



PROGRAMS AND COURSES

PROGRAMS AND COURSES / COURSES / ENGN6528 / FIRST SEMESTER /

CLASS SUMMARY | [BACK TO COURSE DETAILS](#)

Computer Vision

A Postgraduate course offered by the **School of Engineering**.



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Computer Vision is an important field of Artificial Intelligence concerned with questions such as "how to extract information from image or video, and how to build a machine to see". Recent explosive growth of digital imaging technology, advanced computing, and deep learning makes the problems of automated image interpretation even more exciting and much more relevant than ever. This course introduces students to fundamental problems in image processing and computer vision, as well as their state-of-the-art solutions.

Topics covered in detail include: image formation, image filtering, camera geometry, thresholding and image segmentation, edge, point and feature detection, geometric frameworks for vision, single view and two views geometry; 3D visual reconstruction, camera calibration; stereo vision, image classification and object recognition, deep learning and neural networks for computer vision etc. The course features extensive practical components including computer labs and Term Research projects that provide students with the opportunity to practice and refine their skills in image processing and computer vision.

Learning Outcomes

Upon successful completion, students will have the knowledge and skills to:

1. Proficiently apply specialised knowledge, methods and skills in image processing and computer vision applications, research and development.
2. Identify, formulate and innovatively solve problems in image processing and computer vision.
3. Critically analyse, evaluate and examine existing practical computer vision systems.
4. Communicate effectively to both specialist and non-specialist audiences to integrate and synthesize complex visual information processing systems.
5. Critically review and assess scientific literature in the field and apply theoretical knowledge to identify the novelty and practicality of proposed methods.

CLASS NUMBER 2363		TERM CODE 3330	
CLASS INFO		CLASS DATES	
Unit Value	6 units	Class Start Date	20/02/2023
Mode of Delivery	In Person	Class End Date	26/05/2023
COURSE CONVENER	Dr Miaomiao Liu	Census Date	31/03/2023
		Last Date to Enrol	27/02/2023
		TUTOR	Hoang Nguyen Huiyu Gao

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COMPUTER VISION (ENGN6528)

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6. Apply research methods and advanced knowledge to design and develop practical and innovative image processing and computer vision applications or systems.
7. Conduct themselves professionally and responsibly in the areas of computer vision, image processing and deep learning.

Additional Course Costs

The course required GPU resources for students to work on deep learning based lab assignment.

Required Resources

GPU resources

Recommended Resources

Whether you are on campus or studying remotely, there are a variety of online platforms you will use to participate in your study program. These could include videos for lectures and other instruction, two-way video conferencing for interactive learning, email and other messaging tools for communication, interactive web apps for formative and collaborative activities, print and/or photo/scan for handwritten work and drawings, and home-based assessment.

ANU outlines [recommended student system requirements](#) to ensure you are able to participate fully in your learning. Other information is also available about the various [Learning Platforms](#) you may use.

Staff Feedback

Students will be given feedback in the following forms in this course:

- written comments
- verbal comments
- feedback to whole class, groups, individuals, focus group etc

Student Feedback

ANU is committed to the demonstration of educational excellence and regularly seeks feedback from students. Students are encouraged to offer feedback directly to their Course Convener or through their College and Course representatives (if applicable). Feedback can also be provided to Course Conveners and teachers via the [Student Experience of Learning & Teaching \(SELT\) feedback program](#). SELT surveys are confidential and also provide the Colleges and ANU Executive with opportunities to recognise excellent teaching, and opportunities for improvement.

Other Information

We will use turnitin and moss for plagiarism checking.

Class Schedule

WEEK/SESSION	SUMMARY OF ACTIVITIES	ASSESSMENT
1	Course Introduction, Image Processing, Image Formation, Image Transformation	1, 5, 4
2	Image Processing, Image filtering	1, 5, 4
3	Corner detection, SIFT feature	1,5,4
4	Deep Learning basics	2, 5,4
5	Deep Learning and its applications	2, 5,4
6	High level vision: image recognition, object detection and instance segmentation	2,5, 4

WEEK/SESSION	SUMMARY OF ACTIVITIES	ASSESSMENT
7	Line fitting, 3D-vision basics, camera model	3,5,4
8	3D Vision -camera calibration, vanishing points, vanishing lines	3,5,4
9	3D Vision -Homography – two view geometry	3,5,4
10	3D Vision –essential matrix – triangulation – stereo	5
11	Computational Photography: optical flow, shape from x	5
12	Computational Photography: Photometric stereo, Revision	5

Tutorial Registration

ANU utilises MyTimetable to enable students to view the timetable for their enrolled courses, browse, then self-allocate to small teaching activities / tutorials so they can better plan their time. Find out more on the [Timetable webpage](#).

Assessment Summary

ASSESSMENT TASK	VALUE	DUE DATE	LEARNING OUTCOMES
CLAB1	10 %	26/03/2023	1,3,4,6,7
CLAB2	10 %	30/04/2023	1,3,4,6,7
CLAB3	10 %	21/05/2023	1,3,4,6,7
Assignment	15 %	14/05/2023	1,2,3,4,5,6,7
Final Exam	55 %	*	3,6,7

* If the Due Date and Return of Assessment date are blank, see the Assessment Tab for specific Assessment Task details

Policies

ANU has [educational policies, procedures and guidelines](#), which are designed to ensure that staff and students are aware of the University's academic standards, and implement them. Students are expected to have read the [Academic Integrity Rule](#) before the commencement of their course. Other key policies and guidelines include:

- [Academic Integrity Policy and Procedure](#)
- [Student Assessment \(Coursework\) Policy and Procedure](#)
- [Special Assessment Consideration Guideline and General Information](#)
- [Student Surveys and Evaluations](#)
- [Deferred Examinations](#)
- [Student Complaint Resolution Policy and Procedure](#)
- [Code of practice for teaching and learning](#)

Responsible Officer: Registrar, Student Administration / **Page Contact:** [Website Administrator](#) / [Frequently Asked Questions](#)