Image Analysis

Module name	Image Analysis	
Module level	Undergraduate	
Code	IF221220	
Courses (if applicable)	Image Analysis	
Semester	5/6	
Lecturer	Budi Nugroho, S.Kom, M.Kom (PIC) Achmad Junaidi, S.Kom, M.Kom	
Language	Bahasa Indonesia and English	
Relation to curriculum	Elective; 5th/6th semester	
Type of teaching, contact hours	Lectures, < 60 students	
Teaching Methods	Project-based learning, problem-based learning	
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 covers the introduction of image object recognition, pattern recognition methods, and the implementation of image analysis in specific domains. The learning process is facilitated through project-based learning, where students collaborate on group projects with specific topics. During the project execution, groups comprehend conceptual aspects, implement methodologies, conduct method testing, and document their findings in the form of a scientific journal.	
Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to:	
	CO1 Students are able to explain the fundamental concepts of image analysis in a responsive manner and provide examples of the application of image analysis. (C2, A2, C2)	PLO9,PLO10
	CO2 Students are able to explain image preprocessing and image segmentation processes. (C2, A2)	PLO9,PLO10
	CO3 Students are able to explain image feature extraction, including its types and methods. (C2, A2)	PLO9,PLO10
	CO4 Students are capable of practicing image detection and recognition methods, as well as evaluating their results. (C3, P3, A3)	PLO9,PLO10
Content	Fundamental image concepts, image segmentation, image detection methods, pattern recognition, and other forms of image recognition.	
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, take home 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	●W. Burger and M. J. Burge**,** Digital Image Processing – An Algorithmic Introduction*,* 3rd ed. Cham, Switzerland: Springer Nature, 2022 ●F. Cuevas, P. L. Mazzeo, and A. Bruno (Eds.), Digital Image Processing – Latest Advances and Applications. London, UK: IntechOpen, 2024. ●E. Cuevas and A. N. Rodríguez**,** Image Processing and Machine Learning, Volume 2. 2024. ●F. A. Merchant and K. R. Castleman (Eds.), Microscope Image Processing*,* 2nd ed. Oxford, UK: Academic Press, 2022. ●Kashyap, Manish. Digital Image Processing Using Python: A comprehensive guide to the fundamentals of digital image processing. BPB Publications, Jan. 2025. ISBN-13: 978-93-6589-891-0; e-Pub ISBN: 978-93-6589-426-4. [Online]. Available: https://portal.igpublish.com/iglibrary/obj/BPB0000731?searchid=1754990199426t1wpNUBmQoAWC6A1~gl6u