



Course 090125199 Industrial Internship

King Mongkut's University of Technology North Bangkok
The Sirindhorn International Thai-German Graduate School of Engineering
Mechanical and Automotive Engineering Program

Section 1: General Information

1. Course code and course Title

090125199 Industrial Internship

2. Total credits

4 credits

3. Curriculum and course category:

Curriculum: *Master of Engineering in Mechanical and Automotive Engineering Program*

Course category: Required Courses

- Core Course Specific Core Course
 Industrial Internship Master Thesis

Elective Courses

- General Elective Specific Elective Other Elective

4. Course coordinator/ instructors

Course coordinator(s): Curriculum Chairman: Assoc. Prof. Dr. Ekachai Juntasaro
Program Coordinators: Assoc. Prof. Dr. Ekachai Juntasaro (MESD)
Assoc. Prof. Dr. Julaluk Carmai (ASAE)

Advisors: Assoc. Prof. Dr. Ekachai Juntasaro
Assoc. Prof. Dr. Julaluk Carmai
Assoc. Prof. Dr. Saiprasit Koetnuyom
Asst. Prof. Dr. Karuna Tuchinda
Asst. Prof. Dr. Saharat Chanthanumataporn
Dr.-Ing. Alex Brezing
Dr. Ampol Likitchatchawankun

5. Semester/ year of study

Semester 1 (Aug. to Dec.) Semester 2 (Jan. to May) Academic Year: 2023



Program: MAE
Degree Level: Master

Faculty/College: TGGS

6. Pre-requisite (if any)

- No
- Yes, please provide:

7. Co-requisites (if any)

- No
- Yes, please provide:

8. Venue of study

- Industry Sites
- Approved Research Center
- RWTH Aachen University

9. Information for quality assurance in education

This course shows evidence of:

- Development of implementation from previous practices, e.g. the improvement of class teaching, course content, content classification and methods used for learning assessment
- Involvement from professional bodies/ external agencies in instruction; thus enhancing student academic and professional experiences
- Integration of research or creative activities with instruction; use of research-based learning management; knowledge management practices for learning improvement
- Integration of academic services and course implementation
- Combination of cultural heritage preservation efforts into instruction or student activities

10. Date of latest revision

June 2023

Section 2: Course Description and Implementation

1. Course Description *(As written in the Official Approved Curriculum)*

Apply the knowledge for solution or analysis of engineering problem in industry through internship in industrial environment. The student will submit the report to summarize the internship work content, deliverables and confirmed outcomes.

2. Number of hours per semester

Lecture	Practice	Self-study
	720 hours/ 18 weeks (40 hours/week*)	30 hours/ semester (5 hours/3 weeks*)

Remark: * Based on at least 18 weeks

- Course Category: Lecture Practice Laboratory
- Course Evaluation: A-F S/U P

3. Number of hours per week for academic guidance to individual students



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- 1. Giving academic advice (minimally number hour per week) during the office hour
 1 2 3 4 5
- 2. Adopting information technology-based academic advising
 Email Phone Communication Apps Meeting Online:
 Other (specify)
- 3.

4. Course Learning Outcomes (CLOs): Students should be able to:

- CLO 1 To become acquainted with organization cultures and the activities of engineers in different areas, especially, in production process and R&D.
- CLO 2 To learn how to plan and manage a project, as well as how to communicate and collaborate with others in order to accomplish the project.
- CLO 3 To develop the students' own initiative and problem-solving capability, taking into account the boundary conditions under which industry operates and other aspects such as quality, economics, environment, and acceptance by the market.
- CLO 4 To get insight into possible professional career perspectives and commercial awareness on business and employment.

5. The mapping between the curriculum's Expected Learning Outcomes (ELOs) and Course Learning Outcomes (CLOs) (Table 5.1: for subject-specific courses designed for a specific curriculum; Table 5.2 is purposed for courses designed for various curriculums)

Table 5.1 ELOs-CLOs Consistency (for a subject-specific course/ a specific curriculum)

ELOs/CLOs consistency	CLO 1	CLO 2	CLO 3	CLO 4
GELO1 - Competence in the definition and solving of technical tasks	✓		✓	
GELO2 - Awareness of engineering responsibility		✓		
GELO3 - Report writing skills		✓		
GELO4 - Ability to work as team member		✓		
GELO5 - Competence in literature research and summary				
GELO6 - Presentation skills				
GELO7 - Project management and team leadership skills				
GELO8 - Self-Guided Learning (Lifelong Learning)				
SELO1 - Knowledge and understanding in methodology of simulation and design	✓		✓	
SELO2 - Knowledge and understanding in scientific fundamentals of technical systems				



ELOs/CLOs consistency	CLO 1	CLO 2	CLO 3	CLO 4
SELO3 - Knowledge of technical systems and technologies in the field	✓		✓	
SELO4 - Competence in analysis and modelling of technical scenarios	✓		✓	
SELO5 - Skills of using commercial software for simulation in engineering applications	✓		✓	
SELO6 - Skills of using commercial software for design in engineering applications	✓		✓	
SELO7 - Knowledge of engineering materials, failure modes and production techniques	✓		✓	
SELO8 - Knowledge of applicable laws, guidelines, regulations	✓			✓
SELO9 - Knowledge, understanding and ability to consider the human body in simulation and design	✓		✓	

Remark: All ELOs and CLOs for the course (highlighted row) are as written in the Official Approved Curriculum.

Table 5.2 Mapping of desirable characteristics of KMUTNB graduates and CLOs (for non-specific courses, designed for various curriculums)

Consistency between desirable characteristics of KMUTNB Graduates- CLOs	CLO 1	CLO 2	CLO 3	CLO 4
1. Professional credentials with critical thinking skills			✓	
2. Integrity and social responsibility				✓
3. Innovative and technopreneur mindset				✓
4. Global Competence	✓	✓		

Section 3: Student Improvement in relation to Course Learning Outcomes (CLOs)

Organizing learning experiences to develop skills/knowledge; assessment of CLOs in accordance with the ones identified in Section 2.4

Course Learning Outcomes (CLOs)	Teaching Methods compliant with CLOs	Evaluation Methods compliant with CLOs
CLO 1	<ul style="list-style-type: none"> Learning by doing Participation of the student in the internship company/ organization's 	<ul style="list-style-type: none"> Internship company/organization supervisor observation and evaluation during the internship period



Course Learning Outcomes (CLOs)	Teaching Methods compliant with CLOs	Evaluation Methods compliant with CLOs
	<p>activities: orientation, plant tour and safety training during the first several weeks of internship, as well as social activities throughout the internship period. This will strengthen the relationship among the co-workers.</p> <ul style="list-style-type: none"> As one of the employees, the student must follow the rules and regulations 	<ul style="list-style-type: none"> TGGS internship supervisor observation and evaluation during the visit Weekly activity report Student's proposal, progress or final presentation Student's internship report
CLO 2	<ul style="list-style-type: none"> Learning by doing Weekly meetings or regular meetings between the internship student and the internship company/organization supervisor to plan and discuss about the engineering problems (project) or report the progress Discussion among other engineers and technicians while solving the problems and/or seeking for assistance 	<ul style="list-style-type: none"> Internship company/organization supervisor observation and evaluation during the internship period TGGS internship supervisor observation and evaluation during the visit Weekly activity report Student's proposal, progress or final presentation Student's internship report
CLO 3	<ul style="list-style-type: none"> Learning by doing Applying/integrating the knowledge learned from courses, observing/learning from colleagues and practicing to improve himself/herself Searching for more articles from research journals in order to solve the problem Solving the problem by identifying the problem and the cause, then obtaining the solution, and validating by implementing at the company/organization with the permission from the company/organization. 	<ul style="list-style-type: none"> Internship company/organization supervisor observation and evaluation during the internship period TGGS internship supervisor observation and evaluation during the visit Weekly activity report Student's proposal, progress or final presentation Student's internship report
CLO 4	<ul style="list-style-type: none"> Learning by doing As one of the employees, the student must consider the business and 	<ul style="list-style-type: none"> Internship company/organization supervisor observation and evaluation during the internship period



Course Learning Outcomes (CLOs)	Teaching Methods compliant with CLOs	Evaluation Methods compliant with CLOs
	<p>commercial aspects in every step of solving the engineering problems</p> <ul style="list-style-type: none"> As a good engineer, the student must practice having good morality, confidentiality and engineering ethics in every step of solving the engineering problems. 	<ul style="list-style-type: none"> TGGS internship supervisor observation and evaluation during the visit Weekly activity report Student's proposal, progress or final presentation Student's internship report

Section 4: Learning Activities

1. Student activities

The list of specific qualifying internship activities depends on the field of study and is part of the prevailing internship regulations for each course. This list may be supplemented by individual agreement between the prospective industry mentor and the university supervisor, if activities shall be covered which are not listed as standard topics.

2. Reports or assignments

Audit visit: Responsible advisors pay a visit every 6 weeks to assist or give guidance to students and the main objectives of each time for students are described as follows:

Reports or assignments	Deadline
Meeting No. 1 Proposal: Project objectives, scope of work and project plan. Background information on the process in a presentation format.	During week No. 4-6
Meeting No. 2 Progress: Progress of the project in a presentation format.	During week No. 11-13
Meeting No. 3 Final: Final presentation of the result to company management team, and preparation of the final report.	During week No. 16-18

Remark: Number of meetings and deadlines can be redesigned to suit the company working style.

3. Monitoring student learning outcome in an internship experience



Each meeting, both supervisors from the industry and university will evaluate the performance of students in each listed aspect and provide the grade on the evaluation form. Students will be informed in order to improve those aspects.

4. Duties and responsibilities of a workplace internship mentor

The industry mentor in the respective enterprise should be an experienced engineer preferably with at least having a Master's degree him/herself. Since currently the South East Asian industry will not yet employ engineering masters to sufficient extent, an industry mentor with a Bachelor's degree, 5-10 years of experience in the respective technical field and with engineering development background is acceptable as a transitional alternative. This person serves as an advisor and point of contact for any problem arising within the enterprise. He is responsible there for the fulfillment of the internship guidelines and for issuing the final reference letter.

5. Duties and responsibilities of the advisor / faculty supervisor

The university supervisor should be a professor actively engaged in the respective engineering field of study and qualified to supervise the master thesis (must have a Ph.D. degree in engineering). He is the contact person for the industry mentor if a problem with the student and his internship arises. At the end of the internship, the industry mentor has to issue a written approval statement and brief judgement of the student's performance. The TGGs Cooperative Engineering Education/Internship office then is responsible for a final check of the internship record (report with list of daily activities, company reference letter, and supervisor's technical judgement), for completeness and formal correctness and will then give the final approval signature and stamp for the acceptance of the internship as part of the studies.

6. Preparation in guiding and assisting the students

6.1 Orientation Day (During the first week of the first semester of the first academic year):

- Previous interned students give the presentation of their work at the industries to the new students.
- The TGGs Internship Guidelines and Procedures will be provided to students.
- New students will discuss all the issues with students who had been at the company.

6.2 Course Work: Provide all the skills that students need during the internship. For example,

- Research and Presentation Skills: Students will have to do the projects in all the courses and then they have to present their findings to the audience.
- Computer Programming Skill: Students will learn how to write the computer programs in solving engineering problems within the related courses.
- Computer Simulation Skill: Students will learn how to use the computer simulation



tools such as ANSYS in solving engineering problems within the related courses.

7. Facilities and support required by the workplace

The focus group is engineering- and technology-related industry with a sufficient number of engineers (minimum of 5). In the respective branch/department selected for the students internship work; SMEs with less than 50 employees qualify only under exceptional circumstances (e.g. if the SME is an entrepreneurial high-tech company) to be recorded in writing by the university supervisor. These enterprises should typically provide opportunities to get acquainted with development and industry-oriented research, simulation and design (in particular CAD, Computer aided Design), conceptual planning, construction, production, assembly, machine operation, maintenance and testing.

Section 5: Planning and Preparation

1. Work place identification

The curriculum chairman/program coordinator will send the internship proposal letter to the selected/qualified companies in Thailand and foreign countries requesting for the internship support along with the TGGS Internship Guidelines and Procedures. The curriculum chairman/program coordinator will coordinate this activity and also provide additional information to the companies to establish the understanding about the Aachen model for internship program. The students will go through the same selection process as they are seeking for a job at the company. The selection process involves the following aspects: preparation for CV, applying for a position at the company, interview with the company. After this selection process, the company will select the internship student that is appropriate to the internship project. In addition, the company will assign the company supervisors/mentors for this internship project.

2. Student preparation

To review and gain understanding of the objectives of the internship and prepare the students for the internship, the internship orientation will be held prior to the internship period. In order to have a successful internship, students must have the following skills which are taught in the related courses:

- 2.1 Research skill
- 2.2 Experimental skill including in the laboratory and simulations
- 2.3 Problem solving skill
- 2.4 Presentation skill
- 2.5 Writing skill for the project and/or technical report
- 2.6 Social skill

3. Advisor/ supervisor preparation



The curriculum chairman/program coordinator will assign the lecturer to be the advisor to the internship project based on his/her experience and provide the internship plan for 18 weeks and the internship project topic in advance. The advisor must be familiar with the TGGs Internship Guidelines and Procedures and following the procedures and regulations very closely. In addition, the advisor pays a visit every 6 weeks to assist or give guidance to students.

4. Preparation of mentor at work place

Since, the supervisors/mentors are already familiar with the internship project; they only need to understand the TGGs Internship Guidelines and Procedures. The curriculum chairman/program coordinator will provide the internship plan for 18 weeks and stress the important of the visit and the monthly meeting.

5. Risk management

- 5.1 The internship student is selected by the company based on his/her background that is appropriate to the internship project.
- 5.2 The internship student has been supervised by the advisors and supervisors/mentors that are familiar with the internship project.
- 5.3 The supervisors/mentors have clearly planned the internship project tasks for the internship student.
- 5.4 The internship student receives the orientation and safety training from the company during the first several weeks of internship.
- 5.5 The responsible lecturer/advisor pays a visit every 6 weeks to assist or give guidance to students and discuss the internship project with the supervisors/mentors.

Section 6: Student Evaluation

1. Evaluation criteria

According to the TGGs Evaluation Form for Internship Project, the students will be evaluated as follows:

- Did the student scientifically approach the project in a systematic way?
- Did the student obtain and review the number of available articles in sufficient detail?
- Did the student develop a fundamental understanding of the research topic?
- Did the student work independently?
- Did the student effectively take into account suggestions and specifications?
- Did the student contribute ideas to solve the task?
- Did the student completely solve the task with appropriate means, work thoroughly with sufficiently sophisticated methods?



- Was the report written comprehensively and in a logical structure?
- Did the student work out clearly when writing the report?
- Did the student work effectively on the project (motivation, commitment)?

2. Evaluation process

Responsible advisor pays a visit every 6 week to assist or give guidance to students and also meet with supervisors/mentors. In each meeting, both supervisors from the industry and university will evaluate the performance of students in each listed aspect and provide the grade on the evaluation form. Students will be informed in order to improve those aspects.

3. Responsibilities of monitoring and student evaluation by the mentor

Responsible lecturer/advisor pays a visit every 6 weeks to assist or give guidance to students and also meet with supervisors/mentors. In each meeting, both supervisors from the industry and university will evaluate the performance of students in each listed aspect and provide the grade on the evaluation form. Students will be informed in order to improve those aspects. In addition, the supervisors/mentors can discuss freely with the advisors on any aspects related to the internship project including the performance of the internship student.

4. Responsibilities of evaluation by the faculty in charge

Responsible advisor pays a visit every 6 weeks to assist or give guidance to students and also meet with supervisors/mentors. In each meeting, both supervisors from the industry and university will evaluate the performance of students in each listed aspect and provide the grade on the evaluation form. Students will be informed in order to improve those aspects. In addition, the advisors will discuss with supervisors/mentors on any aspects related to the internship project including the performance of the internship student.

5. Conclusion of assessment discrepancies

The evaluation results will be discussed during this meeting and students will be informed in order to improve those aspects. Since the grade is assigned for each evaluation, the advisors and supervisors/mentors can observe the improvement of the student's performance.

Section 7: Evaluation and Improvement of an Internship Program

1. Evaluation process conducted by:

1.1 Student intern

The internship student will evaluate the internship course using the Course Evaluation form provided by TGGS.

1.2 Mentor at work place

The supervisors/mentors will evaluate the internship student using the TGGS Evaluation Form for Internship Project in which they can provide additional comment.



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1.3 Advisor/ teacher in charge

The advisors will evaluate the internship student using the TGGS Evaluation Form for Internship Project in which they can provide additional comment.

1.4 Others

None

2. Review of evaluation procedures and improvement planning

The internship evaluation results will be discussed with the supervisors/mentors and the advisors at the final meeting. The new strategies and procedures will be suggested to improve the internship program. The revision and improvement planning of internship procedure and program will be discussed during the program meeting prior to the internship period.



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**Instruction for OBE 4 Preparation
Section 1: General Information**

Topic	Description
1. Course code/ title	XXXXXXXXXX Course title (Thai and English)
2. Number of credits	Credits (Lecture/Practice/Self-study Hours)
3. Course category	Specify the program of study and course classification e.g. general core courses for several disciplines, required, major, electives, specific elective categories
5. Semester / year of study	Specify semester/ year of study consistent with the curriculum
8. Information for quality assurance in education	Put check marks in the appropriate boxes

Section 2: Course Description and Implementation

Topic	Description
1. Course description	As defined in Program Specification (OBE2)
2. Time length per week	Indicate lecture hours – lab/practice hours – self study hours
3. Time length per week for individual academic consulting	Identify time and modes of consultation outside classroom, e.g. <i>consulting via mobile phone, e-mail, social media</i>
4. Course Learning Outcomes: CLOs	Complete the form (●) in accordance with the statements of responsibilities in OBE2 (program specification) and fill out the Table indicating the ELOs-CLOs Consistency
5. Expected Learning Outcomes of the study program(ELOs)	Define ELOs as specified in OBE2, section 4 (Table 5.1 -Specific course for a particular program; Table 5.2- Course for multiple programs) Put check marks to the ones that apply.

Section 3: Student Improvement in relation to Course Learning Outcomes (CLOs)

Topic	Description
Teaching methods, learning experience and assessment in line with CLOs	See statements in OBE2 (Program specification) section 4. ELOs can be applied to determine course implementation and learning outcomes assessment on the basis of CLOs.