Module designation	CE649 Image Processing
Semester(s) in which the module is taught	5
Person responsible for the module	Nabila Husna Shabrina, S.T, M.T.
Language	Indonesian
Relation to curriculum	Compulsory
Didactic Methods	Lecture, Problem Based, Collaborative, Demonstration, Hands-On, Interactive Multimedia, Independent Learning
Workload (incl. contact hours, self-study hours)	Theory: Total workload: 90.72 hours 23.34 hours of synchronous lecture. 56.04 hours of self-study and assignments in the form of essays. 11.34 hours related to exam and self study Lab Total workload: 45.36 hours 23.35 hours of group project (in-class assistance) 16.34 hours of self-conducted group project and assignments related to the group project 5.67 hours related to exam and self study
Credit points	Theory 2 SKS /(3.36 ECTS) Lab 1 SKS /(1.68 ECTS)
Required and recommended prerequisites for joining the module	CE529 Digital Signal Processing

<table>
<tr><td>Module objectives/intended learning outcomes</td><td>
<table>
<tr><td>D</td><td>D1</td><td>Ability to operate and coordinate (if necessary) on technical working tasks in a team.</td><td>Students will be able to implement digital image processing methods based on the problem specifications given individually or in groups (C4) (Lab)</td></tr>
<tr><td>F</td><td>F2</td><td>Ability to design computer-based solutions to solve actual problems.</td><td>Students will be able to explain the concept of image properties and image processing methods (C2)
Students will be able to use image processing methods such as image filtering and image processing morphology (C3)
Students will be able to analyze various digital image processing methods (C4)
Students will be able to use various digital image processing methods with the Python programming language (Lab) (C3)</td></tr>
<tr><td rowspan="2">I</td><td>I1</td><td>Understand the concept of software and hardware integration, distributed system, and computer communication protocols.</td><td rowspan="2">Students will be able to design image processing systems as solutions to problems in the surrounding environment (C6) (Lab)</td></tr>
<tr><td>I2</td><td>Ability to develop and integrate software and hardware as scalable distributed systems that incorporate various device types for the purpose of solving engineering problems.</td></tr>
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<tr><td>Content</td><td>This course covers the concept of image properties and image processing methods with the Python programming language.</td></tr>
<tr><td>Assessment Instrument</td><td>Written Test, Performance, Product Based</td></tr>
<tr><td>Study and examination requirements</td><td>The total average score for this subject
● Theory 66.67% = assignments&quiz (30%), midterm exam (30%), final exam (40%)
● Lab 33.33% = assignments&quiz (30%), midterm exam (30%), final exam (40%)
Final score must be more than or equal to 55 (C).</td></tr>
<tr><td>Reading list</td><td>Theory
1. Raphael C. Gonzalez, Richard E. Woods, Digital Image Processing 4th Edition, Pearson, 2019 [RCG]</td></tr>
</table>

	2. Richard Szeliski, Computer Vision: Algorithms and Applications, 2nd ed, 2022 [RS] 3. Joseph Howse, Prateek Joshi, Michael Beyeler, OpenCV: Computer Vision Projects with Python, Packt Publishing, 2016 [JH] 4. Jan Erik Solem, Programming Computer Vision with Python, O'Reilly Media, 2012 [JES] Lab 1. Sandipan Dey, Hands on Image Processing with Phyton, Packt Publishing, 2018 [SD]