Optimization Techniques

Module name	Optimization Techniques	
Module level	Undergraduate	
Code	IF221223	
Courses (if applicable)	Optimization Techniques	
Semester	5/6	
Lecturer	Budi Nugroho, S.Kom, M.Kom (PIC) Yisti Vita Via, S.ST, M.Kom	
Language	Bahasa Indonesia and English	
Relation to curriculum	Elective; 5th or 6th semester	
Type of teaching, contact hours	Project-based learning, problem-based learning, and research-based learning.	
Teaching Methods	Lecture, lab works, project	
Workload	1. Lectures: 3 sks x 50 = 150 minutes (2 hours 30 minutes) per week. 2. Exercises and Assignments: 3 x 60 = 180 minutes (3 hours) per week. 3. Private study: 3 x 60 = 180 minutes (3 hours) per week	
Credit points	3 credit points (sks)	
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.	
Mandatory prerequisites	Artificial Intelligence	
Courses description	This course consists of concepts, practices, and methods of optimization techniques on solving classification and clusterisation. Topics that will be covered in this course are: Optimization Techniques concepts and basics; calculation of evaluation method in Optimization Techniques; and case studies of Optimization Techniques implementations on solving classification and clustering problems.	
Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to:	
	CO1 Students are able to illustrate the concept and common terms in Optimization Techniques, able to discuss examples of Optimization Techniques implementations in, either from scientific journals or commonly used everyday applications.	PLO9,PLO10
	CO2 Students are able to implement and build every steps on Optimization Techniques method, either by theory or practice by programming.	PLO9,PLO10
	CO3 Students are able to evaluate and present the performance of classification and clustering methods in Optimization Techniques using performance measurement evaluation methods correctly.	PLO9,PLO10
Content	Concepts of spatial information system, data forms, data storage, data integration, differences between SIS data format, and web-based SIS application.	
Media employed	LCD, whiteboard, websites, books (as references), online meeting, etc.	

Assessments and Evaluation	One written Midterm assessment (60 minutes) and one final oral exam (30 minutes), two short computer-based quizzes, takehome written assignments
Study and examination requirements and forms of examination	The final grade in the module is composed of: • Two short computer-based quizzes: 15% x 2 = 30% • Take-home written assignments : 15% • Written Midterm assessment: 25% • Final oral exam: 30% Students must have a final grade of 55.6% or higher to pass.
Reading List	● A. Khamis, Optimization Algorithms: AI Techniques for Design, Planning, and Control Problems. Shelter Island, NY, USA: Manning, 2024. ● S. Chen, K. C. Cheung, and P. Yam, Financial Data Analytics with Machine Learning, Optimization and Statistics. 2024. ● C. Hudson, High-Performance Computing with Julia: Optimizing Algorithms and Applications. 2024. ● E. F. Combarro and S. Gonzalez-Castillo, A Practical Guide to Quantum Machine Learning and Quantum Optimization. 2023. ● M. Makrehchi, Efficient Algorithm Design: Unlock the power of algorithms to optimize computer programming. Packt Publishing, Oct. 31, 2024. ISBN: 978-1835886823. [Online]. Available: https://portal.igpublish.com/iglibrary/obj/PACKT0007631?searchid=1755056595384_xyN4Se7KVAhexeF7VM1G ● P. M. Pardalos and T. M. Rassias (Eds.), Analysis, Geometry, Nonlinear Optimization and Applications. Singapore: World Scientific Publishing Co., 2023. ISBN: 978-9811261565. [Online]. Available: https://portal.igpublish.com/iglibrary/obj/WSPCB0011233?searchid=1755056745135fi9btlsXh6IY6HavLk6T1