

Course analysis for course ML2300 Sustainable Production

Period: Period 1 2019.

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Examining moments:

- INL1 (A-F, 3 hp).
- ÖVN1 (P/F, 3 hp).
- TEN1 (A-F, 3 hp).

1. Description of the course evaluation process

The course was evaluated in two ways. First an online Mentimeter based evaluation was performed on the last day in course, second a LEQ was performed by the students. The Mentimeter evaluation was done at the last class, before the written exam (TEN), and the LEQ was conducted after the exam. Generally the online feedback worked very well and gave the opportunity of anonymous feedback from 100% of the students. The LEQ gave a low response rate.

2. Statement of meetings held with students

A physical meeting was held with the student representative at the start of P2, discussing P1 courses in the master's programme.

3. Course structure

The course has six learning objectives:

1. *Describe how the different subject areas production management, production logistics and industrial operational reliability relate to sustainable production development.*
2. *Account for motives, driving forces and obstacles for sustainable production.*
3. *Explain and analyse the sustainable production system where environmental aspects and other sustainability aspects have connections to the system components and relations.*
4. *Evaluate, analyse and compare alternatives for development of production, considering economic, environmental and social sustainability, based on established methods and tools.*
5. *Relate a sustainable production to sustainability aspects regarding product supply chains and transport.*

6. *Discuss the role of production for an increased life-cycle perspective and circular material and energy flows.*

To assess the achievement of these learning objectives, three assessment moments have been set in the course. These are:

INL1 (A-F, 3 hp). Group assignment. Case based continuous in course with written hand-in.

ÖVN1 (P/F, 3 hp). Three exercises. Literature based seminar tasks in 3 sessions focusing Production management, Production logistics and Sustainability.

TEN1 (A-F, 3 hp). Written final exam to assess theoretical understanding.

The relationship of the ILOs and the assessment moments are given in the matrix below.

<i>ILOs</i>	<i>INL1</i>	<i>TEN1</i>	<i>ÖVN1</i>
ILO1		X	X
ILO2		X	
ILO3	X		
ILO4	X		
ILO5		X	X
ILO6		X	X

Final grading has been set to be a combination of INL1 and TEN1 as shown in the table below with the condition that pass grade is achieved in ÖVN1.

<i>INL1 (5hp)</i>	<i>TEN1 (4hp)</i>				
	A	B	C	D	E
A	A	A	B	C	D
B	B	B	B	C	D
C	B	C	C	C	D
D	C	C	D	D	E
E	D	D	D	E	E

4. Students' work effort time in relation to points

The extent of students work are estimated to corresponds to the course's points (40 hours / 1.5 credits)? This is also verified by the statements in the course evaluations, indicating a work load of some 24-46 hours a week.

5. Students' results

All the 13 students have secured pass grade on the ÖVN1.

In INL1 8 scored B, and 4 scored C and one student without grade (did not fulfil).

In TEN1 twelve of the 13 students scored passing grades and one Fx, in the following respective distribution from A to E: 2, 2, 4, 2, 2; One Fx was registered, and that student completed additional assignment, ending up in an E.

Final grades scored by students are: 2 A's, 4 B's, 4 C's, 1 D in the pass range. One student completed additional assignment for the Fx, ending up in E. One did not have a final grade due to not handed in INL1.

As this is the first time the course has been run, no comparison is available as to changes in student's results.

6. Answers to open questions

The general view of the course is positive. It was deemed well organised, knowledgeable teachers and relevant content. The responses on all the LEQ statements scored between 6 and 7 on a 7 grade scale.

7. Summary of students' opinions

The student course evaluation has been run as live Menti.com anonymous quiz with the student representative running the questions. This way it was possible to achieve very high rate of response (100%).

The LEQ however did only have a response rate of 23% (3 out of 13).

As a note, the students composed of some coming from programmes in HPU and others internationally. This meant that their awareness and engagement in similar activities before joining this program could be different.

Overall, these are the key things the responses indicated as positive:

- The students found most of the several formats of teaching and engagements as educative
- The amount of the activities (2 study visits, lectures, 3 guest lecture) was mostly regarded as just right. Some students asked for some more study visits.
- Regarding project work, students mostly felt that it was relevant, helped them to achieve ILOs, and they felt they got enough help.
- The topics were diverse and fun as well as promoting critical thinking as well as encouraging discussions.
- Good connection to industry and industrially relevant knowledge.
- Active engagement and availability from teachers to help when needed.

Things that could be improved considering students' evaluations include:

- Explanation of the project task
- While the information for the course was perceived as structured and clear, it could be further improved
- Provide even more engaging projects that do not necessarily be graded.

8. Overall impression

After the students have completed the answers to the survey, they had a chance to reflect upon the summarised results. It appears that there were clear areas of improvement as it is the first time the course was delivered, however, they overall seem to have enjoyed the experience.

9. Analysis

Some key issues of consideration for future development include the following:

At program level

- Try to coordinate among teachers to perceive and plan for more or less smooth student load over the period
- Note: This comment has already been considered in running course in P2

At course level

Include content such as LCA and related practical examples of environmental impact estimation. This relates to the lower scores on if the students achieved the ILOs, where ILO4 was estimated to be least fulfilled.

- The course may need additional time to cover and cope with the vast topics
- How to balance the exposure differences between students from students with Bachelor from HPU versus students from other backgrounds that have limited exposure to some basic topics
 - This could be an opportunity to introduce flipped structured for basic topics to bring most students *to similar level*.

Other issues (miscellaneous)

- Mixed views were observed on the number of industry visits and guest lectures. While most felt it was right amount there were exceptions that wanted more and less.
 - While differences are appreciated it is probably fair to keep the same proportion in the next round with possibly advancing focus areas.
- How to balance workload over the weeks and further improve communication
 - As already mentioned preparatory work placement and coordinating between parallel-running courses is a good solution. Specifically for the course, it is important to clearly set pre-readings, activities and project tasks so that students could plan and redistribute their own workload.
 - Grading criteria could be further elaborated to make it much more transparent than it already was.

As a last remark, the cohort was a very nice mix of diverse academic backgrounds. It has been a very lively experience with active discussions and different opinions. We hope the students keep up the engaging spirit and their active role to improve the program as it progress in the upcoming periods as well.

10. Priority course development

Following aspects of the course should be developed in the first place:

- Further clarify the project assignment (INL1).

- Possibly include even more material relating to ILO4 (*Evaluate, analyse and compare alternatives for development of production, considering economic, environmental and social sustainability, based on established methods and tools*) to be included in the project assignment (INL1)
- Communicate the workload for parallel courses in period 1. Show awareness of other course deliverables and timelines.

11. Other information