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Teacher's Feedback: CHEM-E1150 Biomass Pretreatment and Fractionation - in Class

Course facts: 5 cr; periods III-IV (2022); teachers: Kyösti Ruuttunen (responsible teacher, lectures), Kaarlo Nieminen (MATLAB exercises); number of students: 25 (18 students in total passed the course, 72%); grades: 1-5 (average passing grade 2.3)
MyCourses: https://mycourses.aalto.fi/course/view.php?id=31927

Teaching and learning methods: Lectures, independent studying, MATLAB simulation exercises (group activity), and course exam or a literature essay on a given topic. Due to the pandemic situation, practically the whole course was carried out online (Zoom). The course includes theoretical teaching on the biomass availability and structure, as well as the technology and chemistry of industrial processes for chemical modification of biomass for manufacture of value-added products. The lectures also cover description of the pretreatment processes for the feedstock; in Finnish context the emphasis is on northern hardwood and softwood species. The MATLAB section of the course also included a couple of introductory online lectures as well as written material for independent study. Details on the course contents can be found in MC (click the link above).

Assessment methods: Standard grading was used (passing grades 1-5). The maximum points to be earned was 100, containing the exam or essay points (max. 80 p) and the MATLAB group exercise points (max. 20). Minimum 40 points were required for obtaining the lowest passing grade (1). The exam was organised electronically as a MyCourses (MC) quiz through the Exam e-examination system in the exam rooms on campus. Since some students were not able to come to Otaniemi to attend the exam, an option to write a literature assignment on a given topic was provided. The submission of the essay was realised in MC through Turnitin originality check online software.

Feedback summary: Feedback was collected with the standard electronic survey (Webropol) – see Table 1 for a summary of the results.

Table 1. Summary of the student feedback from the electronic (Webropol) survey. The figures are averages from the students' responses. The deviation of the answers is described presenting the range of the given responses (the column titled Min.-Max.). The number of respondents (n) was 6 (24% of the participants).

	Average 2022	Min.-Max.
1. Overall assessment	3.33	2-5
2. Teaching methods	3.33	2-4
3. I am pleased with my study effort	3.67	2-5
4. Workload compared to other courses	3.50	3-5
5. Correspondence to the description	4.00	3-5
6. Effect on the study motivation	3.00	2, 5
7. Difficulty compared to other courses	3.83	3-5
8. The course enhanced my general skills	2.83	2-4

The numerical averages of the students' feedback are very good, but of course the response rate was not impressive (only 24%). However, this is a good starting point for developing the course. In the open questions, the students' answers concentrated on describing the materials and the general contents of the lectures and the simulation exercise. The lecture slides were seen partially confusing, although in general the contents were acknowledged to cover wide range of essential topics. Constructive and helpful feedback was given also for the MATLAB assignment. The professors were commented to be "very helpful, showing real concern with the students' learning" – thanks!

Development actions for next year: Right now, I see as the biggest development point the MATLAB assignment, and especially the way how the group work is instructed and realised. In my mind we should make real teamwork happen instead of giving the students the opportunity to divide the work into equal pieces and then putting the pieces together the night before the deadline. In the current scheme, there is a list of eight exercises from which each group selects four ones. (No restriction in several groups doing the same exercise.) Because the groups also typically have four members it suggests itself to the groups to split the exercises. Hence, one approach for preventing the fragmentation of the groups could require the development of new, more extensive exercises, of which each group would select only one.

Next year, I would like to give most of the teaching as contact sessions. Some of the sessions can be arranged in the remote mode, of course, especially if that suits better for the visiting lecturers. In my mind, the rather poor grades from this year's examination show that purely remote teaching does not provide the best learning results. However, the teaching mode will of course depend on the pandemic situation in the future, but I do hope that we will not see too many restrictions due to this in the future. Hybrid lectures (*i.e.* enabling participation either live in the lecture hall or remotely at the same time) are not an option in my mind, because realising teaching sessions successfully in that manner requires resources, which I feel I do not have.

More work should be put into aligning the different courses of this major so that overlapping topics are avoided and that they form a coherent entity. Also, I want to define the used studying materials in a better manner for this course. The most important material could be the ForestBioFacts online learning environment. I tried to do this already this year, but I am sure not how well I was able to communicate the most important materials to the students – from the exam results it seems that I was not successful.

I would like to organise the exam also in the future as an electronic one. The Exam system provides flexibility to both the students and the teacher, and grading the exams is easy because MC quizzes can be used. Based on the feedback collected during the course exam, the students found the electronic examination system easy to use and appreciated the fact that they could choose the exact time when to take the exam.

General feedback from the teacher: This year was the first time I was responsible for this course. In general, I am happy about the result. I am not currently 100% sure if I will be the responsible teacher of the course also next year. I hope I will, so that I can go on developing the course and trying to provide the students excellent learning experiences.