**Course Description Form**

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| 1. Course Name:
 |
| Computer Vision |
| 1. Course Code:
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| 1. Semester / Year:
 |
| 2023-2024 |
| 1. Description Preparation Date:
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|  |
| 1. Available Attendance Forms:
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|  |
| 1. Number of Credit Hours (Total) / Number of Units (Total)
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|  |
| 1. Course administrator's name (mention all, if more than one name)
 |
| Name: Dr.Adil Abdulwahhab Al-AzzawiEmail: adil\_alazzawi@updiyala.edu.iq |
| 1. Course Objectives
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| **Course Objectives** | * **Understand the fundamental concepts and components of computer vision systems.**
* **Learn about image representation, enhancement, and segmentation techniques.**
* **Explore feature extraction methods, including point detection, edge detection, and corner detection.**
* **Study object detection and recognition algorithms, such as template matching, HOG, and CNNs.**
* **Gain practical experience in implementing computer vision algorithms using programming languages such as Python and libraries like OpenCV.**
* **Understand the challenges and limitations of computer vision systems, including occlusion, illumination, and scale variations.**
* **Explore advanced topics in computer vision, including 3D reconstruction, motion analysis, and video processing.**
* **Learn about real-world applications of computer vision in fields such as robotics, healthcare, surveillance, and autonomous vehicles.**
* **Develop critical thinking and problem-solving skills through hands-on projects, assignments, and case studies.**
* **Explore ethical considerations and societal impacts of computer vision technologies, including privacy concerns and bias in algorithms.**
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| 1. Teaching and Learning Strategies
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| **Strategy** | **The Computer Vision course provides a comprehensive introduction to the principles, techniques, and applications of computer vision. Students will learn about image processing, feature extraction, object detection, and recognition, as well as advanced topics such as deep learning for vision tasks. The course will cover both theoretical concepts and practical implementation, with hands-on exercises and projects to reinforce learning.** |
| 1. Course Structure
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| **Week**  | **Hours**  | **Required Learning Outcomes**  | **Unit or subject name**  | **Learning method**  | **Evaluation method**  |
| **1** | **2** | **Understand the fundamental concepts and components of computer vision systems.** | **Introduction to Computer Vision** |  |  |
| **2** | **2** | **Learn about image representation, enhancement, and segmentation techniques.** | **Image Processing Basics: Filters, Histograms, and Transformations** |  |  |
| **3** | **2** | **Explore feature extraction methods, including point detection, edge detection, and corner detection.** | **Image Enhancement and Restoration** |  |  |
| **4** | **2** |  | **Image Segmentation** |  |  |
| **5** | **2** | **Study object detection and recognition algorithms, such as template matching, HOG, and CNNs.** |  |  |
| **6** | **2** |  | **Feature Extraction: Point, Edge, and Corner Detection** |  |  |
| **7** | **2** | **Gain practical experience in implementing computer vision algorithms using programming languages such as Python and libraries like OpenCV.** |  |  |
| **8** | **2** | **Understand the challenges and limitations of computer vision systems, including occlusion, illumination, and scale variations.** | **Object Detection and Recognition****Deep Learning for Computer Vision** |  |  |
| **9** | **2** | **Explore advanced topics in computer vision, including 3D reconstruction, motion analysis, and video processing.** | **Advanced Topics: 3D Vision, Motion Analysis, and Video Processing** |  |  |
| **10** | **2** | **Learn about real-world applications of computer vision in fields such as robotics, healthcare, surveillance, and autonomous vehicles.** | **Real-world Applications of Computer Vision** |  |  |
| **11** | **2** | **Develop critical thinking and problem-solving skills through hands-on projects, assignments, and case studies.** |  |  |
| **12** | **2** |  |  |  |
| **13** | **2** | **Explore ethical considerations and societal impacts of computer vision technologies, including privacy concerns and bias in algorithms.** | **Ethical and Societal Implications of Computer Vision** |  |  |
| **14** | **2** |  |  |  |
| **15** | **2** |  | **Final Exam Review** | **Lecture Base** |  |
| 1. Course Evaluation
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| The course will consist of lectures, demonstrations, hands-on labs, programming assignments, and a final project. Students will have the opportunity to work with real-world datasets and apply computer vision techniques to solve practical problems. |
| 1. Learning and Teaching Resources
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| Required textbooks (curricular books, if any) |  |
| Main references (sources) |  |
| Recommended books and references (scientific journals, reports...) |  |
| Electronic References, Websites |  |