

CHEM Course Feedback Form

Course: CHEM-E1160 Biomass Pretreatment and Fractionation - in Laboratory, spring 2019; number of students: 10. All of the students passed the course.

Reporter and date: Kyösti Ruuttunen (KR), August 27th, 2019.

Teaching and learning methods: Lectures, workshops, laboratory exercise. Dr. Jaana Suviniity from Aalto Design Factory (ADF) cooperated in planning, and partially executing, the teaching. Some parts of the teaching were carried out at ADF. In the beginning, course's theme was presented to the students: Utilising waste- or side-streams of the industry as raw materials. Two teams (5 students/team), one working with sawdust and the other with corrugated cardboard as a raw material, were formed, and subsequently "hired" to work as specialists for an imaginary company. Firstly, the students studied what kind of possibilities the company would have around the raw materials, and secondly they had to plan a production scheme according which they would be able to produce value-added bioproducts. Alkaline pulping (kraft/soda), with some possible modifications, could be used as the fractionation method. The laboratory experiments were carried out by methods and equipment available at the Department (air-bath digester, kappa number & viscosity determination, ClO₂ and peroxide bleaching etc.), instructed by KR and Ph.D. students. The student teams reported their results in many different ways, both orally and in written form. In addition, the students gave feedback on each other's work with the *I like, I wish* method developed at ADF.

Assessment methods: The student teams produced various written documents during the course: Project and Production Plan, Laboratory Report, and Project Report. These accounted for 20%, 40%, and 40%, respectively, of the final grade. The students carried out self and peer evaluation of the team members' input in the team work and based on this, a personal coefficient was calculated for each student. The coefficient's impact on the student's personal grade was limited to ± 1 grade point.

Feedback summary: Feedback was collected both by group discussion (10 replies) with the students and by the standard electronic survey (7 replies; Webropol). Summary on the positive aspects mentioned by the students: very kind instructors (n=7); working in the lab (5) course format: project work and independent planning (n=5); good atmosphere and helpful discussions was also mentioned.

The average values of the numerical data in the Webropol survey is displayed in Table 1.

Table 1. Average values of the numerical feedback given by the students in 2019 and 2018. The column "Min.-Max." indicates the deviation. Number of respondents: n=7 (2019); n=8 (2018).

	Aver. 2019	Min.-Max.	Aver. 2018	Min.-Max.
1. Overall assessment	4.14	4-5	3.88	2-5
2. Teaching methods	4.71	4-5	3.88	2-5
3. I am pleased with my study effort	5.00	5	4.00	2-5
4. Workload compared to other courses	4.14	3-5	4.00	2-5
5. Correspondence to the description	4.43	4-5	3.75	2-5
6. Effect on the study motivation	4.14	3-5	3.25	1-5
7. Difficulty compared to other courses	3.83	3-4 ^(*)	3.25	2-5
8. The course enhanced my general skills	4.67 ^(†)	4-5	4.25	3-5

^(*)One respondent chose E=Not applicable.

^(†)n=6

Summary on the things to develop according to the students: clearer communication and planning of the schedule (5); too heavy workload, especially with the reports (5); clearer instructions for the lab (3).

Development actions for next year: Although the student feedback was very positive, I will develop some aspects of the course next year. Especially I will improve planning of the lab work schedule and communicate it more clearly to the students. In addition, I will take care that the workload will stay reasonable; this year the lab projects proved to be more laborious than I originally expected.

General feedback from the teacher: I enjoyed the course very much: most of the teaching methods (also the more “experimental” ones) were working very well and received positive student feedback. The student groups were excellent: all the members were extremely active and motivated throughout the course, which made the teaching a very pleasant experience. The students’ high level of motivation is also seen in the feedback; especially I was happy with the very high numerical averages in the Webropol survey – it is also very positive that an improvement from last year is clearly visible.