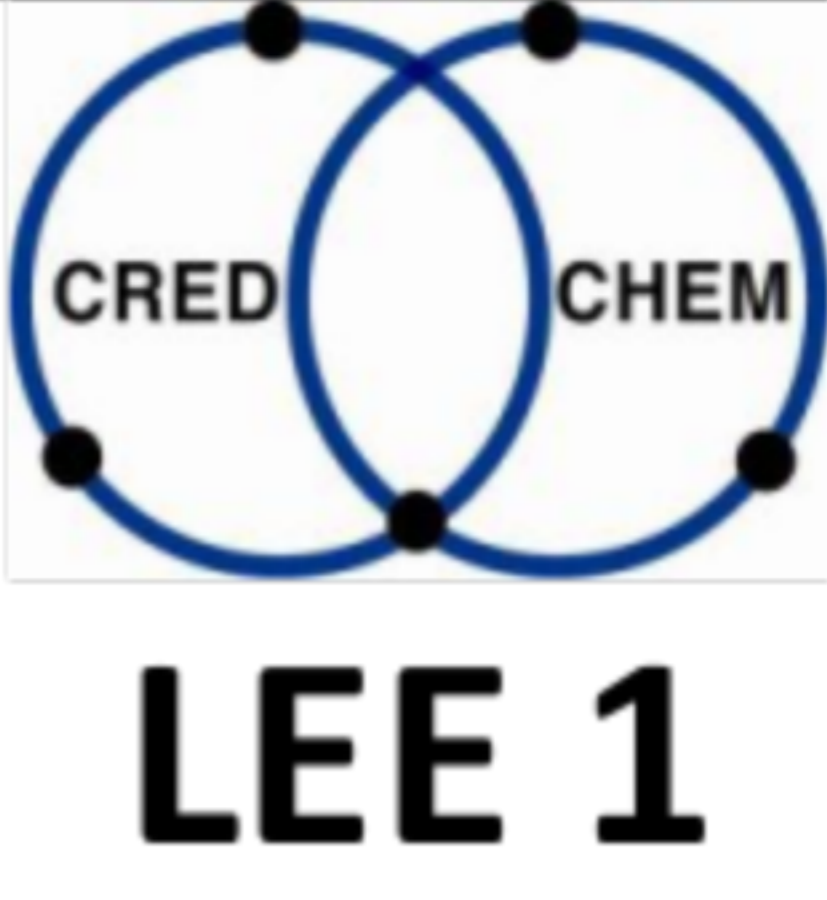
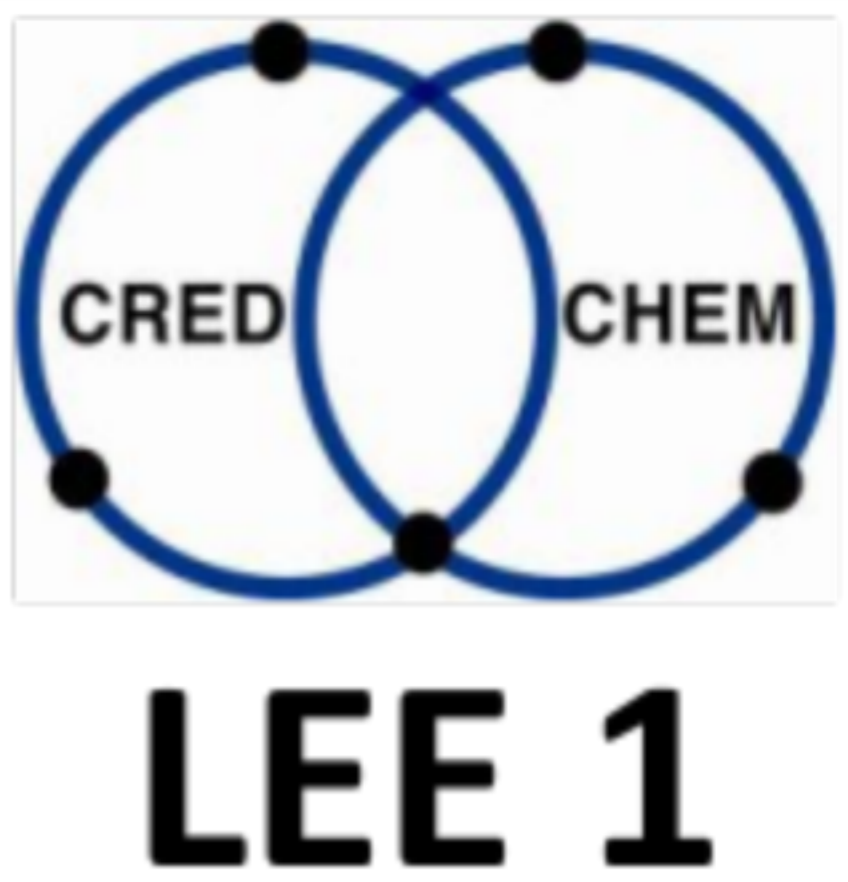


Field of action	Working in the laboratory				
Learning outcome unit	1 - Separating and mixing substances				
EQF level	Competence level A: EQF level 3 Competence level B: EQF level 4				
Relations to national qualifications	BG	CZ	DE	IT	SK
		Chemical technician, chemical laboratory technician	Chemical laboratory technician, chemical technician, physics laboratory technician	Biochemical technician	Chemical technician / chemical laboratory technician, chemical technology modeller, chemical laboratory assistant
<b>Learning outcomes</b>					
<b>Competence<sup>1</sup></b>		<b>Skills</b>		<b>Knowledge</b>	
<b>Competence level A (EQF level 3)</b> - separates and mixes substances by using the standard methods and adapts these methods to the given conditions (selects methods depending on the properties of the substances)		- accepts orders for separating and mixing substances and plans all further processing steps until supplying the result - selects methods, respective laboratory equipment and necessary chemicals (solvents...) and handles them accurately, carefully and expertly		- knows chemicals (properties, structure, R/S statements) - knows principles of separating/mixing and respective methods (knows steps of action) - knows respective equipment and its functioning/ operation	
<b>Competence level B: (EQF level 4)</b> - deals with problems typical for the methods		- analyses the problem, develops solution approaches by applying specialist knowledge and decides how to solve the problem - reflects on whether the problem was actually solved		- knows processes which the methods are based on - knows structural characteristics which are responsible for behaviour/ properties of a substance - knows solubilities of substances at different temperatures	

<sup>1</sup> The competence levels build upon each other.

<b>Field of action</b>	<b>Working in the laboratory</b>					
<b>Learning outcome unit</b>	<b>1 - Separating and mixing substances</b>					
<b>Countries</b>	<b>BG</b>	<b>CZ</b>	<b>DE</b>	<b>IT</b>	<b>SK</b>	
<b>Which CREDCHEM learning place offers the learning outcome unit?</b>	-	Chemical College Pardubice	Saxon Education Company for Environmental Protection and Chemical Occupations Dresden Ltd.	ITAS Scalcerle	Secondary Technical School Bratislava, Secondary Technical School Novaky	
<b>How many learners can be admitted?</b>		3	3-4	12	10	
<b>At which competence level is the learning outcome unit offered?</b>		A, B	A	A, B	A, B	
<b>In which language is the mobility taught?</b>		English	English/German	English	English/German	
<b>Which methods are used?</b>	Extraction Distillation Filtration Recrystallisation Preparation of solutions of solid and solvent					
<b>The following occupational tasks<sup>2</sup> (which can also be used for imparting the learning outcomes) have been exemplarily analysed in preparing the LEE:</b>						
Extraction of copper sulphate						
Extraction of caffeine						
Rectification of trichloromethane						
Sedimentation						
Alcoholic fermentation and distillation						
Filtration of calcium carbonate						
Preparation of a sodium hydroxide titrant						
Recrystallisation of sulphanilic acid						
Recrystallisation of copper sulphate						

<sup>2</sup> Occupational and examination tasks can be downloaded at [www.credchem.eu](http://www.credchem.eu).

Steam distillation of toluene	
Grinding and sieve analysis	
Mixing	
<b>The following examination tasks were designed for the competence levels indicated:</b>	<b><i>Competence level</i></b>
Extraction of copper sulphate	A, B
Extraction of caffeine	A, B, C
Alcoholic fermentation and distillation	A, B, C
Rectification of trichloromethane	A, B, C
Filtration of calcium carbonate	A, B
Preparation of a sodium hydroxide titrant	A, B
Recrystallisation of copper sulphate	A, B
Steam distillation of toluene	A, B