Course Syllabus

Code - Course Title	**BVA228 - Computer Vision**
Course Type	IV. SEMESTER
Laboratory + Practice	2+1
ECTS	**3.0**
Language of Instruction	Türkçe
Course Type	Area Elective Courses
Course Instructor(s)	ÖĞR. GÖR. AHMET MÜCAHİD ARVASİ

Mode of Delivery	Face to face
Prerequisites	There are no prerequisites or corequisites for this course.

Course Syllabus

Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 1		Fundamentals of Computer Vision: Image Formation, Pixels, and Color Spaces (RGB, HSV, Grayscale)	
Week - 2		Basic Filtering Operations: Image Smoothing, Noise Reduction, and Spatial Filters	
Week - 3		Image Processing Techniques 1: Gradients and Edge Detection Algorithms (Sobel, Canny)	
Week - 4		Image Processing Techniques 2: Morphological Operations (Erosion, Dilation) and Image Segmentation	
Week - 5		Feature Extraction: SIFT, SURF, and Harris Corner Detection Techniques	
Week - 6		Relationships Between Images: Feature Matching and Fundamentals of Object Recognition	
Week - 7		Deep Learning in Computer Vision: Introduction to Convolutional Neural Networks (CNN) and Feature Learning	
Week - 8		Midterm Exam	
Week - 9		Modern CNN Architectural Designs (ResNet, VGG) and Transfer Learning in Image Classification	
Week - 10		Object Detection: R-CNN Based Region Networks and YOLO Architectures	
Week - 11		Real-Time Object Tracking and Optical Flow Algorithms	
Week - 12		Biometric Analysis Applications: Face Recognition and Human Pose Estimation	
Week - 13		Industrial Applications: Environmental Perception in Autonomous Systems and Video Analytics	
Week - 14		Computing on Edge Devices for Vision, Model Optimization, and End-of-Term Project Presentations	

Learning Outcomes

#	Learning Outcome
1	Upon successful completion of this course, students will gain the competence to grasp the building blocks of computer vision such as image formation, color spaces, and basic filtering, apply image processing techniques like edge detection and morphological operations, perform feature extraction and object matching using SIFT and corner detection methods, train deep learning models like convolutional neural networks (CNNs) and YOLO architectures for use in object detection and real-time tracking tasks, and integrate facial recognition, pose estimation, and optical flow algorithms into industrial video analytics projects on autonomous systems or edge devices.

Sustainable Development Goals

No content has been provided.

Course Theme

No content has been provided.

AKTS Workload

Activity	Duration (Hour)	Count	Workload
Teorik Derse Katılım	0	0	0
Sınıf Dışı Çalışma (Ön Hazırlık & Pekiştirme Amaçlı)	0	0	0
Ödevler	0	0	0
Proje - Rapor - Sunum Hazırlama	0	0	0
Ara Sınav Hazırlığı (sınav süresi dahil)	0	0	0
Final Sınavı Hazırlığı (sınav süresi dahil)	0	0	0
Uygulama (Laboratuvar, Müzik/Enstrüman Uygulaması, Atölye/Saha Çalışması vb.)	0	0	0
Staj Uygulaması	0	0	0
		Calculated ECTS	**0**

Assessment Method and Passing Requirements

No content has been provided.