

HANDBOOK

BACHELOR OF INFORMATICS PROGRAM
DEPARTMENT OF INFORMATICS
FACULTY OF INTELLIGENT ELECTRICAL AND INFORMATICS TECHNOLOGY
INSTITUT TEKNOLOGI SEPULUH NOPEMBER

Module name	Digital Image Processing
Module level	Undergraduate
Code	IF184952
Courses (if applicable)	Digital Image Processing
Semester	6
Contact person	
Lecturer	
Language	Bahasa Indonesia and English
Relation to curriculum	1. Undergraduate degree program; mandatory; 6 th semester. 2. International undergraduate program; mandatory; 6 th semester.
Type of teaching, contact hours	1. Undergraduate degree program: lectures, < 60 students, 2. International undergraduate program: lectures, < 40 students
Workload	1. Lectures: $3 \times 50 = 150$ minutes (2 hours 30 minutes) per week. 2. Exercises and Assignments: $3 \times 60 = 180$ minutes (3 hours) per week. 3. Private study: $3 \times 60 = 180$ minutes (3 hours) per week.
Credit points	3 credit points (skrs).
Requirements according to the examination	A student must have attended at least 80% of the lectures to sit in the exams.

regulations	
Mandatory prerequisites	Computational Intelligence
	After completing this module, a student is expected to:

Learning outcomes and their corresponding PLOs	C01 Students are able to explain visual perception and definition of digital image processing.	PLO3
	C02 Students are able to explain image enhancement to increase contrast and to perform filtering using various methods in the spatial domain.	PLO3
	C03 Students are able to explain transformation and image filtering in the frequency domain, wavelet, and Hough transform.	PLO3
	C04 Students are able to explain the basics of color, color image processing, and pseudo color.	PLO3
	C05 Students are able to explain the process of image restoration to repair the degraded image visually, geometrically image registration, and zooming process.	PLO4
	C06 Students are able to implement digital image processing for visualization and analysis of the results.	PLO4
	C07 Students are able to explain the methods of segmentation with a variety of techniques, which based on boundary/edge detection, threshold values, and regions.	PLO5
	C08 Students are able to explain the concept of representation and description as well as feature extraction methods as image descriptors, and template matching method.	
	C09 Students are able to explain morphological method, especially for binary images.	
	C10 Students are able to explain the process of encoding and decoding, and the concept of image compression.	
	C11 Students are able to implement image segmentation, feature description and analyze the results.	
Content	<p>Knowledge:</p> <p>Mastering concept and principles of Intelligent System such as representation and reasoning techniques, searching technique, intelligent agent, data mining, machine learning, and development of intelligent application in various fields, and also mastering concept and principles of computation science such as manage information, multimedia data processing, and numerical analysis.</p> <p>Specific Skill:</p> <p>Able to design and develop applications using principles of intelligent systems and computing science to produce intelligent applications in various fields.</p>	
Study and examination requirements and forms of examination	Mid-terms examination and Final examination.	
Media employed	LCD, whiteboard, websites, books (as references), etc.	

Assessments and Evaluation	CO1: Problem 1 in mid-term exam (5%) and exercise 1 (5%) - 10% CO2: Problem 2 in mid-term exam (5%) and exercise 2 (5%) -
	10% CO3: Problem 3 in mid-term exam (5%); problem 4 in mid-term exam (5%); assignment 1: make an algorithm and computer program (5%); and exercise 3 (5%) - 20% CO4: Problem 5 in mid-term exam (5%); problem 1 in final exam (5%) and exercise 4 (5%) - 15% CO5: Problem 2 in final exam (5%); assignment 2: make a function and recursive (5%); and exercise 5 (5%) - 15% CO6: Problem 3 in final exam (5%) and exercise 6 (5%) - 10% CO7: Problem 4 in final exam (5%) and exercise 7 (5%) - 10% CO8: Problem 5 in final exam (5%) and assignment 3: make a program based on a real-life problem (5%) - 10%
Reading List	Gonzales, R.C., and Woods, R. E., "Digital Image Processing", Prentice Hall, 2008 Pratt, W.K., "Digital Image Processing", John Wiley & Sons, Inc., 2007 Forsyth, David A., and Ponce, Jean, "Computer Vision: A Modern Approach", 2nd Ed., Pearson Education, Inc., 2012 Petrou, Maria, and Petrou, Costas, "Image Processing: The Fundamentals", John Wiley & Sons Ltd, 2010 Costaridou, Lena (Ed.), "Medical Image Analysis Methods", Taylor & Francis Group, 2005 Russ, John C., "The Image Processing Handbook", fifth edition, CRC Press, 2007