10. MO18-5206 Experimental Design and Data Analysis

Module name	Experimental Design and Data Analysis
Module level, if applicable	Master
Code, if applicable	MO18-5206
Subtitle, if applicable	-
Course, if applicable	Experimental Design and Data Analysis
Semester	2nd Semester
Person responsible for the module	R. Haryo Dwito A., S.T., M.Eng., Ph.D. Prof. Ir. Mukhtasor , M.Eng., Ph.D.
Lecturer	R. Haryo Dwito A., S.T., M.Eng., Ph.D. Prof. Ir. Mukhtasor , M.Eng., Ph.D.
Language	Indonesian
Relation to curriculum	Elective course for master degree program in Ocean Engineering
Type of teaching, contact hours	Lecture, <50 students 150 minutes x 16 weeks per semester
Workload	1. Class, 3 × 50' = 150 minutes per week 2. Independent Study, 3 × 60' = 180 minutes per week 3. Structured Activities, 3 × 60' = 180 minutes per week
Credit points	3 CREDITS ~ 4.8 ECTS CREDITS × 1.6 ECTS
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.
Recommended prerequisites	-

Learning outcomes **and their corresponding PLOs**	CLO.1. Able to understand concepts and can perform the Dimensional Analysis CLO.2. Able to understand physical phenomena and can perform modeling technique, based on the concept of dimensional analysis CLO.3. Able to understand the design procedure in designing physical model experiments CLO.4. Able to understand statistical concepts used in the analysis of experimental results and perform multiparameter regression	LO.3. Able to carry out scientific and technological development in ocean engineering through independent research
Content	This course guides the students along the correct road to perform physical model to get experimentally constants and coefficient used to obtain a fairly complete definition of physical process under investigation. Furthermore, the design of experimen and the analysis process of the experimental results will be discussed. 1. Theory a. Dimensional Analysis b. Similarity Theory and Similitude Analysis c. Method of Synthesis d. Scaling and Scale Errors 2. Practice a. Model Technique b. Model of Coastal Structure c. Model of Coastal Processes d. Model of Thermal and Effluent Outfalls 3. Analysis a. Design of Experiment b. Multi Parameter Regression c. Uncertainty and error d. Experiment variable validation e. Covariance analysis f. Sensitivity analysis	
Study and examination requirements and forms of examination	11. In-class exercise 12. Assignment 13. Mid-term exam 14. Final exam	
Media employed	Offline: LCD, whiteboard, PowerPoint presentation Online: websites (myITS Classroom), Zoom, Microsoft Teams, PowerPoint presentation.	

Reading list	1. *Physical modelling in coastal engineering* / edited by Robert A. Dalrymple, 1985. 2. *Physical Models and Laboratory Techniques in Coastal Engineering Steven* A. Hughes, World Scientific, 1993 3. *Hydraulic modeling*: J.J. Sharp. The Butterworth Group, London-Boston-Sydney-Wellington-Durban-Toronto, 1981. 242 pp 4. *Fundamental of Fluid Mechanics*, Donald F. Young, Bruce R. Munson, Theodore H. Okiishi, John-Wiley & Son, 1990 5. *Design and Analysis of Experiments*, Douglas C Montgomery, Douglas C Montgomery, Wiley; 3rd edition, 1991 6. *A first course in design and analysis of experiments*, Gary W Oehlert