

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

Period: Period 2 2021.

Course responsible: Tarun Kumar Agrawal

Examiner: Magnus Wiktorsson

Teachers in course: Tarun Kumar Agrawal, Masoud Zafarzadeh, Wajid Ali Khilji, Magnus Wiktorsson; Jan Olhager (Guest Lecturer, Lund University); Jannis Angelis (Guest Lecturer INDEK, KTH) 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. 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 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 100% of the students. The LEQ gave a response rate of 40%.

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.

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

In 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

In 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

In 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
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This course ran for the third time with almost half the number of students in 2020 and the average scores of the students increased.

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 and 6 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 (90% to 100%).

The LEQ however did only have a response rate of 40% (4 out of 10).

As a note, the students composed of some coming from bachelor programmes in HPU, some internationally and one student from exchange program. This meant that their awareness and engagement in similar activities before joining this program were different.

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

- The students found the guest lectures, LOVIS project seminar and Blockchain lecture 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, nevertheless, the regular lectures can be reduced or modified in content as some student found it bit too much.
- 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.
- They found some of the beer game exercise and class quizzes very useful.

Things that could be improved considering students' evaluations include:

- Better explanation of the project tasks.
- They found some content of the online videos (given as preparation work) and onsite lectures overlapping, which can be improved to avoid repetition.
- Few students also suggested to improve the content of the lectures to make them more detailed and in-depth to facilitate learning process.
- Coordination with Scania Smart factory lab for project work could be improved in order to facilitate smoother execution of experiments.

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 are some clear areas of improvement. It was bit challenging for students, teachers as well as the course responsible to handle unexpected disruptions that the course faced due to the pandemic situations. Although most of the lectures for executed onsite with hybrid mode facility, attendance due to health reasons of concern. The industry visits to Scania took place this time and students could perform experiments at Scania Smart Factory lab. Towards the end of the course the students felt satisfied and expressed a good learning experience.

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.

At course level

- This year the students found content related to sustainable supply chain and logistics practices satisfying. Nevertheless, ILO 3 and 4 related to digitalisation and information flow in different parts of the production logistics, between different units in an organisation and between companies in a supply chain for physical products was estimated less fulfilled and require further focus.
- How to balance the exposure differences between students from students with Bachelor from KTH Södertälje versus students from other backgrounds that have limited exposure to some basic topics. Video lectures were 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 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.
- 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 (PRO1).
- Possibly include even more material relating to ILO 3 and 4.
- Better coordination with Scania Smart Factory Lab.
- Amount of lecture can be reduced and/or lectures can be more detailed.

11. Other information