03/06/2016 Sachsische Bildungsgesellschaft für Umweltschutz und Chemiebende Dresden mbH Gutenbergstraße 6, 01370 Dresden Tel:: 0351 4445-612 Fax: 0351 4445-612 Fax:: 0351 445-612 Fax:: 0351 445-612 F	results Page 5 of 10 Page 5 of 10 Correctly dismantle and reinstall the equipment clean the equipment correctly and accurately abiding by safety regulations and plant intern standards	Erasmus+ autonomously instruct his team on the in plant standards regarding the cleanliness of the equipment supervise that these standards are maintained by his team take responsibility for the keeping of responding in plant standards
equipment and know how to shut it down Set. 03/06/2016 Set. 03/06/2016 Sachsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Gutenbergstraße 6, 01307 Dresden Tet:: 0351 4445-60 Fax:: 0351 4445-61 Fax:: 0351 4445-61 E-Mini:: into@isbgdd.de Home:: www.sbgdd.de appropriately appropriately appropriately appropriate Clean-in-place (CIP), Wash-in-place (WIP) and Sterilisation-in-place (SIP) technology describe the setup of the equipment explain how to safely transfer and add raw material into the equipment describe solid, semisolid and liquid medicines regarding the pharmaceutical peculiarities	results Page 5 of 10 Page 5 of 10 Correctly dismantle and reinstall the equipment clean the equipment correctly and accurately abiding by safety regulations and plant intern standards handle chemicals and equipment according to safety regulations transfer/add the raw material into the equipment correctly, taking specific safety regulations into account estimate requirements for material against supplier's stock levels to ensure production	erasmust in the event of the event of the event of the set of the event of the set of the set of the event of the eve

package the product technically correct according to product specifications and required regulations choose the right container for the

respective product, abiding by work place safety regulations

classify the waste according to the specified rules point out unsafe situations and malfunctions in the production process

Page 6 of 10

 describe the proper disposal of chemical and biological waste distinguish between normal operation and emergency situations Sei, 03/06/2016
Seite 31 von 37 Sächsische Bildungsgesellschaft für Umweltschutz und
Gutenbergstraße 6 01307 Dresden Tel 0351 444

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gesellschaft für Umweltschutz und Chemieberufe Dresden mbH 01307 Dresden | Tel 0351 4445-60 | Fax 0351 4445-612 | info@sbgdd.de

name possible by-products and contaminants for specific reactions

describe possible ways for packaging the products explain requirements on the container

according to respective stored product

DRAFT

take responsibility for the correct and accurate purification of products and the

accurate pullication of products and the resulting quality autonomously package the product and equipment specifics autonomously instruct team on the right specifics

storing of products dispose waste correctly and autonomously

supervise a team in adjusting processes according to respective specification

containers for respective products assume responsibility for the correct

•





 (also by help of automatically generated details) and deal with them adequately details) and deal with them adequately (also by help of automatically generated details) and deal with them adequately (also by help of automatically generated details) and deal with them adequately (also by help of automatically generated details) and deal with them adequately (also by help of automatically generated details) and deal with them adequately (also by help of automatically generated details) and deal with them adequately (also by help of automatically generated details) and deal with them adequately (also by help of automatically generated details) and deal with them adequately (also by help of automatically generated details) and deal with them adequately (also by help of automatically generated details) and deal with them adequately (also by help of automatically generated detaily and accurately required values taking theoretical foundations into account (conduct the experiment specific parameters curves (curves) (curves) (curves) (curves) (curves) (curves) (curves) (calculation the influence of experiment specific factors on the experimental process (calculation software) (calculation software) (calculation software)

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3) Control of the working process:		
	make a production plan	take responsibility for the delivered products to maintain plant intern standards
 describes the standards to be met by the product 	 deliver products that full fills plant intern standards 	 take responsibility for the delivered products to maintain plant intern standards
explain the safety systems	 monitor and assess the process and recognize faults and problems during the process complete log sheets, sample results, product quality certificates, maintenance request forms, reports and any other written form required by the day to day 	 instruct team on these standards autonomously check the assessment of the working process by his colleagues on the basis of his experience instruct team on emergency procedures and supervise these procedures
 have knowledge of how to neutralize or minimize the effect of a developing emergency situation 	 start emergency procedures and call authoritative / supervisory staff identify a basic approach for a solution to react to a hazardous problem change and adjust the production depending on faults detected establish the deviations from the desired specifications, possible causes and the solutions for improving the faults use operating and emergency procedures as a guide to take the correct actions until authoritative assistance arrives report clearly and accurately on the process fault monitor and direct all operations in hazardous situations concerning the safety of the plant, personnel and environment 	 decide on improvement action autonomously after consulting with his team evaluate the deviations from the desired specifications, possible causes and the solutions for improving the faults autonomously and instruct a team on improvement actions instruct team on emergency actions autonomously and take responsibility for their success monitor and direct all operations in hazardous situations concerning the safety of the plant, personnel and environment, taking responsibility for the success of these operations supervise the correct logging and writing of
Sei, 03/06/2016	Page 8 of 10	DR/

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O2 Identification of relevant areas





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ENTRUM Home: ww	is1 4445-612 io@sbgdd.de ww.sbgdd.de	Chempharm		Erasmus+
harmaceutical Pr	rocess Operator			
JLO 3	Title of the unit: Partic	cipate in quality control		Date: 03/06/2016 Version: #1
Vork tasks:	 Taking samples Sample analysis Participating in qui 	ality control		
Fechnological context	Taking samples, met	nods of analysis, quality management,		
_earning Outo	comes:			
Knowledge (theore Scientific Context	etical + factual) Theoretical context	Skills (practical + cognitive (= use of knowledge)	Competence responsibilit	(Role and level of y and autonomy)
 define various n preparing samp control and fina 	nethods of taking and les for in process I product check	 distinguish processes for taking and preparing samples for in process control und final product check 	 assume re right samp 	sponsibility for choosing the ling method
 recognize the commethod for taking 	orrect process specific ng samples	 select and give reasons for the required method for sample taking 	 assume re right samp 	sponsibility for choosing the ling method
 identify possibili suitable for the and tested mate 	ities for taking samples respective equipment erials	 prepare samples und sampling devices as well as pay attention to specifics of the equipment and safety regulations 	 takes resp regulations 	onsibility for abiding by safety
 explain methods 	s of sampling	take samples correctly	autonomo	usly take samples from the
ei, 6/3/2016		Page 1 of 3		DDAET
Sächsisch Umweltsch Dresden m Gufenhems	e Bildungsgesellschaft für nutz und Chemieberufe hbH rufaße 6 01307 Dresden	0. 0 C		
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Sächsisch Umwelted Dresden m Gutenbergs Tel: 0:0 E-Mail: in Home: w	e Bildungsgesellschaft für nutz und Chemieberufe hbH 351 4445-60 351 4445-612 fo@ebgdd.de ww.sbgdd.de	ိုင်း လိုင်း Chempharm	VET process cr	Erasmus+
Sächsisch Umweltsch Umweltsch Gentreum Fax: 0: Fax: 0: Fax: 0: Fax: 0: Home: w • have knowledg packed and sto	e Bildungsgesellschaft für nutz und Chemieberufe hbH 351 4445-50 351 4445-612 fo@ebpdd.de ww.sbgdd.de ww.sbgdd.de	pack and store samples correctly	VET process co • autonomo	Erasmus+
Sachsisch Umweltsch Versedne m Gelentrum Fac: 00 Fac: 00	e Bildungsgesellschaft für nutz und Chemieberufe nbH 151 4445-60 351 4445-612 togebpdd de wwr.sbgdd.de e how the samples are ored is for sample king and storage	 pack and store samples correctly compile a documentation for the samples 	VET process co autonomo assume re document	Erasmus+
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Sachsisch Umweltsch Greeden m Gutenberge Fax: 00 Fax: 00	e Bildungsgesellschaft für nutz und Chemieberufe hbH 351 44450 351 44450 wwr.sbgdd.de wwr.sbgdd.de wwr.sbgdd.de store sample king and storage e about plant internal inalysis of samples al, physical and/or parameters that are lity assessment iddelines	 pack and store samples correctly compile a documentation for the samples organize and document the transfer of samples to the lab interpret decisive characteristics for quality 	process co autonomo assume re document assume re samples assume re samples	DRAFT Erasmus+ orrectly usly store samples correctly usponsibility for the correct ation sponsibility for transfer of sponsibility for transfer of
Sachsisch Umweltsch Greeden Generation Eentrum Anae knowledg packed and sto explain method preparation, tal have knowledg guidelines for a identify chemic microbiological needed for qua according to gu describe method determining pa	e Bildungsgesellschaft für nutz und Chemieberufe hbH 351 4445-60 351 445-60 351 445-60 3514	 pack and store samples correctly compile a documentation for the samples organize and document the transfer of samples to the lab interpret decisive characteristics for quality execute analyses at production process level 	Process of autonomo assume re document assume re samples assume re samples	DRAFT Erasmus+ orrectly usly store samples correctly sponsibility for the correct ation sponsibility for transfer of sponsibility for transfer of
Sachsisch Umwettsch Greeden Greeden Greeden Fall: 0 Fall: 0 Fal	e Bildungsgesellschaft für nutz und Chemieberufe hbH 351 4445-60 351 4445-612 fogjebgdd de ww.sbgdd de ww.sbgdd de stored ls for sample a bout plant internal inalysis of samples al, physical and/or parameters that are lity assessment uidelines ods of analysis for rameters results of the analysis	 pack and store samples correctly compile a documentation for the samples organize and document the transfer of samples to the lab interpret decisive characteristics for quality execute analyses at production process level present and evaluate results of an analysis 	VET process co autonomo assume re document assume re samples assume re samples autonomo e evaluate r	DRAFT DRAFT DRAFT DRAFT
Sachsiech Umweitsch Dresden m Generen Fentreum EENTRUM Sachsiech Umweitsch Dresden m Generen Fentreum E-Mait in Home: w E-Mait in Home: w Home: w Home	e Bildungsgesellschaft für hutz und Chemieberufe hbH 351 4445-60 351 4445-60 351 4445-612 fogebodd de ww.sbgdd.de e how the samples are ored ls for sample king and storage e about plant internal inalysis of samples al, physical and/or parameters that are lifty assessment uidelines ods of analysis for rameters results of the analysis is specifications and/or e product	 pack and store samples correctly compile a documentation for the samples organize and document the transfer of samples to the lab interpret decisive characteristics for quality execute analyses at production process level present and evaluate results of an analysis deduce characteristics for quality of the product 	VET process co autonomo assume re document assume re samples assume re samples autonomo evaluate r take respor results	DRAFT DRAFT DRAFT DIVENTION DRAFT DIVENTION DRAFT
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Sachsisch Umweltsch Greiden m Greiden m Greiden m Greiden m Greiden m Have knowledg packed and sto explain method preparation, tak have knowledg guidelines for a identify chemica microbiological needed for qua according to gu describe methor determine the r define required standards of th identify possible describe the re: assessment	e Bildungsgesellschaft für nutz und Chemieberufe hbH 351 4445-60 351 445-60 351 451-60 351 451-6	 pack and store samples correctly compile a documentation for the samples organize and document the transfer of samples to the lab interpret decisive characteristics for quality execute analyses at production process level present and evaluate results of an analysis deduce characteristics for quality of the product evaluate deviations depending on the qualitative goal present measured results in technically correct for 	Process co autonomo assume re document assume re samples assume re samples assume re samples autonomo evaluate r take respor of results	DRAFT DRAFT DRAFT DRAFT DRAFT DRAFT

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Sachsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Gidenbergstraße 5, 01307 Dresden Tel: 0251 4445-500 Fax: 0251 4445-512 E-Mail: Info@spbdd de Home: www.sbgdd de	مَنْ جُوْنُ مَنْ Chempharm	Erasmus+
describe results of analyses	report on the results and the respective conclusions	proactively inform the involved team
 define possibilities to minimize deviations 	 execute adjustments of equipment parameters 	autonomously execute task
 recognize and check further quality criteria 	 evaluate interventions on the equipment by taking and analysing samples again 	supervise the working process
 describe deviations in a complex situation 	report deviations and started actions to supervisors	take responsibility for passing on information
 recognize and define possibilities to improve quality 	 deduce possibilities to improve quality specifically for the process together with colleagues 	 autonomously supervise the working process and recognize potential for optimization
 describe the possibilities for the development and optimization of drugs 	 select the necessary equipment and the required auxiliaries expertly use the required measuring devices 	 autonomous carry out the tests, detect and evaluate the results
 explain important models and methods of process development and optimization (e.g.: GMP, GLP) 	 apply models and methods of process development and optimization (GMP, GLP) 	 apply models and methods of process development and optimization autonomously
 name quality specifications, working conditions and regulations regarding conditions and regulations regarding 	integrate regulations into the process	autonomously integrate regulations into the process

Comment Guina Comment Commen	Bildungsgesellschaft chutz und fe Dresden mbH aße 6, 01307 Dresden 1 4445-60 1 4445-612 @sbgdd.de <i>w.sbgdd.de</i>	چې د د د د د د د د د د د د د د د د د د د	VET Era	asmus+
ULO 4	Title of the unit: F	Participating in maintenance and repairs		Date: 03/06/2016 Version: #1
Work tasks:	 Working perm Lock out and Maintenance 	its tag out of installation or repair		
Technological context	Chemical Proces	s Industry		
Knowledge (the	oretical + factual)	Skills (practical + cognitive (= use of	Competence (Role and	level of
Knowledge (the Scientific Context context	oretical + factual) Theoretical	Skills (practical + cognitive (= use of knowledge)	Competence (Role and responsibility and auto	level of nomy)
Knowledge (the Scientific Context context 1. Working permits	oretical + factual) t Theoretical	Skills (practical + cognitive (= use of knowledge)	Competence (Role and responsibility and auto	i level of nomy)
Knowledge (the Scientific Context context 1. Working permits express knowledg systems explain process d explain environme regulations explain safety rule	oretical + factual) Theoretical le of 2 nd language le of used software lagrams (P&ID) ental rules and	Skills (practical + cognitive (= use of knowledge) • understand /compare the required documentation of machinery and working permits • consult others when necessary (colleagues, maintenance) • consult others when necessary (colleagues, maintenance) • act proactively in maintenance of the installation	Competence (Role and responsibility and autor of a work permit are foll a team assume responsibility of of a team monitor the quality of the team optimise work processes communication with ope team members, contrac management and suppli	t the (safety) instructions owed by all members of t his/her own safety and e work executed by a s through open orators, maintenance tor team members, jers
Knowledge (the Scientific Context context 1. Working permits express knowledg systems explain process d explain environme regulations explain safety rule describe how the	e of 2 nd language te of 2 nd language te of used software lagrams (P&ID) ental rules and os	Skills (practical + cognitive (= use of knowledge) • understand /compare the required documentation of machinery and working permits • consult others when necessary (colleagues, maintenance) • consult others when necessary (colleagues, maintenance) • act proactively in maintenance of the installation	 Competence (Role and responsibility and autoresponsibility and autoresponsibility and autoresponsibility and a team assume responsibility of a team monitor the quality of the team optimise work processes communication with ope team members, contract management and supplication 	t the (safety) instructions weed by all members of t his/her own safety and e work executed by a s through open prators, maintenance tor team members, iers

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CENTRUM Home: www.sbgdd.de	နှင့် ငွေငိုင် Chempharm	VET Erasmus+
 prepared for maintenance check and explain whether the optimal personal protective equipment is used describe safety rules during maintenance work 	use the correct personal protective equipment	
 explain used tools in relation to methods 	 Apply operating, control and emergency procedures and other management measures for preventing dangerous situations, especially in working with hot equipment narts and in parrow snares 	 propose and assume responsibility for improvement initiatives and projects
explain used tools in relation to personnel safety material and equipment. Lock out and tag out of installation.	identify and use proper personnel safety material and equipment	
demonstrate linewinders of technical	- abut down inclute and provide process	- instruct autonomously a taxes on all sociones.
emonstrate knowledge of technical condition of machinery explain maintenance instructions	shut down, isolate and prepare process units or production equipment for maintenance	 Instruct autonomously a team on an necessary work steps for shutting down, isolating and preparing process units for maintenance
	 maintain accurate records and documentation 	 supervise documentation of maintenance preparation
	 report deviations correctly and inform the involved departments/colleagues 	 assume responsibility of his/her own safety and of a toam
 explain process diagrams (P&ID) 	 monitor own or contractor maintenance work and identify unsafe and improper working procedures and conditions 	 report deviations proactively and correctly and inform the involved departments/colleagues
	 read and understand the plan of maintenance schedules 	 report on team work progress optimise work processes through open communication with operators, maintenance team members, contractor team members, management and suppliers propose and assume responsibility of
	Seite 2 von 3	DRA
Sachsische Bildungsgesellschaft für Umweltschutz und		
Sei 11.04.2019 Sächsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Gutenbergstraße 6, 01307 Dresden Tel: 0351 4445-612 ENTRUM E-Mait: infoglebgdd de Home: www.sbjdd.de	Concert and Concer	
Sei 11.04.2019 Sachsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Gutenbergsfraße 6, 01307 breden Fac. 0351 4445-50 Fac. 0351 4445-50 Fac. 0351 4445-512 EINTRUM Home: www.sbgdd.de 3. Maintenance or repair	Concol I von C	VET improvement initiatives and projects
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Sei 11.04.2019 Sei 11.04.2019 Sachsische Bildungsgesellschaft Grundberufe Dresden mbH Gleinbergstraße 6, 01307 Dresden Tel: 0251 4445-612 E-Mai: info@sbgdd.de Home: www.sbgdd.de 3. Maintenance or repair • explain different maintenance systems (preventive / corrective maintenance) • explain different manuals • know the working regulations	 perform and monitor minor repair and maintenance work according audited procedures on mechanical, electrical and instrument field support and cooperate with maintenance personnel 	Improvement initiatives and projects
Sei 11.04.2019 Sachsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Guetenbergstraße 6,01307 Dresden Tel: 0351 4445-612 EMBL volk 4445-612 EMBL info@sbgdd de Home: www.sbgdd de 3. Maintenance or repair • explain different maintenance systems (preventive / corrective maintenance) • explain equipment manuals • know the working regulations • understand and explain the working principles of equipment, like pumps, valves, measure & control equipment, seals, piping).	 perform and monitor minor repair and maintenance work according audited procedures on mechanical, electrical and instrument field support and cooperate with maintenance personnel organise and use tools, machinery, equipment, chemicals and energy for doing proper and safe maintenance work 	Improvement initiatives and projects Improvement initiatives Improvement
Sei 11.04.2019 Sei 11.04.2019 Sachsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Gutenbergstraße 6, 01307 Dresden Tel: 0351 4445-612 EMait: undegsbgdd.de Anne: www.sbgdd.de Ann	 perform and monitor minor repair and maintenance work according audited procedures on mechanical, electrical and instrument field support and cooperate with maintenance personnel organise and use tools, machinery, equipment, chemicals and energy for doing proper and safe maintenance work 	Improvement initiatives and projects Improvement initiatives Impr
Sei 11.04.2019 Sei 11.04.2019 Sachsische Bildungsgesellschaft für Umweltschutz und Chemieberufe Dresden mbH Gutenbergstraße 6,01307 Dresden Tel: 0351 4445-612 EMai: undgebpdd.de Home: www.sbpdd.de Amai: undgebpdd.de Amai: undgebpdd.de Amai: undgebpdd.de Know the working regulations whow the working regulations understand and explain the working principles of equipment (like pumps, valves, measure & control equipment, seals, piping). understand the principles of electricity in relation to safety recognise unsafe or critical situations and explain appropriate measures	 perform and monitor minor repair and maintenance work according audited procedures on mechanical, electrical and instrument field support and cooperate with maintenance personnel organise and use tools, machinery, equipment, chemicals and energy for doing proper and safe maintenance work monitor the use of reliable equipment and working methods during maintenance work 	improvement initiatives and projects instruct a team on all necessary work steps autonomously if the need for maintenance work occurs assume responsibility of his/her own safety and of a team coordinate his/her own work schedule and the schedule of a team concerning minor repairs and maintenance work assume responsibility of the cost efficiency of the works and repairs executed by a team and optimises hand on tool times report on the state of maintenance in the plant autonomously and proactively optimise work processes and detect maintenance needs through open communications with operators, maintenance team members, contractor team members, management and suppliers propose and assume responsibility for improvement and maintenance of the equipment

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5 Conclusion and Recommendation

For tacit knowledge as well as for critical skills, areas were identified in the units of learning outcome that were developed by the project ChemPharm. Tacit knowledge was divided into common and specific competences. Critical skills only belong to the specific competences.

After selecting the appropriate work task, it is possible to determine content to visualize tacit knowledge and critical skills.

Next step is to find examples in the work task that are parts of tacit knowledge or critical skills. Then script had to be produced and a film of the competence would be recorded.

The films should be placed to Skillsbank, so that Skillsbank's users have an idea of the expected competencies in practicing the profession of chemical and pharmaceutical operator.

Because the work on the units of learning outcome will not be finalized, due to future changes in the requirements of the chemical and pharmaceutical operator, the identification of relevant areas of tacit knowledge and critical skills cannot be concluded conclusively, since the changes in the job profile are also reflected here.

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