

Supplementary material S2

Questionnaires for evaluation of course 23936 from the years 2021-2025 with % answers for each teaching year. Free text answers for 2021-2024 can be found in Supplementary S1.

2021/2022:

Question	Selection	%
Q1. Which of the following statements are related to engineering competences?	Add value by application of knowledge on existing technology in a new and creative way for solving requested practical challenges (process, product or system)	88
	Use relevant information and sources to perform a specific and critical bibliography	75
	Understand and apply new terminology and knowledge with reflection and a critical mind set	88
	Cooperate with and possibly lead people with different education, language and cultural background	63
	Present both oral and written problems with solutions to various target groups	63
	Take responsibility for own learning and continuous development of competences	50
	Free text	
Q2. Do you have other suggestions/comments?	Free text	
Q3. Which part of the course gave you engineering competences?	Performing laboratory exercises	75
	Technical writing	63
	Analysis of results	50
	Timeschedule/work across groups/ critical thinking/understand others data	All: 37
Q4. After this course I feel more comfortable in future engineering tasks including chemical analysis and data generation?	Strongly agree	25
	Agree	75
	Neutral, disagree and strongly disagree	0
	FREE text	
Q5. What do you think is critical thinking and how can you relate it to engineering competences?	Free text	
Q6 How did you experience to work without given templates? Advantage/disadvantages	Free text	
Q7. What was your achievements from listening to others present data, results and methods?	Free text	
Q8. I experienced it as a good idea to present data and methods to others as part of the learning process?	Strongly agree	63
	Agree	25
	Neutral	13
	Disagree/disagree strongly	0
	Free text	
Q9. How did you experience data sharing with other	Free text	

groups? Advantages/disadvantages		
Q10. As part of understanding others results, did you spend enough time to discuss data and methods with the other groups?	Free text	
Q11. Did you realize that a large part of the course were about knowledge sharing between groups?	Free text	
Q12. If you should take the course again, can you suggest changes?	Free text	

2024:

Question	Selection	%
Q1. Which concepts do you consider to be engineering-relevant? (tick, more than one answer is allowed)	Apply existing technological knowledge in new and creative ways to solve practical problems, whether it involves a new or improved process, product, or system that generates added value for the task provider	89
	Use subject-relevant information sources and conduct relevant and critical information searches	67
	Acquire new knowledge through reflection and critical thinking in order to understand and master subject areas.	89
	Participate in collaborative and managerial functions and contexts on a qualified basis together with people who have different educational, linguistic, and cultural backgrounds	67
	Present and communicate problems and solution models both in writing and orally to various types of stakeholders	67
	Take responsibility for one's own learning and ongoing competence development	67
	None of the above	0
Q2. Do you have additional comments on question 1 – feel free to write them here	Free text	No answers
Q3. In the course, I gained engineering competencies by... (Select the statements you agree with)	Designing experimental plans including standardizing e.g. sampling and sample preparation (common reference framework)	72
	Making a plan and coordinating laboratory tasks	61
	Getting familiar with the terms within analytical chemistry	78
	Processing data in Excel	94
	Applying statistical tools for data analysis	67
	Having own expertise in a group setting	33
	Selecting appropriate methods for analysis of food components based on method principles	61
	Carrying out experimental work in an interdisciplinary, non-self selected group	61
	Formulating and testing hypotheses	83
	Evaluating results (own and others) based on the method applied (e.g. sample preparation, method choice, etc.) by critical thinking	72
	Understanding the challenges of analyzing food	78
None of the above statements apply to me	0	
Q4. Do you have additional comments on question 3?	Free text	
Q5. The course has strengthened my generic competencies, which I can carry forward in my studies and everyday life, in the form of... (select the statements you agree with)	Working in groups	78
	Cross-group collaboration	78
	Sharing my knowledge with others	61
	Communication and knowledge sharing with others about a task	78
	Giving and receiving feedback	44
	Finding knowledge based on needs and task development	67
	Reflecting on own work	78
None of the above statements apply to me	0	

Q6. Do you have additional comments on question 5?	Free text	No Answers
Q7. After taking the course, I feel better prepared for future engineering tasks involving chemical food analysis and data generation...	Strongly agree	33
	Agree	61
	Neutral	6
	Disagree	0
	Strongly disagree	0
Q8. After taking the course, I feel more confident in my own competencies within the subject...	Strongly agree	18
	Agree	76
	Neutral	6
	Disagree	0
	Strongly disagree	0
Q9. The group dynamic was positively affected by 3 to 4 experts contribution to the final report	Strongly agree	39
	Agree	33
	Neutral	22
	Disagree	6
	Strongly disagree	0
Q10. This course has improved my confidence in that I can contribute with knowledge in group work	Strongly agree	24
	Agree	53
	Neutral	24
	Disagree	0
	Strongly disagree	0
Q11. Do you have additional comments on questions 7 to 10? Please write	Free text	
Q12 In the future, my engineering competencies can be used to... (Select the statements you agree with)	Compare and evaluate results based on method principles	94
	Evaluate results based on expected (theoretical) values	78
	Critically assessing own and others' results based on the overall picture (e.g. sampling info, sample prep, analysis)	72
	Being curious on how others' have obtained their results and ask clarifying questions to understand results and how they were produced	72
	Sampling and sample preparation based on knowledge about the food and the analytes	56
	Recommending the most appropriate method for analyzing specific analytes	67
	None of the above statements apply to me	0
Q13. Do you have additional comments on question 12?	Free text	No further comments
Q14. I gained something from hearing others present data, results, and methods, e.g. via posters?	Strongly agree	17
	Agree	56
	Neutral	22
	Disagree	0
	Strongly disagree	6
Q15. I found it beneficial to communicate data and methods to others as part of the learning process (tick answer)	Strongly agree	18
	Agree	59
	Neutral	18
	Disagree	6
	Strongly disagree	0
Q16. In the course I experienced that I could ask questions in a positive atmosphere	Strongly agree	50
	Agree	44
	Neutral	6
	Disagree	0

	Strongly disagree	0
Q17. Do you have additional comments on questions 14 and 16 please write here	Free text	
Q18. If you were to take the course again, what would you do differently if you could choose? (Select the statements that apply to you)	Conduct more analyses to reduce downtime	50
	Only work in groups of own choice	17
	Start the report writing earlier	44
	Collaborate more with other groups	11
	Make better use of the guidance offered by instructors during group work	6
	Make Excel sheets more clear/structured	50
	Familiarize more with the analytical methods used by others	56
	I wouldn't do anything differently	6
Q19. Do you have additional comments on question 18?	Free text	
Q20. Did you realize during the course that a large part of it is about cross-group collaboration and knowledge sharing?	Yes, definitely	44
	Yes, partly	50
	No, not really	6
	No, not at all	0
	I don't know	0
Q 21. Do you have additional comments on question 20?	Free text	No comments

2025:

Question	Selection	%			
Q1. In the course, I gained engineering competencies by... (Answers includes strongly agree only)	Formulating and testing hypotheses	100			
	Creating time schedules, coordinating and performing laboratory experiments	86			
	Understanding the challenges of chemical food analysis	71			
	Processing data in Excel	86			
	Functioning as an experimental expert in group report writing	100			
	Evaluating results (own and others) based on the method applied (e.g. sample preparation, method choice, etc.) by critical thinking	86			
Q2. The course has strengthened my generic competencies, which I can carry forward in my studies and everyday life, in the form of... (answers includes strongly agree only)	Cross-group collaboration	86			
	Communication and knowledge sharing with others about a task	86			
	Finding knowledge based on needs and task development	86			
	Reflecting on my own work	100			
Q3. After taking the course, I feel better prepared for future engineering tasks involving chemical food analysis and data generation...	Strongly agree	43			
	Agree	57			
	Neutral	0			
	Disagree	0			
	Strongly disagree	0			
Q4. After taking the course, I feel more confident in my own competencies within the subject...	Strongly agree	71			
	Agree	0			
	Neutral	29			
	Disagree	0			
	Strongly disagree	0			
Q5. I gained something from hearing others present data, results, and methods, e.g. via posters?	Strongly agree	57			
	Agree	29			
	Neutral	14			
	Disagree	0			
	Strongly disagree	0			
Q6. I found it beneficial to communicate data and methods in small groups to others as part of the learning process (e.g. poster presentation)	Strongly agree	86			
	Agree	0			
	Neutral	14			
	Disagree	0			
	Strongly disagree	0			
	Answer categories, strongly agree (SA), agree (A), to some extent (SE), not at all (NO), when not adding up to 100% the last fraction answered "do not know"	SA	A	SE	NO
Q7. If you were to take the course again, what would you do differently if you could choose? (Select the statements that apply to you)	Conduct more analyses to reduce downtime	0	43	57	0
	Only work in groups of own choice	57	0	29	0
	Start the report writing earlier	29	43	14	0
	Collaborate more with other groups	43	0	43	0
	Learn more about the methods used by others	71	29	0	0
	I wouldn't do anything differently	0	43	29	14
Q8. Do you have other comments that can help us improve the course, please write?		NO Answers received			

