

<b>Consortium Agreement</b>
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**The participating organisations:**

**The University of Tartu (UT)**, Faculty of Science and Technology, Estonia, referred to as **the Consortium Coordinator** (in issues related to studies as **first year university**),

**Uppsala University (UU)**, Department of Chemistry – BMC, Sweden,  
**University Claude Bernard Lyon 1 (UCBL)**, Department of Chemistry, France, and  
**Åbo Akademi University (AAU)**, Faculty of Science and Engineering, Finland,  
referred to as **the Contractors** (in issues related to studies as **second-year university**)

**and the Associated Partners listed in Annex 1.**

The Consortium Coordinator and the Contractors are collectively referred to as **Partners** to this Consortium Agreement.

All the participating organisations are collectively referred to as **Parties** to this Consortium Agreement.

**The Consortium Coordinator and the Contractors form together the Consortium of the EACH (Excellence in Analytical Chemistry) programme.**

**1. Purpose of the Consortium Agreement**

**1.1.** The purpose of the Consortium Agreement is to agree on the implementation and management of the Erasmus Mundus Joint Master Degrees (EMJMD) programme EACH (below “EACH programme”) approved and funded by the Education, Audiovisual & Culture Executive Agency (EACEA) of the Commission of the European Communities (the European Commission) under the Erasmus+ Framework programme and in accordance with the EACH programme application and its annexes, EACH programme funding decision, Grant Agreement (No 619658) and its annexes (including Administrative and Financial Handbook) and the Erasmus+ Programme Guide Version 3 (2020): 25/08/2020 as well as the Programme decision (no 1288/2013/EC).

**1.2.** The Consortium Agreement shall specify the respective rights and obligations of the Partners with regard to the running of the EACH programme. All Partners are subject to the rules and regulations set up by the European Commission in the agreements and documents mentioned above regarding both the responsibilities towards the European Commission and towards other Partners.

**2. Validity, Amendments and Definitions**

**2.1.** The present Consortium Agreement shall enter into force after its signature by all the Partners but shall have a retroactive effect from 1<sup>st</sup> of September 2020. It shall be valid until 31<sup>st</sup> of August 2026, or as long as the Grant Agreement is active.

**2.2.** Amendments to the present Consortium Agreement shall be made only by supplementary agreement signed on behalf of each of the Partners by authorized representatives.

**2.3.** The provisions of the Grant Agreement shall take precedence over any other agreement between the Coordinator and Contractors that may have an effect on the implementation of the Grant Agreement.

**2.4.** The terms “partner country” and “programme country” are defined as in the Erasmus+ Programme Guide Version 3 (2020): 25/08/2020 and in the Withdrawal Agreement between the EU and the UK. The term “EU/EEA country” refers to the EU countries, Norway, Lichtenstein, and Iceland. The term “EU/EEA/CH country/UK” refers to the EU/EEA countries, Switzerland and United Kingdom. The term “non-EU/EEA programme country” refers to Republic of North Macedonia, Turkey, and Serbia.

### **3. Obligations of Consortium Coordinator**

**3.1.** The Consortium Coordinator manages the administrative, legal, and financial matters of the EACH programme towards the European Commission. The Consortium Coordinator is responsible for all contacts with the European Commission.

**3.2.** Consortium Coordinator shall report to the Contractors in such a way that these have full understanding of the administrative, legal, and financial matters.

**3.3.** The Consortium Coordinator shall undertake:

3.3.1. to take all the steps necessary to prepare for, perform, and correctly manage the EACH programme;

3.3.2. to communicate and exchange information and send necessary documents to EACEA;

3.3.3. to notify and provide Contractors with any amendments made to the Grant Agreement;

3.3.4. to nominate the Academic Coordinator for the EACH programme;

3.3.5. to nominate the Administrative Coordinator who is directly in charge of the EACH programme coordination and will head the Programme Secretariat;

3.3.6. to coordinate the work of the Consortium Committee and its two Boards (see section 6) and be responsible for implementation of changes to the EACH programme;

3.3.7. to prepare and maintain the website and other marketing materials for the Consortium and ensure proper use of the EU emblem (EU flag) in conjunction with the name “Erasmus+”, in line with the conditions stipulated in the grant agreement;

3.3.8. to organize the appropriate health, accident, and illness insurance for all Erasmus+ scholarship holders and self-paying students during the first study-year at UT and second-study-year at AAU, UCBL, and UU according to the minimum insurance requirements set by the European Commission.

3.3.9. to initiate the formation of the External Advisory Council (EAC): members of professional bodies and international organizations related to analytical chemistry, who are in charge of external evaluation of the EACH programme;

3.3.10. to collect comprehensive feedback from EACH programme students during and after the end of their studies: create/adjust the e-forms, collect responses, summarize feedback, and present the results to the Consortium Committee;

3.3.11. to initiate and compile the necessary materials and data for internal evaluation at the consortium level (carried out every two years, next evaluation is planned for 2022). The following aspects are evaluated: a) programme’s content and structure; b) assessment of teaching and learning process - teaching methods, Recognition of Prior Learning, etc.; c) academic capacity of the teaching staff (including practitioners); d) students’ academic progress – graduation and drop-out rate, admissions efficiency; e) learning environment, including quality of labs and facilities.

3.3.12. to submit the interim reports to EACEA on 31 October 2021, 31 August 2022 and 29 February 2024 and the final report no later than 12 months before the end of the period set in 2.1.

## 4. Obligations of the Partners

**4.1.** The Partners are subject to the rules and regulations set up in Consortium Agreement, EACH programme application and its annexes, programme funding decision, Grant Agreement (No 619658) and its annexes (including Administrative and Financial Handbook) and the Erasmus+ Programme Guide Version 3 (2020): 25/08/2020 as well as the Programme decision (no 1288/2013/EC).

**4.2.** The Partners shall undertake:

4.2.1. to take all the steps necessary to prepare for, perform, and correctly manage the EACH programme set out in the present Consortium Agreement (Annex 4);

4.2.2. to notify the Consortium Committee in advance of any planned changes in the modules/courses taught at the respective Partner, which may affect the EACH programme, and not to make any changes without informing the Consortium Committee. The Consortium Committee reviews the proposed changes and decides, whether the changes are adequate and can be implemented (see 7.4);

4.2.3. to participate in a cooperative manner at the meetings of the Consortium Committee and other bodies under this Consortium Agreement;

4.2.4. to act at all times in good faith and in manner that reflects the good name, good will and reputation of the other Partners and in accordance with scientific and academic ethics;

4.2.5. to organize the Winter School (with duration approximately one week in the second half of January) that is every year organized by the Partner from the same country where the Winter School will take place<sup>1</sup>. The Winter School includes (1) short courses on novel and timely topics of analytical chemistry and metrology in chemistry delivered by external scholars, possibly including individual/group work by students, (2) presentations by second year students on the progress of their master theses, and (3) discussions (interviews, if needed) and concluding with selection of students for study tracks. All Consortium students participate in the Winter School;

4.2.6. to search for professional sectors willing and qualified to offer training placements for the students of the EACH programme and to organise the practical placement of all the EACH JMD students studying at their universities;

4.2.7. to inform the Consortium Committee of relevant information received from third parties as regards the EACH programme.

**4.3.** The Contractors shall undertake:

4.3.1. to communicate to the Consortium Coordinator any information or document required by the latter that is necessary for the management of the EACH programme, including the information and documents necessary for compiling the interim and final reports.

4.3.2. to accept responsibility for all information communicated to the Consortium Coordinator, including details of costs claimed and, where appropriate, for ineligible expenses;

4.3.3. to nominate at least one academic and one administrative representative to the Consortium Committee according to the internal rules of the Contractors;

4.3.4. to contribute to the promotion of the EACH programme along with the Contractor's specific marketing activities;

4.3.5. to promptly notify the Consortium Coordinator of any delay in performance or any event that may have an impact to the performance of EACH programme;

4.3.6. to keep supporting documents evidencing expenditures incurred by the Contractors for the purpose of the EACH programme in original and send to the Consortium Coordinator upon request. All payment orders to the Consortium Coordinator must be dated and certified as true and exact by the Financial Officer of the Contractor.

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<sup>1</sup> If needed, for health reasons, the WS can be conducted as online teaching.

**4.4.** In addition to the listed, the Contractors have the following tasks to perform:

4.4.1. AAU coordinates the calls of invited scholars: setting up the online application form, collecting the applications, initial screening of the applications for eligibility, and passing the documents to the Academic Board of the Consortium Committee.

4.4.2. UCBL coordinates the consortium's strategy of interaction with industry by (1) finding internship possibilities, (2) attracting funds from industry and (3) organising joint applied research with industrial enterprises. UCBL also actively looks for additional funding sources from private/industrial sources, evaluates the chances of being successful, initiates and coordinates compilation of funding proposals.

4.5.3. UU plans and performs activities for supporting sustainability related to funding from public sources. UU actively looks for additional funding sources from public funding agencies, evaluates the chances of being successful, initiates and coordinates compilation of funding proposals.

**4.5.** All Partners are obliged to acknowledge the support by the Erasmus+ programme when promoting or disseminating information on the EACH programme, and make every effort to follow and initiate the measures contributing to the sustainability of the EACH programme (see Annex 2).

## **5. Role of Associated Partners**

**5.1.** The associated partners participate by giving added value to the EACH programme in terms of providing link to the professional world. By signing the present Consortium Agreement, the associated partners are offered the possibility to participate in the EACH programme, but they take no legally binding obligations.

**5.2.** Contribution of the associated partners may be, but is not limited to, the following:

5.2.1. spreading information about the EACH programme and promoting it;

5.2.2. encouraging their staff members to apply for the visiting scholars status in the EACH programme;

5.2.3. participate in mentoring and quality assurance of the EACH programme by nominating a staff member to the programme's Advisory Council;

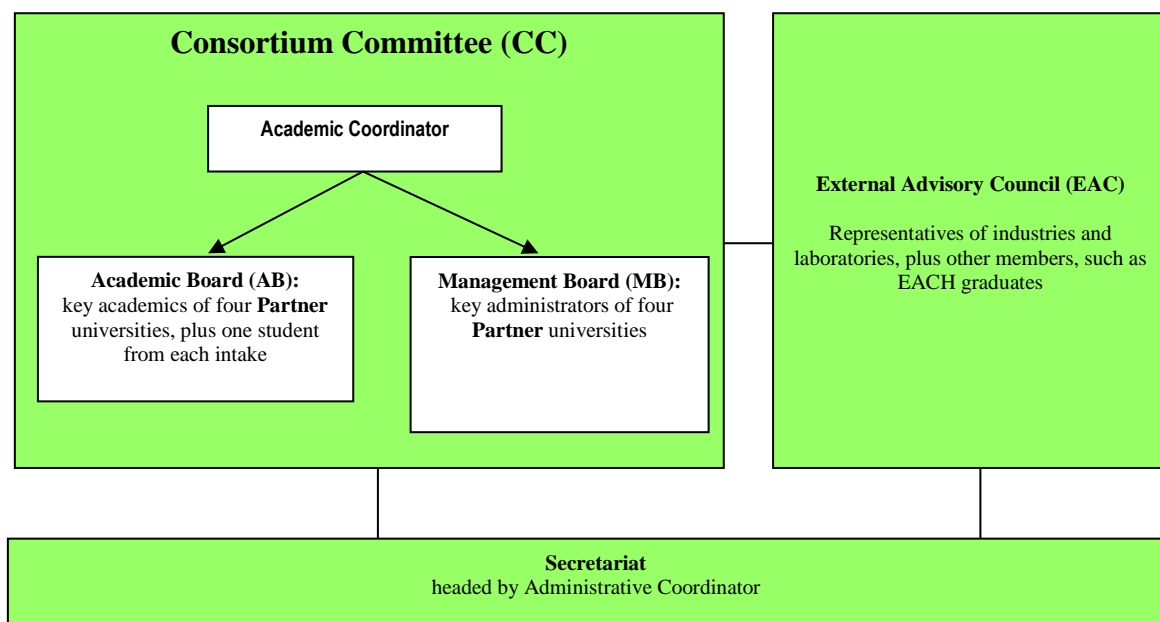
5.2.4. offer training (practical placement) possibilities and support the EACH programme by paying stipend/salary to the trainees working at their company (industrial/laboratory partners);

5.2.5. offer research topics for master theses and if necessary/available also laboratory facilities for their realization (industrial/laboratory partners).

## **6. Structure of the Consortium**

### **6.1. The Consortium Committee**

6.1.1. The EACH programme is governed by the Consortium Committee (CC). The Consortium Committee is chaired by the Academic Coordinator (ACO). The Consortium Committee, which consists of two boards - Academic Board (AB) and Management Board (MB), shall support the Academic Coordinator in managing the EACH programme. Members of the AB and MB are the members of the Consortium Committee. The CC will meet three times a year (Winter School, admission meeting, and meeting in November). The meetings can be via the Internet, if needed.



6.1.2. **AB** includes the Academic Coordinator, key scholars of all Contractors, plus one EACH programme student of each intake to represent students' interests and arguments. The student representative does not regularly participate in meetings, but he/she will be kept informed about the activities and decisions of the AB by the Academic Coordinator.

6.1.3. **MB** includes key administrators of all three Contractors (UU; UCBL; AAU) plus the Secretariat (including the Administrative Coordinator).

6.1.4. The Consortium Committee shall undertake (the responsible board is indicated in brackets):

6.1.4.1. to define standards for admission, application procedure, and student selection process for the EACH programme (MB);

6.1.4.2. to screen the applications for eligibility (MB) and to evaluate applicants' academic performance both at admission and at later stages (AB);

6.1.4.3. to select the students and establish the proposed list of Erasmus+ scholarship holders to be sent to the European Commission (AB; MB);

6.1.4.4. to select students for additional stipends or financial support (AB; MB);

6.1.4.5. to distribute students between the study tracks (AB);

6.1.4.6. to collect and agree upon the master theses topics and assign those to students (AB);

6.1.4.7. to appoint members to the joint committee that evaluates master theses and to submit the list of joint committee members for approval by the university authorities (AB);

6.1.4.8. to agree upon the distribution of the EACH programme lump sum (MB, AB);

6.1.4.9. to modify the evaluation system of the EACH programme described in the application (AB);

6.1.4.10. to discuss and implement changes to the EACH programme, including but not limited to the changes proposed by the Partners (AB);

6.1.4.11. to invite new associate partners to join the Consortium (MB);

6.1.4.12. to ensure quality assurance and adopt the necessary changes of the EACH programme (MB; AB);

6.1.4.13. to discuss any problematic issue related to the EACH programme and react adequately to all the issues (AB, MB);

6.1.4.14. to work with industry and other potential partners to have additional scholarships for EACH students (AB);

6.1.4.15. to establish quality criteria for the visiting scholars, to rank the applications, and to select the visiting scholars for the programme (AB);

6.1.4.16. to collect, store, and share among Partners student assessment records (MB).

## **6.2. The External Advisory Council**

The task of the External Advisory Council (EAC) is to participate in external evaluation and guiding of the EACH programme. The members of the EAC can include representatives of the EACH programme associated partners and the EACH graduates.

## **6.3. The Secretariat**

Routine management (administrative and financial) of EACH programme is performed by the Secretariat which is headed by the Administrative Coordinator. Its tasks include but are not limited to:

- 6.3.1. management of payments and reporting tasks;
- 6.3.2. arrange meetings, assure the agendas and minutes;
- 6.3.3. information exchange on matters requiring immediate attention.

**6.4.** The Consortium Committee boards shall make decisions by consensus whenever possible. Where decisions cannot be taken by consensus, decisions on the following general programme matters will be taken by a two-thirds majority: (1) funding; (2) academic contents of the EACH programme; (3) admission of students and distributing them to 2<sup>nd</sup> year universities; and (4) visiting scholars. All other matters will be decided by a simple majority.

## **7. Programme Contents, Structure and Study Tracks**

**7.1.** The EACH programme is structured around two years of studies, covering 4 semesters, in total 120 ECTS. Each academic year consists of 40 weeks of studies, divided into two semesters and the workload per semester is 30 ECTS. Please see Annex 4 for more details.

**7.2.** There is one first year university – UT, and three second year universities (three study tracks) – UU, AAU, and UCBL. The enrolled students study in two universities during the programme.

**7.3.** The teaching language of the EACH programme is English.

**7.4.** The content and structure (curriculum) of the EACH programme (please see Annex 4) is designed by and agreed between the Partners. The Partners will review the curriculum of the programme each study-year. If needed, changes can be made in the curriculum by each Partner. In such case, the changes a) must be communicated to and approved by the involved Partner universities in advance (at least one year ahead) and b) must ensure that the quality of teaching in the programme is maintained or improved.

## **8. Visiting Scholars**

**8.1.** Visiting scholars are academics or practitioners who participate in teaching in the EACH programme on a temporary basis (1-8 weeks). Visiting scholars are welcome in the following areas: new directions and developments in analytical chemistry; analytical chemistry and metrology in chemistry; guideline materials on QA in analytical chemistry; metrological and quality aspects of analytical chemistry; food analysis and nutrition, QA in food analysis; mass spectrometry, isotope methods; environmental analysis; occupational analysis, and forensic analysis.

**8.2.** The suitability of the visiting scholar candidates will be decided by the AB based on their track record and suitability of their proposed topics for the EACH programme.

**8.3.** Visiting scholars contribute to the EACH programme via teaching short course(s) in their fields of competence at any of the Partner universities or at the Winter School.

## **9. Admission of Students**

**9.1.** Students' application process will be technically administered by the Consortium Coordinator as follows:

- 9.1.1. announcing the application period;
- 9.1.2. updating the EACH programme's website at <https://www.analyticalchemistry.eu/>;
- 9.1.3. collecting application documents;
- 9.1.4. uploading materials for administrative screening and academic evaluation;
- 9.1.5. informing candidates of their admission.

**9.2.** Admission requirements at the time of signing this Consortium Agreement are:

9.2.1. Bachelor's degree (or equivalent) according to the standards required by each involved partner university, containing at least 60 ECTS in chemistry or chemical engineering and 20 ECTS in mathematics and/or physics during the prior learning periods. Minimum eligibility requirement for application is 66% of the maximum grade available as the average of all courses included in the transcript.

No student can be admitted to Uppsala University without being considered as eligible by Uppsala University's Admission Office.

9.2.2. English language requirements:

- IELTS Academic: Overall mark of 6.5 and no section below 5.5. Copy of the test result is accepted, as it will be verified online by UT;
- TOEFL iBT® (Internet-based): minimum score 90. The revised TOEFL® Paper-delivered Test: minimum 22 for all subcategories. The TOEFL result must be sent directly to the University of Tartu by the Educational Testing Service. TOEFL institutional code for the University of Tartu is 0133. The University of Tartu also accepts the TOEFL iBT Special Home Edition test result, see further information here: <https://www.ets.org/s/cv/toefl/at-home/>;
- Cambridge English: B2 First (former Cambridge English: First (FCE)) – minimum score 173;
- Cambridge English: C1 Advanced (former Cambridge English: Advanced (CAE));
- Cambridge English: C2 Proficiency (former Cambridge English: Proficiency (CPE));
- Pearson PTE Academic – minimum score of 62.

The language requirements will, if necessary, be jointly revised by the **AB** after approval by the Partner universities.

English language requirement is waived if an applicant can document any of the following:

- has completed secondary education in English in one of the following countries: in EU/EEA member states; Switzerland; United Kingdom; USA; Canada; Australia or New Zealand. In the case of EU/EEA member states and Switzerland, the education certificate must include information on the language of instruction;
- has completed secondary education (also known as upper-secondary/high school education) in one of the EU/EEA member states and taken the final exam in English with a result that indicates correspondence to B2 level according to Common European Framework of Reference for Languages;
- has studied in English (with English as medium of instruction), in full-time student status for at least one academic year, in a higher education institution in one of the following countries:

USA; Canada; Australia; New Zealand; Switzerland; United Kingdom or any of the EU/EEA member states. The transcript of records must include information that the applicant was enrolled in the programme taught in English.

9.2.3. Motivation letter (of maximum 5000 characters, with spaces) addressing the following: (1) Give a short overview of the physical and chemical basis of modern analytical chemistry. (2) What is the role of analytical chemistry in the world's economy and society? (3) Please describe briefly your previous study and work experience, as well as your personality. (4) Give your first and second preference for study track (i.e. Tartu-Uppsala, Tartu-Lyon, Tartu-Åbo), together with short argumentation of your choice. (5) Describe how the EACH programme will help you in achieving your professional goals. The motivation letter is considered eligible if at least 51% of the maximum score is obtained.

9.2.4 Successful passing of an online test on problem-solving. The problems include the following: calculations of moles and percentages based on molecular formula and weighing data, calculations of solution concentrations, calculations of results of simple analytical determinations (titration, gravimetry, etc.). The test is considered passed if at least 51% of the maximum score is obtained.

9.3. The admission requirements are reviewed annually by the Consortium Committee and are amended as needed after approval by the partner universities.

9.4. Admission to the EACH programme is granted on a competitive basis. At the assessment, the applicants are ranked based on the following criteria:

9.4.1. average grade of the previous study level (yields 40% of the final score);

9.4.2. knowledge of the field, motivation and argumentation skills, relevant study and work experience and other relevant activities (publications, project management, etc.) as presented in a motivation letter (40%);

9.4.3 result of the online problem-solving test (20% of the final score).

9.5. A full list of supportive documents to be submitted for admission is available at <https://each.ut.ee/EACH/admission-requirements/>.

## 10. Number of Students to be Admitted

10.1. The number of Erasmus+ scholarship holding students to be admitted will be decided in accordance with the EACEA funding which is fixed in the Grant Agreement.

10.2. In addition to the student places funded by EACEA, the Partners contribute to the sustainability of the programme by different means. UT, UCBL and AAU contribute with tuition fee waivers for a number of students. UU contributes by accepting EU/EEA/CH students without tuition fees and with a substantial partial tuition fee waiver for non-EU/EEA/CH students.

## 11. Selection of Students for the Study Tracks

11.1. The aim of the Consortium is to give every student the opportunity to choose the study track most suitable for his/her abilities and interests, while at the same time have in broad terms similar numbers of students in all three study tracks.

11.2. The selection of students for the study tracks is a three-stage process:

11.2.1. On admission to the EACH programme, the students are requested to tentatively indicate their two preferences in the online application form and additionally describe their expectations in the motivation letter.

11.2.2. At the end of semester 1, during the Winter School, the students get more specific information on the three specialities offered by the 2<sup>nd</sup> year universities. Thereafter they are asked again to provide their first and second preference of the second-year university.



11.2.3. The final decision is made at the end of the Winter School at a dedicated meeting of the AB, taking into account the preferences of the students and their study results at UT during the first semester. If needed the AB can additionally discuss with the students concerned.

## 12. Grading System

12.1. The following scaling table shall be used if transferring the grades:

Status	Grade	ECTS Equivalent	UT	UCBL*	UU	AAU	Percentage of acquired knowledge
Pass	Excellent	EXCELLENT - outstanding performance with only minor errors	A	16-20	5	5	91-100
Pass	Very good	VERY GOOD - above the average standard but with some errors	B	14-16		4	86-90 81-85
Pass	Good	GOOD - generally sound work with a number of notable errors	C	12-14	4	3	71-80
Pass	Satisfactory	SATISFACTORY - fair but with significant shortcomings	D	11-12	3	2	61-70
Pass	Sufficient	SUFFICIENT – performance meets the minimum criteria	E	10-11	3	1	51-60
Fail	Insufficient	FAIL - further work is required	F	<10	F	F	50 or below

\* Score 16 corresponds to A, score 14 corresponds to B, score 12 corresponds to C, score 11 corresponds to D, and score 10 corresponds to E.

12.2. Examination methods used at all Partner universities include: written examination, oral examination and practical sessions. In addition there might be local methods for examination used by each university. Students must meet the requirements set for regular examinations in each university.

## 13. Supervision and Presentation of Master's Thesis

13.1. A master's thesis topic is agreed upon by both first- and second-year university professors. As a rule, an academic staff member of the second-year university is the main supervisor and an academic staff member from the first-year university is the co-supervisor. Upon agreement, an academic staff member of the first-year university may become the main supervisor. There may be additional supervisors appointed, as necessary. Presentations of the master theses will be organized at second-year universities by joint evaluation committee. The two universities, where the student has studied, must be represented in the committee. In addition, at least one representative from associated partners is appointed as a member of the committee. All committee members have at least a Master's degree. The committee appoints reviewers to the theses, taking into account suggestions by the supervisors and submits the reviewers for approval to the relevant university authorities.

13.2. Research topics for 2<sup>nd</sup> year students are offered by all Partner universities at the beginning of the second study-year, at the latest. The Academic Board approves the topics. The topics are chosen by students in accordance with their chosen study tracks. The content of the thesis can be the following:

- 13.2.1. a scientific research project;
- 13.2.2. an applied research project;
- 13.2.3. educational project, equipment or material.

13.3. Master theses are submitted for evaluation and are presented during time frames predefined by the authorities of the respective second-year university. The theses are submitted according to the

rules set by the second-year university (electronic/printed version or both). The evaluation of the theses will take place at the second-year university by a joint evaluation committee described in 14.

## 14. Evaluation of Master's Thesis

**14.1.** The joint evaluation committee shall evaluate the theses during a closed part of the session. A member of the committee can also participate in assessment via a real-time two-way audio-visual communications channel (e.g. Skype or video conference).

**14.2.** When evaluating the thesis, the following points are taken into account:

14.2.1. technical execution and scientific quality of the thesis work;

14.2.2. layout, structure, and readability; linguistic correctness;

14.2.3. presenting the thesis, including the structure and the quality of the presentation;

14.2.4. presenting skills and the ability to answer questions;

14.2.5. the amount of knowledge of the speciality demonstrated in the presentation and during the discussion;

14.2.6. reviewer's assessment of the thesis.

**14.3.** The joint evaluation committee will suggest a grade for the thesis. Formal approval and grading of the thesis will be done according to the rules of the second-year university, with one exception: in the case of UU the EACH theses will be graded according to the grading scale at UU when included in the degree at UU and according to the grading scale at UT when included in the degree at UT.

**14.4.** If the thesis does not meet the required standards or if the author is unable to satisfactorily present it, the thesis shall be graded as a fail. In this case one more chance to present the thesis is granted (within the timeframe agreed between the student and the AB) which requires supplementing the existing work or choosing a new topic. The joint evaluation committee can give their suggestions on this matter.

**14.5.** Any appeals to examination results and grade received will follow the rules of the second-year university.

## 15. Degree Awarding

**15.1.** All Partners to the present Consortium Agreement are degree awarding institutions. This two-year programme leads to two legally recognized M.Sc. degrees (120 ECTS) issued by the first-year university and a second-year university:

Institution	Role	Title of Degree Awarded (Programme name)
University of Tartu	first-year university	Master of Science (Excellence in Analytical Chemistry)
University Claude Bernard Lyon 1	second-year university	Master of Physical and Analytical Chemistry
Uppsala University	second-year university	Master of Science
Åbo Akademi University	second-year university	Master of Science (Technology), (Master's programme in Excellence in Analytical Chemistry (EACH))

**15.2.** The students will, after fulfilling the local degree requirements of the second- and first-year universities – all required courses and master's thesis – get access to the following possible combinations of degrees:

15.2.1. Master of Science (Excellence in Analytical Chemistry) (UT) + Master of Science (UU);

15.2.2. Master of Science (Excellence in Analytical Chemistry) (UT) + Master of Physical and Analytical Chemistry (UCBL);

15.2.3. Master of Science (Excellence in Analytical Chemistry) (UT) + Master of Science (Technology), (Master's programme in Excellence in Analytical Chemistry (EACH)) (AAU).

**15.3.** The degrees are recognized by all four Partner universities and all institutions award Diploma Supplements in English which follow the model developed by the European Commission, the Council of Europe and UNESCO/CEPES. The courses taken from the EACH programme curriculum (Annex 4) are fully recognized and count toward degree requirements at all four Partner universities according to the regulations above. One exception is introductory Swedish language course taken at UT, which at UU will count as an extracurricular course.

## **16. Financial Matters**

**<<< This section is not public information >>>**

## **17. Quality Assurance**

**17.1.** The Consortium's jointly developed internal evaluation includes the following components:

17.1.1. Comprehensive students' feedback collected at the Winter School. In addition to academic content, this feedback also focuses on central and faculty level support services, transition from first-year university to second-year university, learning environment in general and workload differences (if there are any);

17.1.2. Graduates feedback: from one to twelve months after graduation.

17.1.3. Internal evaluation (carried out every two years) assessing the programmes' content and structure; quality of teaching, academic progress of students, and quality of learning environment.

**17.2.** External evaluation of the EACH programme is carried out by the External Advisory Council every three years.

## **18. Student Agreement and Academic Code of Conduct**

Every student admitted to the EACH programme shall sign the Student Agreement. The Agreement regulates the students' rights and responsibilities. Stipulations applying to students when registering to subjects and taking exams are those in force at the university where the subject is lectured.

## **19. Liability**

**19.1.** Each Partner shall be independently responsible for the performance of any part of its tasks under the present Consortium Agreement and those of its employees, affiliates, or other representatives and nothing contained herein is intended to shift such responsibility from one Partner to the other.

**19.2.** No Partner shall be responsible to any other Partner or its employees, affiliates, or other representatives for indirect or consequential loss or similar damage such as, but not limited to, loss of profit, loss of revenue or loss of contracts.

**19.3.** Each Partner shall release the other Partners from any civil liability in respect of damages resulting from the performance of the present Consortium Agreement, suffered by itself or by its personnel, to the extent that these damages are not due to the serious or intentional negligence of the other party or its personnel.

**19.4.** Each Partner's liability towards the other Partners collectively shall be limited to EUR 100,000 (one hundred thousand euros), provided such damage was not caused by a wilful act or gross negligence.

## **20. Intellectual Property and Data Processing**

**20.1.** None of the parties shall have any right or authority to use the name, trademark, trade secrets, patent, or other rights to intellectual property of the other party in any manner whatsoever, except as contemplated in the present Consortium Agreement or as subsequently authorized in writing by such other party who owns such rights.

**20.2.** Ownership of the intellectual property used or generated in connection with the EACH programme is subject to the regulations of the university where the student or staff was registered or employed at the time the intellectual property was created. If the intellectual property is generated jointly by two or more Partners, then those Partners shall agree which of them shall manage the intellectual property or agree that they shall have joint ownership of such intellectual property.

**20.3.** The Partners agree to keep confidential and not to disclose any information relating to potentially commercially valuable intellectual property generated within the EACH programme without the permission of the appropriate Partner/Partners unless required by the laws of the respective countries.

**20.4.** When processing personal data of the students participating in or accepted for the EACH programme, the Partners declare, as of 25 May 2018, to be bound by the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation - GDPR). Personal data must be accurate and, where necessary, kept up to date. The personal data must be adequate, relevant, and not excessive in relation to the purposes for which they are transferred and further processed.

**20.5.** For the purposes of the application of the principles set forth in the Regulation (EU) 2016/679 (GDPR) the Partners are obliged but not limited to:

20.5.1. implement appropriate technical and organisational measures to ensure a level of security of personal data of students appropriate to the risk, including inter alia as appropriate:

- (a) the ability to ensure the ongoing confidentiality, integrity, availability and resilience of processing systems, and services;
- (b) the ability to restore the availability and access to personal data in a timely manner in the event of a physical or technical incident;
- (c) a process for regularly testing, assessing and evaluating the effectiveness of technical and organisational measures for ensuring the security of the processing.

20.5.2. Where personal data have been obtained from the students, the Partners grant the students all the informational rights of the data subject set forth in article 22 and article 23 of the Regulation (EU) 2016/679 (GDPR), especially article 23 paragraph 1.

## **21. Notice**

**21.1.** Any notice to either Partner hereunder must be in writing signed by the Partner giving notice and shall be served either personally or by mail addressed at the address set forth in article 29 “Requisite Elements” and shall be delivered by traceable courier service (such as DHL) or sent by certified or registered mail. The notice is also accepted when served by the Partner online to the e-mail address set forth in article 29 “Requisite Elements”. This email should be delivered using e-mail delivery confirmation feature “read receipt”.

**21.2.** Notices between the Partners may be submitted by any means in cases where such notices are of informational nature and sending them to the other Partner has no legal effect.

**21.3.** The Partners shall notify the other Partners immediately about the changes in their contact details.

## **22. Entire Agreement**

The present Consortium Agreement, and its attachments, constitutes the entire understanding between the Partners with respect to its subject matter.

## **23. Termination**

**23.1.** The present Consortium Agreement may be terminated by mutual consent or at the request of any of the Partners, provided such request is made in writing at least six (6) months before termination is to become effective. Any termination of the present Consortium Agreement must take into account the rights of students already participating or accepted for the EACH programme to complete their stay.

**23.2.** All the associated partners have the right to withdraw from the present Consortium Agreement, provided such request is made in writing at least one (1) month before withdrawal is to become effective.

**23.3.** Any terms and conditions of this Consortium Agreement that by their nature or otherwise reasonably should survive a termination of this Consortium Agreement shall be deemed to survive.

## **24. Settlement of Disputes**

**24.1.** All disputes arising out of or in connection with the present Consortium Agreement, which cannot be solved amicably, nor through mediation of the Consortium Coordinator, within three (3) months shall be finally settled by arbitrators appointed by the Consortium Coordinator. The place of arbitration shall be Estonia if not otherwise agreed by the conflicting parties. The language to be used in the arbitral proceedings shall be English. The award of the arbitration will be final and binding upon the parties concerned.

**24.2.** If any provision of the present Consortium Agreement shall be held by any arbitrator or court to be invalid or unenforceable, the remainder of the present Consortium Agreement shall not be affected thereby and shall remain in full legal force and effect.

## 25. Applicable Law

Any matter relating to the interpretation or application of the present Consortium Agreement affecting the rights and obligations between the Partners, which are not covered by the Consortium Agreement, shall be resolved by reference to the laws of Estonia.

## 26. Mandatory National Law

Nothing in this Consortium Agreement shall be deemed to require a Party to breach any mandatory statutory law under which the Party is operating.

**27.** The Consortium Agreement has been made in four copies of equal legal force in English, one copy for each Partner.

**28.** The Consortium Agreement will be signed by a legal representative of each university involved.

## 29. Requisite Elements:

<b>University of Tartu</b> Address: Ülikooli 18, 50090 Tartu, ESTONIA E-mail: each@ut.ee Bank details: SEB Pank AS, Tornimäe 2, 15010 Tallinn, ESTONIA IBAN: EE281010102000234007 SWIFT/BIC: EEUHEE2X	<b>Uppsala University</b> Address: Box 256, 751 05 Uppsala, SWEDEN E-mail: registrator@uu.se Bank details: Nordea Bank Sverige AB (publ), Box 276, 751 05 Uppsala, SWEDEN IBAN: SE4895000099604201837970 SWIFT/BIC: NDEASESS	<b>University Claude Bernard Lyon 1</b> Address: 43 Boulevard du 11 Novembre 1918, 69622 Villeurbanne, FRANCE E-mail: secretariat.presidence@univ- lyon1.fr Bank details: Trésor Public, 3 rue de la Charité, 69268 Lyon cedex 02 IBAN: FR7610071690000000100433072 BIC: TRPUFRP1	<b>Åbo Akademi University</b> Address: Domkyrkotorget 3, FI-20500 Åbo, FINLAND E-mail: registrator@abo.fi Bank details: Danske Bank A/S filiali Finland Televisionsgatan 1 00075 Danske Bank IBAN: FI6683199710000456 BIC: DABAFIHH
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**30.** The following Annexes are attached to the Consortium Agreement at the time of signing it:

**Annex 1** – Associated partners of the EACH consortium, their contact data and signatures

**Annex 2** – Sustainability plan

**Annex 3** – <<<< This Annex is not public information >>>>

**Annex 4** – Curriculum

Authorised to sign for the Consortium Agreement of the Consortium of the EACH programme  
as Partner on behalf of

Tartu Ülikool (UT)

*Name of legal entity of the Partner of the Consortium of the EACH programme*

Taivo Raud

*Name of the authorised Representative*

Head of Grant office

*Function of authorised Representative*

Signature of authorised representative: \_\_\_\_\_

Date: 16.04.2021

Stamp



**Authorised to sign for the Consortium Agreement of the Consortium of the EACH programme  
as Partner on behalf of**

**Uppsala University (UU)**

*Name of legal entity of the Partner of the Consortium of the EACH programme*

**Caroline Sjöberg**

*Name of the authorised Representative*

**University director**

*Function of authorised Representative*

**Signature of authorised representative:**



**Date:** 2021-07-26

UPPSALA  
UNIVERSITET  
*Stamp*



Authorised to sign for the Consortium Agreement of the Consortium of the EACH programme  
as Partner on behalf of

**University Claude Bernard Lyon 1 (UCBL)**

*Name of legal entity of the Partner of the Consortium of the EACH programme*

**Frédéric FLEURY**

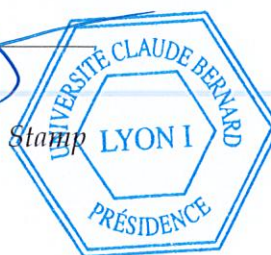
*Name of the authorised Representative*

**President**

*Function of authorised Representative*

Signature of authorised representative: \_\_\_\_\_

Date: 05/05/2021



**Authorised to sign for the Consortium Agreement of the Consortium of the EACH programme  
as Partner on behalf of**

**Åbo Akademi University (AAU)**

*Name of legal entity of the Partner of the Consortium of the EACH programme*

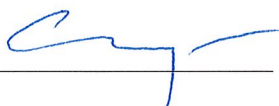
**Stefan Willför**

*Name of the authorised Representative*

**Vice-rector**

*Function of authorised Representative*

**Signature of authorised representative:** \_\_\_\_\_



**Date:** \_\_\_\_\_

6.5.2021



## Annex 1

**Authorised to sign for the Consortium Agreement of the Consortium of the EACH programme  
as Associated Partner on behalf of**

**<< Associated partner >>**

\_\_\_\_\_  
*Name of legal entity of the Associated Partner of the Consortium of the EACH programme*

**<< Name of representative >>**

\_\_\_\_\_  
*Name of the authorised Representative*

**<< Function of representative >>**

\_\_\_\_\_  
*Function of authorised Representative*

**Signature of authorised representative:** \_\_\_\_\_

**Date:** \_\_\_\_\_

*Stamp*

**Annex 2 - Sustainability Plan of the EACH Programme**

<b>Action/steps</b>	<b>Timeline</b>	<b>Partner responsible for leading the activity</b>
The consortium allocates study places where the studying students are exempted from paying tuition fee (details are specified in 10.2). These study places are added to those financed by EACEA.	Confirmation required before admitting the students for every study-year.	Every partner
Every partner makes substantial efforts to attract fee-paying student to the programme, as well as relevant bodies willing to offer scholarships for students to cover the participation costs.	Regular activity throughout the duration of the programme.	Every partner
Ensure alternative funding possibilities: regional (Auvergne Rhône-Alpes, Nordforsk, Nordplus, etc.) and Europe-wide programmes (e.g. Knowledge Alliances, KA).	All year round, first calls to be aimed for are in the year 2022 (KA).	UCBL
To introduce and constantly develop EACH programme communication and marketing strategy to be practiced by everyone involved with EACH (professors visiting conferences, universities top-management) and targeted to the different audiences of the programme.	Starting from 2020.	Every partner
Enlarge the network of internship providers.	Regular activity all year round.	Every partner
The EACH Fund will be continued, and will be used as described in 16.4.	Regular activity.	Every partner
The associated members from industry/laboratories will contribute financially (according to their possibilities) by paying salaries/stipends to students.	Regular activity.	Associated partners
After finishing the EU funding a different fee system will be implemented, with the main features as follows: Non-EU students pay 14000 EUR/programme and EU/EEA/CH students pay 7000 EUR/programme to the consortium. The consortium distributes the money to UT, UU, AAU and UCBL. The student selection to study tracks remains. Tuition-waivers are possible at some universities. The second-year universities will receive unequal fees for students, corresponding to their original fees: at UU 14500 EUR/year for non-EU students; at AAU 12000 EUR/year for non-EU students; UCBL 400 EUR/year for all students. Depending on the situation at the Partner universities, the numbers and principles formulated above might be subject to change when implemented in a new agreement.	After finishing the EU funding.	Every partner

**Annex 3**

**<<< This Annex is not public information >>>**

## Annex 4. Contents of the curriculum Excellence in Analytical Chemistry

1	<b>NAME OF CURRICULUM</b>	Excellence in Analytical Chemistry
2	<b>ACRONYM</b>	EACH
3	<b>EDUCATIONAL INSTITUTION(S)</b>	University of Tartu, Estonia (UT) Uppsala University, Sweden (UU) University Claude Bernard Lyon 1, France (UCBL) Åbo Akademi University, Finland (AAU)
4	<b>CURRICULUM TYPE</b>	Joint Master Programme
5	<b>LEVEL OF STUDY</b>	Master's studies
6	<b>CURRICULUM GROUP</b>	Physical sciences
7	<b>LANGUAGE(S) OF INSTRUCTION</b>	English
8	<b>OTHER LANGUAGES REQUIRED FOR ATTAINMENT OF THE LEARNING OUTCOMES</b>	Swedish, French or Estonian
9	<b>FORM OF STUDIES</b>	Regular studies
10	<b>NOMINAL PERIOD OF STUDY</b>	2 years
11	<b>AMOUNT OF CREDITS (ECTS)</b>	120
12	<b>QUALIFICATIONS GRANTED</b>	- Master of Science (Excellence in Analytical Chemistry) (UT) and one of the following (according to the assigned study track): - Master of Science (UU) - Master of Physical and Analytical Chemistry (Industrial Analysis) (UCBL) - Master of Science (Technology), (Master's programme in Excellence in Analytical Chemistry (EACH)) (AAU)
13	<b>DOCUMENTS ISSUED UPON GRADUATION</b>	Diploma with Diploma Supplement
14	<b>HIGHER EDUCATION INSTITUTION(S) ISSUING GRADUATION DOCUMENTS</b>	Tartu University Uppsala University University Claude Bernard Lyon Åbo Akademi University
15	<b>APPROVAL</b>	This agreement describes all aspects of the programme and by signing it all participating organisations agree with it.
16	<b>SPECIALISATION(S)</b>	Analytical chemistry
17	<b>VERSION OF CURRICULUM</b>	2020/2021
18	<b>PROGRAMME MANAGER</b>	Ivo Leito
19	<b>TERMS OF ADMISSION</b>	BA degree or equivalent qualification; - Prerequisites: at least 60 ECTS in chemistry or in industrial chemistry and 20 ECTS in mathematics or physics. More detailed admission requirements: <a href="https://each.ut.ee/EACH/admission-requirements/">https://each.ut.ee/EACH/admission-requirements/</a> .
20	<b>GOALS OF CURRICULUM</b>	The goal of the curriculum is to provide students with in-depth knowledge and practical skills in analytical chemistry to be qualified for research and development.
21	<b>BRIEF DESCRIPTION OF CURRICULUM STRUCTURE</b>	<p><b>I study year at the University of Tartu</b></p> <ol style="list-style-type: none"> <li>1. General analytical chemistry module (21 ECTS);</li> <li>2. Metrology and quality management module (9 ECTS);</li> <li>3. Socio-economic module (6 ECTS) and language module (6 ECTS);</li> <li>4. Internship (6 ECTS);</li> <li>5. Elective courses (9 ECTS);</li> <li>6. Optional courses (3 ECTS);</li> </ol> <p><b>II study year - spent in one of the partner universities:</b></p> <p><b>7. Specialisation module (30 ECTS):</b></p> <p><b>7.1. Uppsala University</b></p> <p>7.1.1. Organic and bioorganic analysis and multimodal separation techniques module (30 ECTS).</p> <p><b>7.2. University Claude Bernard Lyon 1</b></p> <p>7.2.1. Industrial analytical chemistry module (30 ECTS).</p> <p><b>7.3. Åbo Akademi University</b></p> <p>7.3.1. Electroanalysis module (30 ECTS);</p> <p>8. Master thesis (30 ECTS).</p>

22	<b>REQUIREMENTS FOR COMPLETION OF CURRICULUM</b>	Completion of the coursework as foreseen in the curriculum.
23	<b>LEARNING OUTCOMES OF CURRICULUM</b> (to be attained/developed/professional knowledge and skills, general competencies, etc.)	<p>Upon completion of the curriculum, the student:</p> <ol style="list-style-type: none"> <li>1) Has systematic understanding of the physical, chemical and metrological foundations of analytical chemistry; factors affecting analytical results; methods for calculating and presenting of results and evaluating their quality for the widespread chemical analysis methods.</li> <li>2) Has systematic understanding of laboratory quality systems (ISO 17025 and GLP), economic and legal aspects of chemical analysis and basic understanding of managing an analytical laboratory, including maintaining a quality management system.</li> <li>3) Has the basic skills to work with the widespread analysis and sample preparation techniques and to tune them according to specific analysis tasks; to optimize analysis procedures; to make data evaluation and sampling.</li> <li>4) Is able to define the problem, choose the methods, test them and determine their characteristics, assess their suitability for the task and apply corrective actions in one of the subfields of analytical chemistry: <ul style="list-style-type: none"> <li>- Separation science and organic analysis, including multimodal separation techniques and complex samples of biological importance;</li> <li>- Industrial analytical chemistry and process control;</li> <li>- Electroanalysis and electrochemical sensors, including their design, miniaturization and uses for different analytical tasks.</li> </ul> </li> <li>5) Has the knowledge and skills to evaluate the adequacy of chemical analysis results obtained either by him/herself or by others.</li> <li>6) Is able to apply his/her knowledge and skills for solving novel analytical chemistry problems, including in multidisciplinary context, having limited information and time.</li> <li>7) Is able to work in a team (including as team leader), manage streams of information, time and resources, present results both for experts and non-experts.</li> <li>8) Is able to speak Swedish; French or Estonian at least at A1 level.</li> </ol>
24	<b>MODULES</b>	
	<b>General analytical chemistry module (21 ECTS)</b>	
	<b>GOALS OF MODULE:</b>	To provide the basic knowledge and skills in analytical chemistry.
	<b>LEARNING OUTCOMES OF MODULE</b> (to be attained/developed/professional knowledge and skills, general competencies, etc.)	<p>Upon completion of the module, the student:</p> <ol style="list-style-type: none"> <li>1) Has systematic understanding of analytical chemistry, its main concepts, methods of analysis and their characteristics</li> <li>2) Knows the physical and chemical background of the common chemical analysis techniques and is able to apply them in practice;</li> <li>3) Knows and is able to apply mathematical methods for treatment of measurement data and is able to present measurement results correctly;</li> <li>4) Knows the specialisation related terminology and will be capable of explaining and defending the results of his/her research in an academic discussion;</li> <li>5) Will be able to solve the problems of analytical chemistry in teamwork.</li> </ol>
	<b>MODULE COURSES AND PRINCIPLES OF CHOOSING THEM BY STUDENTS</b>	<i>Principles of module selection: Obligatory for all students studying in the programme.</i> LOKT.06.050 Master seminar in measurement science I (6 ECTS) LOFY.01.039 Measurement data processing (3 ECTS) LOKT.06.032 Practical chemical analysis (6 ECTS) LOKT.06.033 Practical works in chemical analysis and metrology (6 ECTS)
	<b>Metrology and quality management module (9 ECTS)</b>	
	<b>GOALS OF MODULE:</b>	The goal of the module is to provide knowledge and skills on metrology and its application in analytical chemistry and on the quality assurance of measurements and analysis.
	<b>LEARNING OUTCOMES OF MODULE</b> (to be attained/developed/professional knowledge and skills, general competencies, etc.)	<p>Upon completion of the module, the student:</p> <ol style="list-style-type: none"> <li>1) Has the knowledge of the main metrological concepts (traceability, measurement uncertainty) and approaches (validation of analysis procedures, reference materials, interlaboratory comparisons) relevant to chemical analysis;</li> <li>2) Has the knowledge and skills for ensuring and assessing the reliability of analysis results and expressing them correctly;</li> <li>3) Knows the main principles of quality management and the main quality management systems in laboratories (ISO 17025 and GLP) and is capable of following these requirements.</li> </ol>
	<b>MODULE COURSES AND PRINCIPLES OF CHOOSING THEM BY STUDENTS</b>	<i>Principles of module selection: Obligatory for all students studying in the programme.</i> LOKT.06.030 Metrology in Chemistry (6 ECTS) LTKT.06.015 Quality Systems (3 ECTS)
	<b>Socio-economical module (6 ECTS) and language module (6 ECTS)</b>	
	<b>GOALS OF MODULE:</b>	To provide socio-economical knowledge of analytical chemistry and language skills at level A1 in one of the following: Swedish; French or Estonian.
	<b>LEARNING OUTCOMES OF MODULE</b> (to be attained/developed/professional knowledge and skills, general competencies, etc.)	<p>Upon completion of the module, the student:</p> <ol style="list-style-type: none"> <li>1) Understands the socio-economic impact of analytical chemistry, both at micro- and macro-economy level; understands the economics of functioning of an analytical laboratory;</li> <li>2) Is able to communicate results of chemical analysis to a non-specialist audience;</li> </ol>

knowledge and skills, general competencies, etc.)	3) Is able to communicate, at the level A1, in one of the three languages spoken in partner universities (Swedish, French or Estonian).																												
<b>MODULE COURSES AND PRINCIPLES OF CHOOSING THEM BY STUDENTS</b>	<p><i>Principles of module selection: The student has to choose at least two out of the three courses - LOKT.04.072, LOKT.06.034 or MJRI.10.037 - and one a foreign language course.</i></p> <p><i>Some of the electives of the first study-year are preparatory courses for specific study tracks and are therefore highly recommended for students assigned to the respective study track (specified in column "Preferred study track(s)" below).</i></p> <p><i>At UU the Swedish language course will be counted as extra credits.</i></p> <table border="1"> <thead> <tr> <th>Course</th><th>Preferred study track(s)</th></tr> </thead> <tbody> <tr> <td>LTKT.06.011 Economic Aspects of Measurements (3 ECTS)</td><td>UU, UCBL, AAU</td></tr> <tr> <td>LOKT.04.072 Environment and Measurement (3 ECTS)</td><td>UU, AAU</td></tr> <tr> <td>LOKT.06.034 Measurements and the Law (3 ECTS)</td><td>UU, UCBL, AAU</td></tr> <tr> <td>HVLC.03.006 French for Beginners I on the Basis of English, Level 0 &gt; A1.1 (6 ECTS)</td><td>UCBL</td></tr> <tr> <td>HVLC.06.010 Swedish for Beginners I (on the Basis of English), Level 0 &gt; A1.2 (6 ECTS).</td><td>AAU, UU (extra credits at UU*)</td></tr> <tr> <td>FLLC.09.001 Estonian for Beginners I, on the Basis of English, Level 0 &gt; A1.1 (6 ECTS)</td><td></td></tr> </tbody> </table> <p><i>* Students assigned to the UU study track must note that the HVLC.06.010 course will not be counted towards the master's degree at UU. Therefore, in addition to this course, these students have to choose another foreign language course (e.g., HVLC.03.006, FLLC.09.001, etc.).</i></p>	Course	Preferred study track(s)	LTKT.06.011 Economic Aspects of Measurements (3 ECTS)	UU, UCBL, AAU	LOKT.04.072 Environment and Measurement (3 ECTS)	UU, AAU	LOKT.06.034 Measurements and the Law (3 ECTS)	UU, UCBL, AAU	HVLC.03.006 French for Beginners I on the Basis of English, Level 0 > A1.1 (6 ECTS)	UCBL	HVLC.06.010 Swedish for Beginners I (on the Basis of English), Level 0 > A1.2 (6 ECTS).	AAU, UU (extra credits at UU*)	FLLC.09.001 Estonian for Beginners I, on the Basis of English, Level 0 > A1.1 (6 ECTS)															
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<b>Internship (6 ECTS)</b>																													
<b>GOALS OF MODULE:</b>	Student acquires understanding of the analytical chemistry issues in a professional environment at industry, research institution or a professional laboratory as well as the knowledge and skills for performing certain tasks in that professional environment.																												
<b>LEARNING OUTCOMES OF MODULE</b> (to be attained/developed/professional knowledge and skills, general competencies, etc.)	<p>Upon completion of the module, the student:</p> <ol style="list-style-type: none"> <li>1) Has understanding of the analytical chemistry issues in a professional environment at industry, research institution or a professional laboratory;</li> <li>2) Has the knowledge and skills for performing certain tasks in professional environment and use the lab equipment;</li> <li>3) Understand the quality norms and standards practiced in a particular field;</li> <li>4) Has experienced working in teams and in professional non-educational setting.</li> </ol>																												
<b>MODULE COURSES AND PRINCIPLES OF CHOOSING THEM BY STUDENTS</b>	<p><i>Principles of module selection: Obligatory for all students studying in the programme.</i></p> <p>LOKT.00.023 Practical Speciality Training (6 ECTS)</p>																												
<b>Elective courses (9 ECTS)</b>																													
<b>GOALS OF MODULE:</b>	The objective of the module is to enhance students' knowledge in analytical chemistry according to their liking and interests.																												
<b>LEARNING OUTCOMES OF MODULE</b> (to be attained/developed/professional knowledge and skills, general competencies, etc.)	Upon completion of the module, the student has acquired further knowledge and skills in analytical chemistry.																												
<b>MODULE COURSES AND PRINCIPLES OF CHOOSING THEM BY STUDENTS</b>	<p><i>Principles of module selection: The student compiles the elective module independently keeping in mind the II year specialisation and the recommendations of the Programme Director.</i></p> <p><i>Some of the electives of the first study-year are preparatory courses for specific study tracks and are therefore highly recommended or obligatory for students assigned to the respective study track (specified in column "Preferred study track(s)" below).</i></p> <table border="1"> <thead> <tr> <th>Course</th><th>Preferred study track(s)</th></tr> </thead> <tbody> <tr> <td>LTKT.02.007 Applied Electrochemistry (3 ECTS)</td><td>AAU</td></tr> <tr> <td>LOKT.06.047 Atomic Spectroscopy (3 ECTS)</td><td>UU, UCBL, AAU</td></tr> <tr> <td>LTKT.06.009 Chemical Analysis Lab for Beginners (3 ECTS)</td><td>UU, UCBL, AAU</td></tr> <tr> <td>LOKT.08.005 Chemometrics (6 ECTS)</td><td>UCBL</td></tr> <tr> <td>LTKT.06.014 Estimation of Measurement Uncertainty in Chemical Analysis (1 ECTS)</td><td>UU, UCBL, AAU</td></tr> <tr> <td>LOKT.06.061 Introduction to Electroanalysis (3 ECTS)</td><td>AAU (obligatory)</td></tr> <tr> <td>LTKT.06.016 Introduction to Forensic Analysis (1 ECTS)</td><td></td></tr> <tr> <td>LOKT.06.064 LC-MS Methods Validation (2 ECTS)</td><td>UU, AAU</td></tr> <tr> <td>LOKT.06.016 Liquid Chromatography and Mass Spectrometry (6 ECTS);</td><td>UU (obligatory), AAU</td></tr> <tr> <td>LTKT.06.013 Measurement Science in Chemistry Summer School (6 ECTS)</td><td></td></tr> <tr> <td>LOKT.10.017 Measurements in Biochemistry (3 ECTS)</td><td>UU</td></tr> <tr> <td>LOFY.01.036 Measuring and Instrumentation (3 ECTS)</td><td>UU, UCBL, AAU</td></tr> <tr> <td>LOFY.01.037 Modern Metrology (3 ECTS)</td><td>UU</td></tr> </tbody> </table>	Course	Preferred study track(s)	LTKT.02.007 Applied Electrochemistry (3 ECTS)	AAU	LOKT.06.047 Atomic Spectroscopy (3 ECTS)	UU, UCBL, AAU	LTKT.06.009 Chemical Analysis Lab for Beginners (3 ECTS)	UU, UCBL, AAU	LOKT.08.005 Chemometrics (6 ECTS)	UCBL	LTKT.06.014 Estimation of Measurement Uncertainty in Chemical Analysis (1 ECTS)	UU, UCBL, AAU	LOKT.06.061 Introduction to Electroanalysis (3 ECTS)	AAU (obligatory)	LTKT.06.016 Introduction to Forensic Analysis (1 ECTS)		LOKT.06.064 LC-MS Methods Validation (2 ECTS)	UU, AAU	LOKT.06.016 Liquid Chromatography and Mass Spectrometry (6 ECTS);	UU (obligatory), AAU	LTKT.06.013 Measurement Science in Chemistry Summer School (6 ECTS)		LOKT.10.017 Measurements in Biochemistry (3 ECTS)	UU	LOFY.01.036 Measuring and Instrumentation (3 ECTS)	UU, UCBL, AAU	LOFY.01.037 Modern Metrology (3 ECTS)	UU
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LOKT.06.064 LC-MS Methods Validation (2 ECTS)	UU, AAU																												
LOKT.06.016 Liquid Chromatography and Mass Spectrometry (6 ECTS);	UU (obligatory), AAU																												
LTKT.06.013 Measurement Science in Chemistry Summer School (6 ECTS)																													
LOKT.10.017 Measurements in Biochemistry (3 ECTS)	UU																												
LOFY.01.036 Measuring and Instrumentation (3 ECTS)	UU, UCBL, AAU																												
LOFY.01.037 Modern Metrology (3 ECTS)	UU																												



	LOFY.01.040 Practical Works on Physical Measurement and Calibration (3 ECTS)	UU
	LTKT.06.012 Principles and Applications of Fluorescence Spectroscopy (3 ECTS)	UCBL
	LOFY.02.028 Sensors and Sensor Materials (3 ECTS)	AAU
	LOKT.09.022 Structural Analysis I (3 ECTS)	UU
Optional subjects (3 ECTS)		
GOALS OF MODULE:	The goal of the module is to learn in accordance with interests and further studies or career.	
LEARNING OUTCOMES OF MODULE (to be attained/developed/professional knowledge and skills, general competencies, etc.)	Upon completion of the module, the student has acquired knowledge in the areas studied.	
MODULE COURSES AND PRINCIPLES OF CHOOSING THEM BY STUDENTS	Principles of module selection: Any courses taught at the University of Tartu or other HEIs that comply with the degree requirements of the involved partner universities	
Specialisation module (30 ECTS)		
GOALS OF MODULE:	During the second academic year, the student studies at one of the following partner universities and specializes in the field of analytical chemistry within the competence of the specific university (the second-year university is assigned during the winter school that takes place between the first and second semesters): UU: Organic and bioorganic analysis and multimodal separation techniques - focuses on the analysis of organic, biochemical and biomedical samples with different separation methods and mass spectrometry; UCBL: Industrial analytical chemistry module - focuses on analytical chemistry applications in industry, and monitoring and controlling of industrial processes; AAU: Electroanalysis module - focuses on electroanalytical chemistry, and the applications and development of chemical sensors (incl. miniaturization). In addition to specialization, the student acquires at least basic knowledge of the local language according to the chosen module (Swedish: UU and AAU, and French: UCBL).	
Specialisation module in Uppsala (30 ECTS)		
GOALS OF MODULE:	The student acquires in-depth theoretical knowledge and practical skills in organic and bioorganic analysis and multimodal separation methods.	
LEARNING OUTCOMES OF MODULE (to be attained/developed/professional knowledge and skills, general competencies, etc.)	Student who has completed the module: 1) will learn and understand the fundamentals of proteomic and metabolomic approaches in complex biological samples; 2) is familiar with the chemical and physical aspects of separation methods (liquid and gas chromatography and capillary electrophoresis), optimization, detection methods, and can predict how changes in experimental conditions affect the operation of these methods; 3) is familiar with the construction of chromatography, capillary electrophoresis, and mass spectrometry instrumentation; 4) knows what type of information can be obtained from chromatograms, electropherograms and mass spectra, and is capable of interpreting and processing chromatograms and mass spectra; 5) is capable of choosing the suitable method (both, for analysis and detection) for analysis according to the properties of the analytes and matrices, and can justify their choice; 6) is able to plan and perform validation of methodologies and determine the characteristics of the methodology; 7) is able to plan and carry out both qualitative and quantitative analysis with different samples, incl. biological samples.	
MODULE COURSES AND PRINCIPLES OF CHOOSING THEM BY STUDENTS	Principles of module selection: Obligatory for all students studying in the study-track. 1KB154 Applied Analysis of Complex Samples (15 ECTS); 1KB159 Advanced Mass Spectrometry (15 ECTS)	
Specialisation module at University C.B. Lyon 1 (30 ECTS)		
GOALS OF MODULE:	The student acquires the knowledge and skills of all critical parts of industrial analysis that are related to the application of analytical equipment at industrial plants.	
LEARNING OUTCOMES OF MODULE (to be attained/developed/professional knowledge and skills, general competencies, etc.)	Student who has completed the module: 1) is familiar with the principles of sampling during industrial analysis, knows the main approaches and constraints of it; 2) is familiar with the construction and characteristics of analytical instruments suitable for industrial analysis, and is capable of installing and using such equipment; 3) is familiar with experimental planning and data analysis, and knows the principles and tools of industrial IT and automation and is able to apply them; 4) is familiar with analytical strategies used in industry and can apply them; 5) is able to choose and implement a suitable industrial analysis and data processing system that takes into account all the limitations of the specific industrial production.	

	<b>MODULE COURSES AND PRINCIPLES OF CHOOSING THEM BY STUDENTS</b>	<i>Principles of module selection: Obligatory for all students studying in the study-track.</i>
		CHM2303M Sampling on an industrial plant (6 ECTS)
		CHM2209M Instrumentation for industrial analysis (6 ECTS)
		GEP2264M Industrial IT and Automation (3 ECTS)
		CHM2304M Industrial measurement strategy (3 ECTS)
		CHM2060 Data Analysis (3 ECTS)
		CHM1045 Experimental design (3 ECTS)
		CHM2070 Communication and Management (6 ECTS).
	<b>Specialisation module at Åbo Akademi University (30 ECTS)</b>	
	<b>GOALS OF MODULE:</b>	The student acquires theoretical knowledge and practical skills about electrochemical analysis and chemical sensors.
	<b>LEARNING OUTCOMES OF MODULE</b> (to be attained/developed/professional knowledge and skills, general competencies, etc.)	Student who has completed the module: 1) knows the most common electrochemical analysis methods, and the capabilities and limitations of them, and can apply these methods to solve different tasks; 2) is able to define an analysis problem and choose a suitable method for solving it; 3) knows the principles of constructing electrochemical sensors and is familiar with the materials used for building them, can test and characterise the sensors, knows the principles of miniaturization of sensors; 4) knows the measurement strategies and data processing capabilities based on sensors, and is able to implement them.
	<b>MODULE COURSES AND PRINCIPLES OF CHOOSING THEM BY STUDENTS</b>	<i>Principles of module selection: Courses 410304.0, AK00BL19, 909970.0, and KE00CG27 are obligatory for all students studying in the study-track. In addition, 10 ECTS among elective courses must be chosen. The elective courses are in italics.</i>
		410304.0 Applied electrochemistry (5ECTS)
		AK00BL19 Chemical sensors and biosensors (5 ECTS)
		909970.0 Swedish as foreign language (5 ECTS)
		KE00CG27 Special project in analytical chemistry (5 ECTS)
		<i>KE00CD66 Applied analytical chemistry (5 ECTS)</i>
		<i>KEMI6429 Bioanalytical techniques (5 ECTS)</i>
		<i>KEMI6513 Functional materials (5 ECTS)</i>
	<b>Masters' thesis (30 ECTS)</b>	
	<b>GOALS OF MODULE:</b>	Student develops practical skills in planning, executing and reporting of scientific research in the field of analytical chemistry.
	<b>LEARNING OUTCOMES OF MODULE</b> (to be attained/developed/professional knowledge and skills, general competencies, etc.)	Upon completion of the module, the student: 1) Is intimately familiar with one specific field of analytical chemistry and can formulate the arguments/statements to be presented at defence. 2) Is able to pose and critically analyse the arguments presented in field-specific sources and to argue and justify his/her positions; 3) Knows the general principle of research ethics and can evaluate the scientific level of the research and its degree of application linked to particular area of research; 4) Can structure and deliver a public presentation and participate in academic discussions; 5) Knows the principles and requirements for scientific work and can formulate their work results accordingly.
	<b>MODULE COURSES AND PRINCIPLES OF CHOOSING THEM BY STUDENTS</b>	<i>Principles of module selection: Obligatory for all students.</i>
		<i>One of the following courses at the second-year university (depending on the assigned study track):</i>
		UU: 1KB052 Degree Project E in Chemistry (30 ECTS )
		UCBL: Master's thesis in Analytical Chemistry (30 ECTS)
		AAU: AK00BD96 Master's thesis in Analytical Chemistry (30 ECTS)
	<i>At UT, one of the above mentioned courses will be transferred as: LOKT.00.002 Master's Thesis (30 ECTS)</i>	