Subject Guide – **Special Topic in Mechanical Engineering Simulation and Design**

Shortened Name	ST in MESD	**Semester**	2-2022
Class Time (weekly)	Mon, 9-12	**Lecture hours**	3h x 15w
Subject Code	090125203	**Assignment and self-study**	5h x 15w
ECTS credits	6	**Preparation for exam**	30
KMUTNB Credits	3(3-0-6)	**Total working hours/semester**	150

1 Revision date of this document, reasons for revision

21.11.2022

2 Course description

This course will be provided on special request for special topic and for flexibility.

Assoc. Prof. Dr. Ekachai Juntasaro:

"Turbulence Modelling for CFD: Turbulence; Turbulence Modelling; Standard Turbulence Models; Advanced Topics in Turbulence Modelling; Engineering Applications."

Asst. Prof. Dr. Karuna Tuchinda:

"Computation-based thermal-structural failure analysis for engineering components: the relationship between working conditions and stress-strain distribution together with energy transformation will be discussed."

Dr.-Ing. Alex Brezing:

"Railway Vehicle Vibrations and Reliability Engineering: General introduction to vibrations in rail vehicles, narrowed down to vertical and longitudinal dynamics; methods of vibration analysis; modelling of vibration systems, notation, examples; determining equations for single mass oscillators with base point displacement excitation; modelling of track irregularities in the displacement and frequency domain. RAM analysis and decision making (FMEA/FMECA), reliability engineering for railway (failure rate, hazard rate, Weibull-model and lifetime estimation); RAM demonstration in railway projects; best-practice example: RAM-model for BTS Bangkok."

3 Lecturers

Course Coordinator: Asst. Prof. Dr. Karuna Tuchinda

Instructor)s(: Assoc. Prof. Dr. Ekachai Juntasaro (EJ)

Asst. Prof. Dr. Karuna Tuchinda (KT)

Dr.-Ing. Alex Brezing (AB)

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):

- Knowledge and understanding of principles, techniques and methodology related to special topics offered each semester up on request (GELO 1)
- Awareness and sensitivity towards an engineer's responsibility for sustainability and aspects such as reliability and safety, engineering's impact on society etc. (GELO 2)
- Ability to write a professional-quality report on a research or problem-solving project (GELO 3)
- Ability to perform a literature research and summary and use to solve engineering problem related to special topics offered each semester up on request (GELO5)
- Ability to present a project in front of a professional audience (GELO 6)
- Ability to design topics require to solve engeneering problem (GELO 8)

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

- Ability to design a methodology based on simulation and design to solve engineering problem related to the special topics offered each semester up on request (SELO 1)
- Knowledge and understanding of scientific fundamentals relevant for the understanding of in engineering applications related to the special topics offered each semester up on request (SELO 2)
- Ability to transform an actual technical scenario into a valid model related to the special topics offered each semester up on request (SELO4)
- Ability to apply commercial software for simulation in engineering applications related to the special topics offered each semester up on request (SELO 5)
- Skills of apply commercial software for design in engineering applications related to the special topics offered each semester up on request (SELO6)

Note: These ELOs correspond to the Program ELOs (referenced in parantheses) but are specifically worded for this course by omissions and additions (in *italics*).

5 Assessment

Each student will be individually assessed on:

	Total %
Assignment	30
Report	50
Presentation	20
Total	**100**

6 Teaching materials

- Electronic or printed materials may be handed over during the class.

7 Books and references

- Vary with topics offered up on request

8 Course schedule

Week	Date	Activity, Class Title (unit number)	Evalu -ation %	Class Hours
1	2/01/23	**Introduction(1)**		3.0
2-14	Mon.	**Individual Assignment (2-14)**	30	39.0
15	10/04/23	**Report**	50	3.0
16	17,24/04/23	**Presentation**	20	3.0
SUM			100	48.0

9 Content details

Unit #	Title	Lesson (L) Contents
1	Introduction	• Course detail • Introduction of the topics covered by cous
2-14	Individual Assignments	• Topics depending on student request each semester

10 Details on the evaluation of Expected Learning Outcomes

		Assignments	Report	Presentation
		30%	50%	20%
GELO1	Knowledge and understanding of principles, techniques and methodology related to special topics offered each semester up on request	20 %	20%	
GELO2	Awareness and sensitivity towards an engineer's responsibility for sustainability and aspects such as reliability and safety, engineering's impact on society etc.	2%	5%	5 %
GELO3	Ability to write a professional-quality report on a research or problem-solving project		5%	
GELO5	Ability to perform a literature research and summary and use to solve engineering problem related to special topics offered each semester up on request		5%	
GELO6	Ability to present a project in front of a professional audience			15 %
GELO8	Ability to design topics require to solve engeneering problem	5%	5%	
SELO1	Ability to design a methodology based on simulation and design to solve engineering problem related to the special topics offered each semester up on request	3%		
SELO2	Knowledge and understanding of scientific fundamentals relevant for the understanding of in engineering applications related to the special topics offered each semester up on request	5%	2.5%	
SELO4	Ability to transform an actual technical scenario into a valid model related to the special topics offered each semester up on request		2.5%	
SELO5	Ability to apply commercial software for simulation in engineering applications related to the special topics offered each semester up on request		2.5%	
SELO6	Skills of apply commercial software for design in engineering applications related to the special topics offered each semester up on request		2.5%	