

## Subject Guide – Research Fundamentals in Mechanical and Structure Engineering

<b>Shortened Name</b>	RFMSE	<b>Semester</b>	2-2022
<b>Class Time (weekly)</b>	Tue, 13-16	<b>Lecture hours</b>	3h x 15w
<b>Subject Code</b>	090125119	<b>Assignment and self-study</b>	5h x 15w
<b>ECTS credits</b>	6	<b>Preparation for exams</b>	30
<b>KMUTNB Credits</b>	3(3-0-6)	<b>Total working hours/semester</b>	150

### 1 Revision date of this document, reasons for revision

- 20.12.2022

### 2 Course description

Research Fundamentals such as basic knowledge and skills required for research including research design and management in topics related to Mechanical and Structural Engineering at the master's degree level by conducting a small research project. Topics are subjected to change each semester depending on current situation.

### 3 Lecturer

- Dr. Ampol Likitchatchawankun

### 4 Expected learning outcomes (in accordance with the MAE program ELOs)

Primary LOs (primary content of class, knowledge is explicitly evaluated (for example, by exams), larger share of overall grade)

- Ability to write a professional-quality report on a research or problem-solving project (GELO 3)
- Ability to present a project in front of a professional audience (GELO 6)

Secondary LOs (not primary content of class, but implicitly taught and evaluated by application (for example, by project work or assignments), lower share of overall grade)

- Ability to independently conduct a literature study on a given topic, identify and acquire relevant sources, extract and sum up the essence in writing (GELO 5)
- Knowledge and understanding of scientific fundamentals relevant for the understanding of the behavior of solid body and fluids in engineering applications (SELO 2)

Note: These ELOs correspond to the Program ELOs (referenced in parentheses).

## 5 Assessment

Each student will be individually assessed based on the performance on assignments consisting of creating research presentations and report/research papers for the current research with their advisors, with the overall grade resulting from the shares in the table below:

<b>Evaluated items*</b>	<b>shares</b>
Presentation (first look)	20%
Report paper (first draft)	20%
Report paper ( <b>final</b> draft)	30%
Final presentation	30%
<b>Total</b>	<b>100%</b>

\*I reserve the right to make small changes to the grading breakdown

- Presentation (first look) includes Introduction & Background, Methodology, Research Project Planning, and constructive Questions/Suggestions to other projects of the classmates as peer-reviewer
- Report paper (first draft) includes 2-column style (as in most journal papers), correct sequences, Overall content with proper use of academic writing in English language as well as citing references.
- Report paper (final draft) will be graded based on overall usage of academic English and content quality in the final paper compared to expected to-be-published paper in any high-quality journal of the same field.
- Final presentation will be graded based on overall usage of academic English and content quality in the presentation as well as understanding of the presenter in their

own topic. Classmates will also evaluate the performance of the presenter accounted for 50% together with the other 50% evaluated by the class instructor.

## **6 Teaching materials**

- Power-point presentation of each lecture is handed over (before each class)
- Research papers, journals relating to a specific topic of each student.

## **7 Books and references**

- Research papers, journals relating to a specific topic of each student.

## 8 Course schedule

Week	Date/Month	Activity, Class Title (Book Chapter)	Evaluation %	Class Hours
1	10/01	Introduction to Research Fundamental: Selection of Research Topic		3
2	17/01	Literature Review		3
3	24/01	Research Methodology & Plan		3
4	31/01	<b>Research Proposal in a Presentation (first look)</b>	20%	3
5	07/02	Small research project		3
6	14/02	Small research project		3
7	21/02	Small research project		3
8	28/02	Small research project		3
9	07/03	<b>Results presentation and discussion in form of a Report Paper (first draft)</b>	20%	3
10	14/03	Data analysis and Graphical representation of the results		3
11	21/03	Data analysis and Graphical representation of the results		3
12	28/03	Result discussion		3
13	04/04	Result discussion and conclusion		3
14	18/04	<b>Final Report Paper</b>	30%	3
15	25/04	<b>Final Research Presentation</b>	30%	3
<b>Sum</b>			100%	45

**9 Details on Evaluation of Expected Learning Outcomes**

		Presentation		Written Report		Sums
		Initial	Final	Initial	Final	
		20%	30%	20%	30%	
<b>GELO3</b>	Ability to write a professional-quality report on a research or problem-solving project (GELO 3)			10%	20%	<b>30%</b>
<b>GELO6</b>	Ability to present a project in front of a professional audience (GELO 6)	10%	20%			<b>30%</b>
<b>GELO5</b>	Ability to independently conduct a literature study on a given topic, identify and acquire relevant sources, extract and sum up the essence in writing	5%	5%	5%	5%	<b>20%</b>
<b>SELO2</b>	Knowledge and understanding of scientific fundamentals relevant for the understanding of the behavior of solid body and fluids in engineering applications	5%	5%	5%	5%	<b>20%</b>