Computer Vision

Module name	Computer Vision
Module level	Undergraduate
Code	IF221221
Courses (if applicable)	Computer Vision
Semester	5/6
Lecturer	Budi Nugroho, S.Kom, M.Kom (PIC) Fetty Tri Anggraeny, S.Kom, M.Kom
Language	Bahasa Indonesia and English
Relation to curriculum	Elective; 5th or 6th semester
Type of teaching, contact hours	Lectures, < 60 students,
Teaching Methods	project-based learning, problem-based learning, research base
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	The course is designed for students to understand object detection, pattern recognition methods, and the implementation of ACVK (Advanced Computer Vision and Knowledge) in specific focus areas. The learning process is conducted using project-based learning, where students work on group projects with specific topics. During the project work, the groups grasp the conceptual, methodological implementation, test the methods, 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 computer vision and provide examples of computer vision applications.	PLO9, PLO10
	CO2 Students are able to explain the image segmentation process, the segmentation process, and the evaluation of segmentation.	PLO9, PLO10
	CO3 Students are able to explain image descriptors along with their types and methods.	PLO9, PLO10
Content	Basic concepts of computer vision, image segmentation, descriptors, statistics-based pattern recognition methods, syntax, and neural networks.
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	• E. Cuevas and A. N. Rodríguez, Image Processing and Machine Learning, Volume 2, 238 pp., 2024. • J. Howse and J. Minichino, Learning OpenCV 5 Computer Vision with Python, 470 pp., 2025. • N. Chimitt and S. H. Chan, Computational Imaging Through Atmospheric Turbulence, 2024. • **Anoma, Jean.** Mastering Neural Network Computer Vision with TensorFlow and Keras: A practical guide to image use cases like object detection, image segmentation, and text recognition. BPB Publications, 2025. ISBN: 9789365897609. [Online]. Available: https://portal.igpublish.com/iglibrary/obj/BPB0000734?searchid=1754988976064iXvX8AGyVudLx8irRw1Um • **Ayyadevara, V. Kishore, and Yeshwanth Reddy.** Modern Computer Vision with PyTorch: A Practical Roadmap from Deep Learning Fundamentals to Advanced Applications and Generative AI, Second Edition. Packt Publishing, 2024. ISBN: 9781803231334. [Online]. Available: https://portal.igpublish.com/iglibrary/obj/BPB0000734?searchid=1754988976064iXvX8AGyVudLx8irRw1Um