



**KTH Industrial Engineering
and Management**

Book of Instructions

Change Project in Industrial Management (CPIM)

ME2502 2024

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Course PM

In the first part of this “Book of Instructions” the Course PM is outlined including the course objective, learning objectives, main content, descriptions of the course examinations, the grading criteria as well as the formal contact information of the course management.

The objective of the course is that students, through their own active work on a company-based authentic change project, will synthesize and develop their knowledge as well as their skills in the area of Industrial management. The students’ work with a real-world problem within an established organization, concerning a considerable transformation, creates the prerequisites in order to implement theories and models in a rich context. By pinning-down the problem formulation, collecting data, analyzing, drawing conclusions, and presenting a thoroughly elaborated plan for the implementation of a change project, the students will exploit their current and (in the course given) new knowledge at the same time as they train their skills in central areas, such as leadership and project management. Furthermore, the objective is to increase the students’ ability to handle challenges within the subject area of Industrial management based on a systems perspective – that is, the final implementation plan should cover how the proposed changes affect the organization as a system (e.g., taking into account effects on the individual-, functional-, and industrial levels). Finally, by the use of an authentic organization as the target for the change project, the course also aims to increase the students’ knowledge and skills concerning research-based approaches and data collection techniques.

1. Individual learning objectives (ILOs)

After the course students will be able to:

- Creatively identify and formulate a concrete researchable problem based on an industrial and authentic issue.
- Critically evaluate and apply knowledge, current research, theoretical concepts and research methods in order to analyze complex issues in industrial and technology-intensive businesses
- Analyze, discuss and generate sustainable solutions to complex and reality-based challenges in industrial and technology-intensive businesses based on a systems perspective
- Evaluate own results and recommendations in the area of industrial management with regard to sustainable development and ethical aspects
- Lead, collaborate and provide feedback in project groups and reflect on group dynamics, academic work process, and outcomes
- Critically discuss other students' scientific work and judgments with regard to problem formulation, theory, and method selection
- Communicate your own positions, judgments and results - orally and in writing - towards companies and course management

2. Main course content

The course content is structured around the implementation of a major change project. In parallel and integrated with the students' own work with the change projects are lectures and seminars where theory is presented and discussed. Particular emphasis is placed on leadership theory/change management, organizational and business development, interactions between fields in Industrial management (systems perspective), sustainable development, and scientific and methodological approaches.

In short, the course includes:

- A course project to structure the implementation of a major change project in industrial and technology-intensive organizations
- Presenting findings and recommendations in the form of a comprehensive academic report
- Lectures and seminars aimed at deepening the knowledge of change management, the systems perspective, sustainable development, and the scientific approach
- Seminars, presentations, interim and final reporting associated with one's own change project, given in front of the course management and company representatives
- Seminars for evaluating other students' scientific work
- Continuous interactions with representatives of the companies, who are the subjects of the change project (through study visits, data collection and guest lectures)
- Personal reflection and feedback through the work on the individual examination portfolio (including the task to individually discuss and exemplify the fulfilment of the course's specified learning objectives)

The CPIM course has a large part dedicated to skills in academic writing and oral presentation techniques. The course represents an integrated course in the Industrial management master's program curriculum and as such the demands on writing, oral presentations, and practice of scientific methods throughout the course are high. Therefore, the methods textbook *Method for engineering students: Degree projects using the 4-phase Model* is used in the CPIM course (see also course literature). In addition, the central theme of change/change management will be supported through the use of the book *Change in the mind of the strategist*. The textbook is linked to the specific lectures and activities on change management in the first period of the course and act as a support for students in using models and theory related to change in their change projects.

3. Examination

In line with the objectives of engineering education in general and with educational systems adopting the CDIO concept (www.kth.se – CDIO) in particular, students' skills and abilities related to their subject area should be set in focus. Hence, skills and abilities should be central aspects of learning and examination in such education. The overall aim of this course is, therefore, based on the students' direct experiences of a "real" industrial project, to improve their professional competence.

In the areas of Industrial management, such skills are represented by e.g., the ability to discuss models and theories taking a systems perspective, leading and managing communication of workgroups, handling expectations, and delivering value for clients (or other stakeholders).

This course is designed in order to put forth learning activities that bring managerial decisions and problem formulation into the hands of the students throughout the learning process. The main tools for learning and examination of these skills and abilities are the major change project in itself, the delivery of the results to an authentic industrial client, the project report, and the examination portfolio. Hence, students will be individually examined by an integrated set of activities including their own work and activities in the project (SEM1; INL1,2; PRO1,2), the contribution to the group's final report (and the final presentation) (PRO2), and their final examination portfolio (INL2).

The learning objectives are particularly important to the students in this course due to the practice of the examination portfolio. The portfolio includes an increased responsibility of the individual student to provide evidence for how they have reached particular learning objectives (e.g., Biggs and Tang, 2007, p 222). Thus, revisit the learning objectives continuously (see section 1).

The examination portfolio is a well-established tool for examination in higher education, especially in relation to skills training, Problem Based Learning PBL (Biggs and Tang, 2007), and CDIO. However, a well-developed portfolio should also be seen as an instrument for promotion and exemplifications of one's own knowledge, skills, and capabilities e.g., F in students' future recruitment processes.

4. Examination process and deliverables

In the following, the process and deliveries related to the formal examination in the course are presented.

Note: in addition to this you are supposed to follow the instructions for delivery, planning, and communication with coaches and companies outlined in the detailed course schedule.

4.1 At the start of the course

This course is based on a pedagogical design that aims at the highest learning objectives of your degrees as well as training your abilities for a career with major managerial responsibilities. Therefore, the course design demands that each student from the start understands and embraces the purpose of the course, the learning objectives, and the deliveries – it is for real this time! At the start of the course, be sure that you:

- Inspect the course learning objectives and make sure that you fully understand what these will require from you and how this will be examined
- Start building your examination portfolio and collect evidence for your actions and contributions – e.g., in a project diary
- Express/add your own goals
- Understand the group's delivery process according to the seminars and coach meetings

4.2 At mid-term students should:

The mid-term examination comprises both individual and group-wise submissions.

Individual submissions (INL1)

Individually submit the following documents according to dates and times in the schedule.

- A. Provide a prototype (a first draft) of “Examples of own work and challenges” in reaching the learning objectives. Give one short example of how you reached (or partly reached) each of the selected learning objectives. In addition, describe and discuss the most important challenges that you have encountered when trying to reach the learning objectives (so far, until mid-term).

N.B.: use only the four (4) selected learning objectives listed below. Use each learning objective as a heading in your report. **Acknowledge your readers: your readers are TINEM students in the CPIM course next year** (maximum 2 pages).

Learning objective to include:

- Creatively identify and formulate a concrete researchable problem based on an industrial and authentic issue
- Critically evaluate and apply knowledge, current research, theoretical concepts, and research methods in order to analyze complex issues in industrial and technology-intensive businesses
- Analyze, discuss and generate sustainable solutions to complex and reality-based challenges in industrial and technology-intensive businesses based on a systems perspective
- Evaluate own results and recommendations in the area of industrial management with regard to sustainable development and ethical aspects

- B. Provide an individual reflection of the group’s work (1/2-1 page)

- C. Provide a critical discussion on ethics based on the learning from your group’s project so far. Use the following two perspectives:

1) Your method: how you plan your upcoming work in the project in order to handle ethical issues related to your investigation and research design

2) Your results: ethical issues related to your anticipated results and recommendations

Use the concepts and the information from the lecture on ethics in your discussion. The discussion in C1 should include an **academic research** perspective (based on Vetenskapsrådet) and the discussion in C2 should include a **professional** (engineering/managerial) perspective (based on Sveriges ingenjörer) (2-3 pages).

Part A above will be accessed by a feedback partner in the learning management system (LMS).

For grading criteria (P/F), see heading 5.2, INL1.

Feedback

Prepare the following documentation and hand it in through the LMS, see deadline in schedule:

- **Review and Feedback:** Based on your experience working together and your feedback partner's mid-term portfolio, provide constructive feedback and suggestions for improvement. Focus on areas relevant to the learning objectives. To clarify, you are not to comment on the text per se (e.g., whether it is well-written or not), but rather on your feedback partner's contribution to the group work/project. Your feedback should be concise, spanning ½ to 1 page.
- **Reflection and Goal Setting:** After submitting, carefully read the comments you receive regarding your own progress toward the learning objectives. Use this feedback to revise your goals and set new targets for the second half of the course.

Group submission (PRO1)

Together with the group submit the mid-term report in the LMS, see deadlines in the schedule. The group officer should also send the report to the company representative, through e-mail.

Together with the group assure that you actively participate in given course activities as well as actively participate in the seminars (related to SEM1).

For grading criteria (P/F), see heading 5.2, PRO1.

4.3 As part of the final examination – students should:

The final examination comprises both individual and group-wise submissions.

Individual submissions (INL2)

Provide a summative and final individual examination portfolio. Individually submit the following two documents according to the dates and times in the schedule. Detailed descriptions follow below.

- A. Challenges in reaching the learning objectives (the four selected, same as for mid-term) and areas of improvement (use the learning objectives as headings in your text: 2-3 pages)
- B. Reflections on group work (1-2 pages)

A: Challenges in reaching the learning objectives (use the four selected learning objectives from mid-term and include them as headings in your text: 2-3 pages)

Give one clear example of how you reached each of the selected learning objectives. Describe and discuss the most important challenges and pitfalls that you have encountered when trying to reach the selected learning objectives. **Acknowledge your reader: The reader is a fellow student with whom you plan to do your Master's Thesis next year.** Therefore, also give clear and direct advice on how you should approach the research process in order to overcome the challenges and avoid the pitfalls you discussed above.

B: Reflections on group work (1-2 pages)

B1: Reflections on group dynamics

- Internal project and group dynamics and performance (reflect using appropriate theoretical concepts)

B2: Reflections on academic work in the project

- Methodology, sources, and the research process – reflections on problem formulation, purpose, and questions (interviews, validity, reliability, etc.)
- Theoretical aspects of group work – reflect on and critically evaluate the group's choice and application of theoretical concepts – check alignment to the three IM-perspectives

For grading criteria (A-F), see heading 5.2, Table INL2.

Group submissions (PRO2)

Together with the group submit the final report, through the LMS and by e-mail to the company representative(s), for the deadline see the schedule.

More detailed instructions regarding the project and the final report may be found in Appendix B.

Together with the group assure that you actively participate in given course activities as well as actively participate in the seminars (related to SEM1).

For grading criteria (A-F), see heading 5.2, Table PRO2.

Please note:

All submissions should be submitted through the learning management system (LMS) using a specific "Assignment page" for digital submission. Please note that some submissions are also due through e-mail to your feedback partner, opposition group, or company representative (according to detailed instructions).

4.4 Plagiarism

The course builds on individual and group work with questions, seminars, and homework assignments. Plagiarism is not allowed. Information about plagiarism can be found at: <https://www.kth.se/en/student/stod/studier/fusk-1.997287>

Information about what plagiarism is and how control of plagiarism is executed will be presented during the course. Amongst the measures taken, automatic control of plagiarism will be done on all assignments (group and individual).

5. Grades

Final grading in this course will be based on a combination of the group report of the project (PRO2) and the final individual examination portfolio (INL2) (see also under heading 5.3 Combining final grade, below). The individual grading of the final examination portfolio will be founded on the evidence that the student presents and how well these items meet the learning objectives of the course (see learning objectives and criteria for grading).

An important notice concerning the implementation of an examination portfolio and the assessment in this course is to acknowledge that this is a qualitative and divergent type of assessment, which means that there are several possible strategies and types of final evidence that could meet each level of the grading scale (thus, the work process of the group will also be assessed). Moreover, this also implies that in order to achieve higher grades students might have to take some risks in line with their project works and learning strategies (e.g., in order to show evidence of creativity and depart from established ways of doing things and presenting solutions). Such efforts could be discussed in the individual learning portfolio of each student, e.g., in the individual reflection on the group's final report.

5.1 Examination

ILO#	ILO (2019)	INL1	INL2	PRO1	PRO2	SEM1
1	Creatively identify and formulate a concrete researchable problem based on an industrial and authentic issue.	P/F	A-F	P/F	A-F	
2	Critically evaluate and apply knowledge, current research, theoretical concepts and research methods in order to analyze complex issues in industrial and technology-intensive businesses	P/F	A-F	P/F	A-F	
3	Analyze, discuss and generate sustainable solutions to complex and reality-based challenges in industrial and technology-intensive businesses based on a systems perspective	P/F	A-F		A-F	
4	Evaluate own results and recommendations in the area of industrial management with regard to sustainable development and ethical aspects	P/F	A-F		A-F	
5	Lead, collaborate and provide feedback in project groups and reflect on group dynamics, academic work process and outcomes	P/F	A-F			
6	Critically discuss other students' scientific work and judgements with regard to problem formulation, theory and method selection					P/F
7	Communicate your own positions, judgements and results - orally and in writing - towards companies and course management					P/F

- A. Pass on active participation in seminars, 1,0 hp (SEM1), grading scale P/Fx/F
- B. Pass on mid-term seminar group report, 1,0 hp (INL1), grading scale P/Fx/F
- C. Pass on mid-term examination portfolio, 1,0 hp (PRO1), grading scale P/Fx/F
- D. Final group report, 4,5 hp, grading scale: A, B, C, D, E, Fx, F (PRO2)
- E. Final individual examination portfolio, 4,5 hp, grading scale: A, B, C, D, E, Fx, F (INL2)

5.2 Criteria for grades

Overview of goal-oriented ILOs

Comments to Table 1, above:

- Colours
 - Light yellow – ILOs fulfilled by reflections (INL1, 2) and/or progressively (INL1, PRO1)
 - Dark yellow – ILOs fulfilled by final examination
- INL1 and PRO1 – ILOs fulfilled according to mid-term progression, according to criteria under INL1, PRO1, below; therefore, INL1 and PRO1 must be met before assessment of INL2 and PRO2
- INL2 and PRO2 – ILOs completely fulfilled and graded according to criteria given in tables INL2, PRO2, below
- In order to fulfil the requirements of the course, students need to meet all criteria given below and pass the examination for INL1, INL2, PRO1, PRO2, and SEM1

SEM 1

- Attendance on mandatory seminars, coach seminars, company visits, data collection, etc.
- Pass on submissions of all seminar presentation materials (following the “speech template”)
- Pass on the “opposition report” – following all assessable parts of the “assessment support”

INL 1 (P/F)

Part A

- ILOs 1-4 are included in the text
- Topics discussed to show a correct understanding of each learning objective
- The text makes some acknowledgments to the “given reader” of INL 1 stated in the assignment
- Gives examples of own work for some ILOs
- Challenges are described

Part B

- Uses and correctly references literature
- A descriptive view on group work and group dynamic in the project
- Descriptive account for the research process

Part C (only mid-term)

- Part C1. Students should exemplify, based on their own research process (current and planned) how to handle ethical issues. Use “Vetenskapsrådets guidelines” and apply these when you critically discuss and give examples based on your group’s investigation.
- Part C2. At least, students should elaborate on the ethical aspect that could/should be acknowledged about their anticipated results/recommendations. At least Sveriges ingenjörer’s guidelines should be used. However, you are free to use also Vetenskapsrådet’s guidelines, since the discussions and exemplifications could be related to both the quality of the results/recommendations (e.g. concerning the

Vetenskapsrådet's guidelines) and the use of the results/recommendations (e.g. could there be risks of violation of the Sveriges ingenjörer's codex by following the suggested results/recommendations of their study?)

- Fx: If no source is used when discussing/exemplifying ethical aspects of their research process. If students have not used both sources in their discussion (either in Part 1 and 2), or if they have not put the discussion into their project's context and thereby not giving any contextualized exemplifications.

Written feedback

- Provide ½ a page of written feedback to one of the members of the student's project group. The written text should adhere to the feedback instructions.

PRO 1

- A researchable problem has been identified and, at least, preliminary formulated.
- Applied knowledge, current research, theoretical concepts, and research methods are outlined and linked to the problem and the project context.
- Results and contributions are, at least, hypothetically outlined for the reader of the report
- The outline of the report, the readability, and the amount of context should be developed to an extent that the opponent group will be able to assess and give critique to at least points 1, 2, 4, 5, 7, 8, 10 in the "assessment support".

INL 2

See table INL 2 below

PRO 2

See table PRO 2 below

INL 2

ILO#	ILO (2019)	INL2	E	D	C	B	A
1	Creatively identify and formulate a concrete researchable problem based on an industrial and authentic issue.	A-F (Part A)	ILOs 1-4 are included in the text Topics discussed show a correct understanding of each learning objective The text make some acknowledgements to the "given reader" stated in the assignment Lack clearness in the examples of own work for some ILOs Challenges are mainly descriptive Advice and reflections are weak	All criterias of E and at least half of the criterias of C	ILOs 1-4 are included in the text Topics discussed show a correct understanding of each learning objective The text acknowledge the "given reader" stated in the assignment Clear examples of own work for the ILOs Challenges are described with a good support from the course and the project Advice and reflections are made from the perspective of the "given reader"	All criterias of C and at least half of the criterias of A	ILOs 1-4 are included in the text Topics discussed show a correct and precise understanding of each learning objective The text acknowledge the "given reader" stated in the assignment with a high degree of situated insight Clear and original examples of own work for the ILOs Challenges are described with an excellent support from the course and the project Advice and excellent reflections are made from the perspective of the "given reader"
2	Critically evaluate and apply knowledge, current research, theoretical concepts and research methods in order to analyze complex issues in industrial and technology-intensive businesses	A-F (Part A)					
3	Analyze, discuss and generate sustainable solutions to complex and reality-based challenges in industrial and technology-intensive businesses based on a systems perspective	A-F (Part A)					
4	Evaluate own results and recommendations in the area of industrial management with regard to sustainable development and ethical aspects	A-F (Part A)					
5	Lead, collaborate and provide feedback in project groups and reflect on group dynamics, academic work process and outcomes	A-F (Part B)	Limited amount of references to the literature Mainly a descriptive view on group work and group dynamic in the project Descriptive account for the research process with limited proof of how the literature have been critically evaluated		Relevant references to the literature are used Reflections of group work and group dynamic in the project are shown with some personal originality Descriptive account for the research process with proof of how the literature have been critically evaluated		Relevant references to the literature, also from outside of the course content, are used Excellent reflections of group work and group dynamic in the project are shown and personal originality is evident Descriptive and reflective account for the research process with excellent proof of how the literature have been critically evaluated
6	Critically discuss other students' scientific work and judgements with regard to problem formulation, theory and method selection						
7	Communicate your own positions, judgements and results - orally and in writing - towards companies and course management						

PRO 2

ILO#	ILO (2019)	PRO2	E	D	C	B	A
1	Creatively identify and formulate a concrete researchable problem based on an industrial and authentic issue.	A-F	- A researchable problem have been identified and formulated with some limitations in creativity and/or demarcation. - Applied knowledge, current research, theoretical concepts and research methods that have to some extent been critically evaluated in order to analyze complex issues - Results have been analyzed and discussed and solutions have been produced. Some limitations are present in the analysis, the discussion and/or in the application of the systems perspective. - Basic aspects regarding sustainable development and ethical aspects have been evaluated.		- A concrete researchable problem have been creatively identified and formulated. - Applied knowledge, current research, theoretical concepts and research methods have been critically evaluated. Good understanding of selected literature and applied methods are displayed. - Results have been analyzed, discussed and in order to generate sustainable solutions and a systems perspective have been applied. - Results and recommendations have been evaluated with regard to sustainable development and ethical aspects		- A concrete researchable problem have been creatively identified and formulated that display excellent insight into the professional context and the academic area of the investigation. - Applied knowledge, current research, theoretical concepts and research methods have been critically evaluated. In addition, the selection of literature, theoretical concepts, and methodological approach are well motivated and display a thorough understanding of both applied research and the studied context. - Results have been analyzed based on a well thought-out structure and are well discussed against the selected literature and a systems perspective have been applied. - Results and recommendations have been evaluated with regard to sustainable development and ethical aspects where insights into its potential effects of results and recommendations have been clearly displayed.
2	Critically evaluate and apply knowledge, current research, theoretical concepts and research methods in order to analyze complex issues in industrial and technology-intensive businesses	A-F					
3	Analyze, discuss and generate sustainable solutions to complex and reality-based challenges in industrial and technology-intensive businesses based on a systems perspective	A-F					
4	Evaluate own results and recommendations in the area of industrial management with regard to sustainable development and ethical aspects	A-F					
5	Lead, collaborate and provide feedback in project groups and reflect on group dynamics, academic work process and outcomes						
6	Critically discuss other students' scientific work and judgements with regard to problem formulation, theory and method selection						
7	Communicate your own positions, judgements and results - orally and in writing - towards companies and course management						

5.3 Combining grades

The following matrix is used for the weighting of the final individual grade (based on P for SME 1, INL 1, PRO 1, and the grades for INL 2 and PRO 2).

Combination for the final grade

		PRO2				
		A	B	C	D	E
INL2	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

6. Formal course information

Course literature

Blomkvist & Hallin (2014/2015). *Method for engineering students: Degree projects using the 4-phase Model*, Studentlitteratur.

or (same book in Swedish):

Blomkvist & Hallin (2015). *Metod för teknologer. Examensarbete enligt 4-fasmodellen*, Studentlitteratur. (in Swedish)

N.B. This book is also used as course literature in the PIM course (ME2501).

Wadström (2023). *Change in the mind of the strategist*, Book on Demand, Norderstedt, Germany.

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