



Course **090245099**

Industrial Internship

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

Section 1: General Information

1. Course code and course Title

090245099 **Industrial Internship**

2. Total credits

4 credits

3. Curriculum and course category:

Curriculum: *Master of Engineering in Electrical and Computer Engineering*

Course category: Required Courses

- | | |
|---|---|
| <input type="checkbox"/> Core Course | <input type="checkbox"/> Specific Core Course |
| <input checked="" type="checkbox"/> Industrial Internship | <input type="checkbox"/> Master Thesis |

Elective Courses

- | | | |
|---|--|---|
| <input type="checkbox"/> General Elective | <input type="checkbox"/> Specific Elective | <input type="checkbox"/> Other Elective |
|---|--|---|

4. Course coordinator/ instructors

Course coordinator

Instructors **All lecturers**

5. Semester/ year of study

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

6. Pre-requisite (if any)

No Yes, please provide:

7. Co-requisites (if any)

No Yes, please provide:

8. Information for quality assurance in education

This course shows evidence of:

- 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



Program: **ECE**
Degree Level: **Master**

Faculty/College: **TGGS**

9. Date of latest revision

July 2023

Section 2: Course Description and Implementation

1. Course Description

Engineering industrial problems; industrial work environment; report about work and outcomes.

2. Number of hours per semester

Lecture	Practice	Self-study
--	Full time	--

Course Category Practice Cooperative Education
 Course Evaluation A-F S/U P

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

Giving academic advice (minimally 1 hour per week)

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

- CLO 1 Identify the activities of engineers in enterprises in different areas such as development, production and applications-oriented research, equipment and production optimization, project planning, acquisition, and organization.
- CLO 2 Take part in the development, production, and/or quality assurance of goods, components, and systems in the field of study.
- CLO 3 Acquaint with the company cultures, social structures (among other things teamwork, hierarchy, social situation), and safety at work, from the point of view of a higher-level employee.
- CLO 4 Develop the students' own initiative and problem-solving capability with commitment, taking into account the boundary conditions under which the industry operates.
- CLO 5 Utilize all knowledge to solve or analyze engineering problems that occur in a plant, as well as to work in an industrial environment.



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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 subject-specific courses for a specific curriculum

ELOs/CLOs consistency	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
ELO1		✓			✓
ELO2					
ELO3					
ELO4					
ELO5					
ELO6				✓	
ELO7			✓		
ELO8					
ELO9	✓	✓	✓		

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	CLO 5	CLO 6
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"> The student will learn and become acquainted via participation in industry/organization then relate the issue with what they have learnt in class before. The ability will also be developed by the discussion during the meeting with the advisor(s). When the student presents the progress of the internship work, the results and relevant phenomena must be explained by referring well-accepted theories. 	<ul style="list-style-type: none"> Feedback from the industry/organization Discussion and progress reporting to both university and industry supervisors
CLO 6	<ul style="list-style-type: none"> During the internship, the assigned project will be designed so that the student has to work with self-reliance. During the internship, the assigned project will be designed, most likely it will be a problem-based project, in which the student needs to utilize knowledge to analyze the problem and find a suitable solution independently. 	<ul style="list-style-type: none"> The advisor(s) assesses this ability at every meeting and gives the appropriate guidance. The internship approval committee will evaluate the student's development from the report, the presentation, and questioning the students. The students will be observed and evaluated by the company's supervisor during the internship period.
CLO 7	<ul style="list-style-type: none"> During the internship, the student will be integrated into the working team at the company. The student will gain experience on how to communicate with the team. This ability will be developed by the discussion during the meeting with the advisor(s). When the student presents the progress of the internship work, the results and relevant phenomena must be well communicated. This procedure will be iteratively repeated, so that the student gets used to the approach and automatically builds up this ability. 	<ul style="list-style-type: none"> This CLO will be assessed by the supervisor's observation together with the work progress reported in every meeting. Feedback from the industry/organization
CLO 8	<ul style="list-style-type: none"> During the internship, technical information, standards, or references need to be used, in which students will learn and achieve this skill. 	<ul style="list-style-type: none"> This CLO will be assessed by the supervisor's observation together with the work progress reported in every meeting.
CLO 9	<ul style="list-style-type: none"> The student will learn best-practice techniques of ethics via participation in 	<ul style="list-style-type: none"> This CLO will be assessed by the supervisor's observation together with



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Course Learning Outcomes (CLOs)	Teaching Methods compliant with CLOs	Evaluation Methods compliant with CLOs
	industry/organization. <ul style="list-style-type: none"> During the course, several aspects concerning standardization and regulations are covered. Along with the technical content, morality and regulations on how such techniques should be implemented are given 	the work progress reported in every meeting. <ul style="list-style-type: none"> Feedback from the industry/organization

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 advisor, if activities shall be covered which are not listed as standard topics.

2. Reports or assignments

Reports or assignments	Deadline
Internship report	After the internship period

3. Monitoring student learning outcomes in an internship experiences

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 a Master's degree him/herself. Since currently the Southeast Asian industry will not yet employ engineering masters to a 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 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 judgment 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 a list of daily activities, company reference letter, and supervisor's technical judgment), 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

(1) Orientation Day (During the first week of the first semester of the first 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 have been at the company.

(2) Coursework: 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 computer programming to solve engineering problems within the related courses.

7. Facilities and support required by the workplace

The focus group is engineering- and technology-related industries 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. Workplace identification

The coordinator will send the internship proposal letter to the selected/qualified companies in Thailand and foreign countries requesting internship support along with the TGGS Internship Guidelines and Procedures. The coordinator will coordinate this activity and also provide additional information to the companies to establish an understanding of the Aachen model for the internship program. The students will go through the same selection process as they are seeking a job at the company. The selection process involves the following aspects: preparation for a CV, applying for a position at the company, and 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 an 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 Solving problems skill
- 2.4 Presentation skill
- 2.5 Writing the project and/or technical report skill
- 2.6 Social skill

3. Advisor/ supervisor preparation

The coordinator will assign the lecturer to advise 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 follow the procedures and regulations very closely.

4. Preparation of a mentor at workplace

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



5. Risk management

- (1) The internship student is selected by the company based on his/her background that is appropriate to the internship project.
- (2) The internship student has been supervised by advisors and supervisors/mentors who are familiar with the internship project.
- (3) The supervisors/mentors have clearly planned the internship project tasks for the internship student.
- (4) The internship student receives orientation and safety training from the company during the first several weeks of the internship.

Section 6: Student Evaluation

1. Evaluation criteria

According to the Evaluation Form for Internship Project, the students will be evaluated in the following:

- Was the student scientifically approached the project in a systematic way?
- Has the student obtained and evaluated available scientific literature in sufficient detail?
- Has the student developed a fundamental understanding of the research topic?
- Was the student working independently?
- Has the student efficiently taken into account suggestions and specifications?
- Did the student contribute own ideas for solving the task?
- Has the student completely solved the task with appropriate means, and worked thoroughly with sufficiently sophisticated methods?
- Is the written report written comprehensible and logically structured?
- Has the student worked carefully when writing the report?
- Has the student worked efficiently on the project (motivation, commitment)?

2. Evaluation process

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

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

Both supervisors from the industry and university will evaluate the performance of students in each listed aspects 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 students will be informed in order to improve those aspects during the internship. 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 the TGGS.

1.2 Mentor at workplace

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

1.3 Advisor/ teacher in charge

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

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. New strategies and procedures will be suggested to improve the



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internship program. The revision and improvement planning of internship procedure and program will be discussed prior to the internship period.