I. DETAILED SUBJECT DESCRIPTION	
1. Title of subject (O/S)*:	**Computer Graphics**
2. Code of subject:	**CoG**
3. Department:	**Mechanical-Electrical**
4. Major:	**BSc in Computer Science**
5. Module:	**Civilian / Military**
6. Education cycle:	**I°**
7. Study mode:	**Full-time**
8. Profile:	**academic**
9. Lecturer:	**Artur Zacniewski (PhD Eng)**
0. Date of update:	**05 March 2025**

** O/S – obligatory / selection*

AIMS OF THE SUBJECT	
A1	To acquaint with the syntax and usage of the Python language.
A2	To acquaint with the tools and libraries of Python language dedicated to Computer Graphics and Image Processing.
A3	To acquaint with the basics of Computer Graphics.
A4	To acquaint with the basics of Image Processing.

PREREQUISITE KNOWLEDGE, SKILLS AND COMPETENCIES	
1	Basics of Statistics and Linear Algebra

LEARNING OUTCOMES	
On successful completion on this subject, students should be expected to:	
LO1	know: basic structures of Python language (lists, tuples, dictionaries) and its syntax.
LO2	know: basic operations performed on images (displaying, manipulating pixels, etc.)
LO3	understand: issues related to usage of proper libraries to retrieve, store and process images.
LO4	know: basics of Computer Graphics, Image Processing and OpenCV library.
LO5	know: how to start analysis of images with given tool.
LO6	use his knowledge in a practical way to build Computer Graphics and Image Processing applications.

STRUCTURE OF THE SUBJECT	
Form of classes	Number of hours
Lecture	15
Laboratory	30

SUBJECT MATTER CONTENT	
LEC01	Introduction to Python and its graphics and images libraries.
LEC02	Retrieving, processing, and storing images, manipulating pixels.
LEC03	Transformations – rotating, cropping, scaling, flipping and translating.
LEC04	Image arithmetic, masking and color spaces.
LEC05	Histograms, blurring, smoothing and thresholding
LEC06	Image gradients and edge detection.
LAB1	Basic image operations on images with OpenCV.
LAB2	Working with image arithmetic, masking and color spaces.
LAB3	Working with histograms, blurring, smoothing and thresholding

LAB4	Working with gradients and edge detection.
LAB5	Working with video files
TEACHING AIDS	
1	Multimedia presentations and tutorials.
2	Computers with the Internet access (tests, labs and exam).
METHOD OF ASSESSMENT (F – FORMATIVE, P - SUMMATIVE)	
F1-F5	Assessment of laboratory reports
F6	Test
P Lec	Assessment of test
P Lab	Average Rating Factor P Lab = Average(F1-F5)

STUDENT WORKLOAD	
Form of activity	**Average number of hours**
Contact hours with the teacher:	**45**
Lectures and classes	45
exam	0
Student work:	**25**
Preparation of a plan-outline (plan work as an instructor at the point of teaching)	15
Preparation for classes	10
TOTAL NUMBER OF HOURS PER SEMESTER	**70**
NUMBER OF ECTS POINTS	**3**

LITERATURE	
Basic	
1	Introduction to Computer Vision and Image Processing – Coursera, 2025.
2	Free OpenCV BootCamp, OpenCV University, 2025.
Recommended	
4	Python Project: Software Engineering and Image Manipulation, Coursera, 2025.
LECTURER (NAME AND SURNAME, E-MAIL)	
1	**Artur Zacniewski, a.zacniewski@amw.gdynia.pl**