

**Course analysis for course
ML2305 Production logistics and Supply chains**

Period: Period 2 2022.

Course responsible: Masoud Zafarzadeh

Examiner: Magnus Wiktorsson

Teachers in course: Magnus Wiktorsson, Masoud Zafarzadeh, Wajid Ali Khilji, Tarun Kumar Agrawal (guest lecturer, Chalmers), Jan Olhager (Guest Lecturer, Lund University); Johan Wilhelmsson (Guest Lecturer, SSAB) and Patrik Johansson (Guest Lecturer, Scania)

Examining moments:

- PRO1 - Project work, 3.0 credits, Grading scale: A, B, C, D, E, FX, F
- TEN1 - Written exam, 3.0 credits, Grading scale: A, B, C, D, E, FX, F

1. Description of the course evaluation process

The course was evaluated in two ways: (1) an online Mentimeter based evaluation was performed on the last day in course, (2) a LEQ was performed by the students. The Mentimeter evaluation was done just before the final presentation for PRO1, 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 83% of the students (15/18). The LEQ gave a response rate of 39% (7/18 responses).

2. Statement of meetings held with students

A physical meeting was held with the student representative at the start of P2, discussing P2 courses in the master's programme, including ML2305. The course was also discussed in program council in May 2023.

3. Course content

3.1 Intended learning outcomes

After passing the course, the students should be able to:

- Define production logistics and supply chain management and categorise the different elements in a supply chain by applying an established framework.
- Describe, analyse and compare different transport systems and warehouse logistics systems, their components and underlying technologies for internal and external material flows.
- Explain how and under which requirements an increased digitisation and various IT systems can facilitate a transparent and seamless information flow in production logistics or in a supply chain.

- Identify and analyse interplay and information sharing in different parts of the production logistics, between different units in an organisation and between companies in a supply chain for physical products.
- Analyse the needs of a producing company, regarding its internal and external logistics systems from environmental, social and economical perspectives and set together possible solution proposals.

3.2 Examination and finalizing the course

- **Grading scale**

A, B, C, D, E, FX, F

- **Examination**

PRO1 - Project work, 3.0 credits, Grading scale: A, B, C, D, E, FX, F

TEN1 – Online exam, 3.0 credits, Grading scale: A, B, C, D, E, FX, F

	ILOS	PRO1 (3,0)	TEN1 (3,0)
ILO1	Define production logistics and supply chain management and categorise the different elements in a supply chain by applying an established framework.		X
ILO2	Describe, analyse and compare different transport systems and warehouse logistics systems, their components and underlying technologies for internal and external material flows.		X
ILO3	Explain how and under which requirements an increased digitization and various IT systems can facilitate a transparent and seamless information flow in production logistics or in a supply chain.		X
ILO4	Identify and analyse interplay and information sharing in different parts of the production logistics, between different units in an organization and between companies in a supply chain for physical products.	X	X
ILO5	Analyse the needs of a producing company, regarding its internal and external logistics systems from sustainability perspectives and set together possible solution proposals.	X	

- **PRO1 – Projektarbete, 3.0, betygsskala: A, B, C, D, E, FX, F**

Group work, Case based. Continuous in the course. Written report and oral presentation.

The purpose of the project is to understand, analyze and experimentally validate the functioning of various production logistics and supply chain technologies/systems. Students are provided with a topic (concerning one technology/system) and they have to conduct experiments in KTH/Scania Smart Factory Lab. During the experimentation, they have to identify and analyze interplay and information sharing in different parts of the production logistics, between different units in an organization and between companies in a supply chain for physical products. This task shall be performed in a group of 2-3 students. The students also present the finding through a report and oral presentation. In the report and presentation, students must also highlight the needs of a production company, regarding its internal and external logistics systems from sustainability perspectives and set together possible solution proposals. Detailed instructions will be available in CANVAS.

Basic Criteria (BC): Attendance at lab introduction, submission of assignment report and oral presentation of projects. Lab introduction is important and compulsory to attend as all the safety instructions will be explained during the session, which is mandatory before starting experiments in lab.

For **Fx** grade the **BC** should be fulfilled. Possibility of supplementation is provided by agreement.

	A	B	C	D	E
ILO4	BC + In the light of a structured external analysis and in a scientific approach, present an identification and analysis regarding collaboration and information sharing (between components or units) for a specific production logistical problem	Partly satisfying criterion for A	BC + In the light of an external analysis, present an identification and analysis regarding collaboration and information sharing (between components or units) for a specific production logistical problem.	Partly satisfying criterion for C	BC + Present an identification and analysis regarding collaboration and information sharing (between components or units) for a specific production logistical problem
ILO5	BC + In the light of a structured external analysis and in a scientific approach, present an analysis of a company's needs with regard to sustainability perspectives and compile possible solutions that can help solve the company's problems in production logistics.	Partly satisfying criterion for A	BC + In the light of an external analysis, present an analysis of a company's needs with regard to sustainability perspectives and compile possible solutions that can help solve the company's problems in production logistics.	Partly satisfying criterion for C	BC + Present an analysis of a company's needs with regard to sustainability perspectives and compile possible solutions that can help solve the company's problems in production logistics.

- **TEN1 – Online Exam, 3.0, betygsskala: A, B, C, D, E, FX, F**

The purpose of the online exam is to evaluate the understanding and knowledge of the students related to the ILOs 1 to 4. Online exam will be a mix subjective and objective questions, including case studies and situation based reasoning questions. The mode of response during the exam would be written, oral or mixed. Detailed instructions will be available in CANVAS.

- **Final Grades:**

- For a passing grade in the course, the student has to pass (at least score E) in TEN1 and PRO1.
- The Final grade is set according to following table with the two grades.

PRO1 (3hp)	TEN1 (3hp)				
	A	B	C	D	E
A	A	B	B	C	D
B	A	B	C	C	D
C	B	B	C	D	D
D	B	C	C	D	E
E	C	C	D	D	E

4. Students' work effort time in relation to points

The extent of students work are estimated to correspond 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 20-23 hours a week.

5. Students' results

2022. Total 18 registered students. 14 active.

	A	B	C	D	E	F	Did not take exam
PRO1	2	7	5	0	0	0	4
TEN1	5	5	1	1	2	0	4
Final	4	7	1	2	0	0	4

2021. Total 10 students

	A	B	C	D	E	F	Did not take exam
PRO1	4	6	0	0	0	0	0
TEN1	4	2	3	1	0	0	0
Final	4	4	2	0	0	0	0

2020 - Total 23 students

	A	B	C	D	E	F	Did not take exam
PRO1	9	0	2	9	3	0	0
TEN1	3	6	6	5	2	0	1

Final	3	5	7	5	2	0	1
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2019 - Total 13 students

	A	B	C	D	E	F	Did not take exam
PRO1	6	2	2	3	0	0	0
TEN1	5	3	1	1	1	1	1
Final	4	5	0	2	0	0	2

This course ran for the fourth time and the average scores of the students were similar to previous years.

6. Answers to open questions

The general view of the course is positive. The students specially liked the guest lectures, experimental work, visit to Scania control tower and some of the topics covered during the lectures. The responses on all the LEQ statements scored between 5.1 and 6.3 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 course responsible running the questions. This way it was possible to achieve very high rate of response, with 100% of active students responding (83% of all registered). The LEQ however did only have a response rate of 39% (7 out of 18).

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

- The students found the guest lectures from LU (Global SCM), Chalmers (Blockchain), SSAB and Scania interesting. Specially the industrial visit to Scania Control tower. It helped them to connect theory with practice.
- In terms of amount of the activities, guest lecture was mostly regarded as just right, also the regular lectures were regarded generally as in the right amount.
- Regarding project work, the students liked it very much. They found them interesting and the experiments helped them to understand the practical applications of technologies.

Things that could be improved considering students' evaluations include:

- Some students wanted better explanation of the project tasks, more teacher guidance. Also possibility to form their own project teams.
- Lectures (not guest lectures) were given various feedback. Some thought they need more theoretical depth, some thought they were demanding as they were. This could be explained by various backgrounds of students.

- Some students suggested improvement in course literature. A book was suggested.
- Some comments were given on examination. Partly on content of part 1 (multiple choice quiz) as well as requests on test examination.

8. Overall impression

The course is maturing in content as well as form. It covers a wide set of areas as well as various learning and examination forms. The project work was conducted at KTH Södertälje Logistics lab as well as Scania Smart Factory lab. Since last year we have adjusted some lectures, adjusted project description and refined the examination format. Generally, the students felt satisfied and expressed a good learning experience. Specific improvement areas include further clarity in project assignment, literature listings, lecture improvements and adjustments in examination format. Quizzes can be used for continuous learning during the course instead of being used as part 1 in final examination. The industry visits and guest lectures provide high value to the course.

9. Analysis

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

At program level

- Efforts were taken to coordinate among teachers to perceive and plan for more or less smooth student workload over the period and to have sufficient time gap between two consecutive course examinations. This practice should continue to make sure students have an evenly distributed workload. As most of the student commute long distance to Campus, they also suggested having more lectures (of different courses in P2) on same day to avoid commute on multiple week days. Or synchronise online lectures between courses. If more students are included from Stockholm campus for 2023, the schedule will require even further consideration.

At course level

- The students found fulfilment of ILO1 and ILO2 well covered. However, ILO3, ILO4 and ILO5 were considered less fulfilled. Especially ILO4 (information flow in different parts of the production logistics, between different units in an organisation and between companies in a supply chain) was estimated less fulfilled and require further focus.
- On issue is how to handle the exposure of differences between students from various backgrounds – some having limited exposure to some basic topics. Video lectures were to some extent shared with students for prior preparation for the lecture. These videos were intended to explain basic concept, nevertheless, the purpose and execution of this flipped classroom format can be further improved to avoid any overlap.
- Course lectures can be more detailed. As per the students' feedback, certain lectures need more detail.

Other issues (miscellaneous)

- Students liked the experimental work, nevertheless, some groups asked for more supervision and support. While most felt it was right amount there were exceptions that wanted more. They also requested to form their own teams.

- As a last remark, as previous years, 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 (PRO1).
- Consider literature clarity. Possibly include even more material relating to ILO 4.
- Include lab possibility in KTH Stockholm, in addition to KTH Södertälje and Scania Smart Factory Lab.
- Amount of lecture can be reduced and/or lectures can be more detailed.
- Study visits to other logistic application sites, apart from Scania, could be considered.
- Adjust examination. Possibly use the quizzes from part 1 in examination as continuous learning instead, and focus final examination on part 2.

11. Other information