

Computer Vision

Code: 45518
ECTS Credits: 6

2025/2026

Degree	Type	Year
Digital Humanities and Heritage	OP	1

Contact

Name: Juan Antonio Barceló Álvarez

Email: juanantonio.barcelo@uab.cat

Teachers

Sonia Boadas Cabarrocas

(External) David R. González

Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

No prior knowledge of computer science or programming is required, except for familiarity with computer equipment at an advanced user level. The required level of mathematics is that of compulsory secondary education.

Some familiarity with humanities and/or cultural topics is recommended.

English proficiency sufficient to read texts is required

It is assumed that subject 45527 Digital Cultural heritage has already been passed.

Objectives and Contextualisation

This course covers the use of computer vision technologies and digital video in cultural and humanistic fields. It introduces methods for digital image processing, semantic annotation, cataloging, and indexing. Regarding 3D modeling, it focuses on object recognition through artificial intelligence techniques and builds upon what was introduced in course 45527 *Digital Cultural Heritage*, delving more deeply into geometric models, reconstruction (digital anastylosis), rendering, and animation.

Learning Outcomes

1. CA16 (Competence) Explain the operation of computer vision systems that provide concrete solutions to problems arising from public use and open access to culture.
2. CA17 (Competence) Describe the limits and drawbacks of some of the computer vision methodologies applied to the study and dissemination of historical and cultural heritage.
3. KA19 (Knowledge) Identify the different computer vision technologies that can be used in cultural and humanistic studies.
4. KA20 (Knowledge) Identify different ways of managing the geometric information of a visual model by adding semantic information.
5. SA23 (Skill) Edit geometric models resulting from 3D scanning of historical and architectural objects.
6. SA24 (Skill) Render geometric models resulting from 3D scanning of historical and architectural objects.
7. SA25 (Skill) Use different technologies and approaches in the virtual reconstruction of heritage elements.

Content

- Introduction to Digital Photography and Digital Image Processing
- Advanced Methods for the Analysis and Processing of Historical Images and Ancient Documents. Cataloging and Annotation. Segmentation.
- Use of Multispectral Images for the Analysis and Restoration of Historical Documents and Works of Art
- Image Recognition and Classification. Introduction to Machine Learning
- Image Recognition and Classification. Image Preprocessing
- Image Recognition and Classification. Convolutional Neural Networks in Art History and Other Cultural Studies
- Image Recognition and Classification. Convolutional Neural Networks in Archaeology

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
attendance at lectures led by the professor	18	0.72	CA16, CA17, KA19, KA20, CA16
Practical work at lab with computer equipment	18	0.72	SA23, SA24, SA25, SA23
Type: Supervised			
Supplementary practical work with computer equipment	34	1.36	CA17, KA19, KA20, SA23, SA24, SA25, CA17
Type: Autonomous			
Personal Study and Bibliographical consultation	60	2.4	CA16, CA17, KA19, KA20, SA23, SA24, SA25, CA16

Attendance at theoretical classes led by the professor.

Attendance at seminar sessions and practicals using computers and specific software, directed by the professor.

Classes are held in a specialized computer lab.

Comprehensive reading of texts.

The student is expected to make an independent effort to consult specialized bibliography. Part of the documentation is in English.

Class debates, moderated by the teaching staff, on the most significant topics.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evaluation of practical work suggested by the professor	40%	10	0.4	CA17, KA19, KA20, SA23, SA24, SA25
Presentation of written comments based on suggested bibliography	30%	5	0.2	CA16, CA17, KA19, KA20, SA23, SA24, SA25
Presenting a written and critical text using Generative Artificial Intelligence	30%	5	0.2	CA16, CA17, KA19, KA20, SA23, SA24, SA25

The assessment methodology for this master's program is based on the active and reflective participation of students. Their analytical skills will be evaluated through practical exercises using computer software as assigned by the teaching staff. In addition, students will be asked to provide commentary on articles and bibliographic references.

At the end of the course, students must prepare critical summaries of different technologies, expressing and arguing for best practice criteria.

Another key component of the assessment will be a critical assignment involving the use of Generative Artificial Intelligence tools, applied to one of the topics covered during the course. This task must include a reflection on the limitations and potential of these technologies within the field of Digital Humanities. Specific details regarding format, criteria, and deadlines will be explained and discussed in class by the teaching staff.

Single final assessment is not permitted.

When each assessment activity is assigned, the teaching staff will inform students (via Moodle) of the procedure and the date for grade review.

Resit procedure: only the final task (critical summary) will be eligible for resubmission. This decision will be made on a case-by-case basis following a personal interview between the student and the teaching staff.

The resubmission deadline will also be determined on a case-by-case basis and by mutual agreement between the teaching staff and the student.

A student will receive a grade of "Not assessable" if none of the required assessment activities are submitted.

If a student commits any irregularity that could significantly affect the grade of an assessment activity, that activity will be graded with a 0, regardless of any disciplinary proceedings that may be initiated. If multiple irregularities are detected in the assessment activities of the same course, the final grade will be 0.

This course encourages the use of Artificial Intelligence (AI) technologies as an integral part of task development, provided that the final outcome reflects a significant contribution from the student in terms of analysis and personal reflection. The student must:

- (i) identify which parts were generated using AI;
- (ii) specify the tools used; and
- (iii) include a critical reflection on how these tools influenced the process and the final outcome of the activity.

Lack of transparency in the use of AI in this assessed activity will be considered academic dishonesty and will be penalized with a grade of 0 with no possibility of resubmission, or with more severe sanctions in the most serious cases.

Bibliography

Additional references will be provided using UAB Campous Virtual-MOOC

General references:

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Jung, A. (2022). *Machine learning: the basics*. Springer Nature.

Lauro, V., & Lombardo, V. (2023). The cataloging and conservation of digital survey in archaeology: A photogrammetry protocol in the context of digital data curation. *Heritage*, 6(3), 3113-3136.

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Mueller, J. P., & Massaron, L. (2021). *Machine learning for dummies*. John Wiley & Sons.

Petrou, M. M., & Kamata, S. I. (2021). *Image processing: dealing with texture*. John Wiley & Sons.

Raschka, S., Liu, Y. H., & Mirjalili, V. (2022). *Machine Learning with PyTorch and Scikit-Learn: Develop machine learning and deep learning models with Python*. Packt Publishing Ltd.

Salaba, A., & Chan, L. M. (2023). *Cataloging and classification: an introduction*. Rowman & Littlefield.

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Tejasree, G., & Agilandeewari, L. (2024). An extensive review of hyperspectral image classification and prediction: techniques and challenges. Multimedia Tools and Applications, 83(34), 80941-81038.

Zhang, D., Islam, M. M., & Lu, G. (2012). A review on automatic image annotation techniques. Pattern Recognition, 45(1), 346-362.

Software

In general:

The GIMP, <https://www.gimp.org/>

Google Teachable Machines, <https://teachablemachine.withgoogle.com/>

Other software will be recommended through the course

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(SEMm) Seminars (master)	1	Spanish	second semester	afternoon