

Course Syllabus

 Edit

DSBA 6010: Applied Computer Vision

Spring 2024

Rick Chakra

Contact Information

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Office Hours: Friday - by appointment

Course Description / Objectives

Applied Computer Vision is designed to equip DSBA students with the fundamental knowledge and skills required in the field of computer vision, with a focus on applications in data science. In the past decade, there has been exponential growth in the volume of visual data available for analysis and decision making. Deep learning-based computer vision techniques offer powerful tools for extracting information and insights from visual data, and have become a core component of modern data analytics and AI implementations across industries. This course aims to bridge the gap between theory and practice, and will provide students with a blend of core theoretical knowledge and hands-on experience in processing, manipulating, modeling, and analyzing vision-based data through deep learning. Through a mix of in-class labs, homework assignments, and a project, students will learn to implement these techniques across a range of real-world problems using Python and PyTorch. By the end of the course, students will have gained a foundational understanding of computer vision, expertise in working with deep learning frameworks, and expanded their data-science toolbox to be able to apply computer vision techniques effectively in their future work / research.

Instructional Method

Materials presented in this course will be covered through lectures and labs. Key topics will be explored through hands-on application in Python / PyTorch. Students will gain both the theoretical understanding of computer vision concepts, as well as the experience of putting such concepts and techniques into practice.

Textbook

[Modern Computer Vision with PyTorch](https://www.packtpub.com/product/modern-computer-vision-with-pytorch/9781839213472)  (<https://www.packtpub.com/product/modern-computer-vision-with-pytorch/9781839213472>)

Topics and Key Dates

Introduction to CV / PyTorch:	1/11
Introduction to CV / PyTorch:	1/18
Image Classification:	1/25
Image Classification / Project Pitch :	2/1
Transfer Learning / Practical Implementation Techniques:	2/8
Transfer Learning / Practical Implementation Techniques:	2/15
Object Detection and Tracking / Project Update :	2/22
Object Detection and Tracking / Exam Review:	2/29
Midterm Exam :	3/14
Exam Recap / Image Segmentation:	3/21
Image Segmentation:	3/28
Autoencoders and GANs / Project Update :	4/4
Autoencoders and GANs / Diffusion Models:	4/11
Zero-shot and Few-shot Learning / Model Deployment:	4/18

Flex / Final Project Presentation:	4/25
Final Exam:	5/2

Course Requirements and Grading Policy

Assignments:	25%
Project:	25%
Midterm Exam:	25%
Final Exam:	25% (not cumulative)

Additional Policies

Attendance: Students are expected to attend all class meetings and to arrive before the class starts. Class topics are integrated, with each week building on prior weeks. Failure to attend or to arrive on time can adversely affect both individual performance, ability to contribute to the group project, and the earned letter grade. If a student misses a class due to work or other reasons, it is their responsibility to get notes from peers; instructors do not hold extra repeat class sessions. Students will be allowed to miss no more than 3 classes without affecting their final grade. For every 3 absences the final grade will be lowered by one letter grade.

Grade Discussions: The instructor will discuss grades only in person (and not via telephone or e-mail) and only with the student (not with parents, spouses, etc). Office hours are listed in the syllabus.

Electronic Devices: Students are not allowed to use any electronic devices during the class, unless otherwise instructed by the instructor.

Academic Integrity







All students are expected to adhere to the **UNC Charlotte Code of Student Academic Integrity** [↗](http://legal.uncc.edu/policies/ps-105.html) (<http://legal.uncc.edu/policies/ps-105.html>) (<http://legal.uncc.edu/policies/ps-105.html> [↗](http://legal.uncc.edu/policies/ps-105.html)) as specified in the current **Catalog** [↗](http://www.provost.uncc.edu/Catalogs/) (<http://www.provost.uncc.edu/Catalogs/>) (<http://catalog.uncc.edu/> [↗](http://catalog.uncc.edu/) (<http://catalog.uncc.edu/>)).

Among other things, this code forbids cheating, fabrication or falsification of information, multiple submission of academic work, plagiarism, abuse of academic materials, and complicity in academic dishonesty.

Inclement Weather

University Policy Statement #13 states the University is open unless the Chancellor announces that the University is closed. The inclement weather hotline number to call is 704-786-2877. In the event of inclement weather, check your email the morning of class. The instructors will use their best judgment as to whether class should be held understanding that some of you commute from far away and the instructors will notify you by email if class is cancelled.

Course Summary:

Date	Details	Due
Thu Jan 11, 2024	 202410-Spring 2024-DSBA-6010-U90-Special Topics in DSBA (https://uncc.instructure.com/calendar?event_id=788914&include_contexts=course_212415)	5:30pm to 8:15pm
Thu Jan 18, 2024	 202410-Spring 2024-DSBA-6010-U90-Special Topics in DSBA (https://uncc.instructure.com/calendar?event_id=789427&include_contexts=course_212415)	5:30pm to 8:15pm
	 Project Teams (https://uncc.instructure.com/courses/212415/assignments/2119824)	due by 11:59pm
Thu Jan 25, 2024	 202410-Spring 2024-DSBA-6010-U90-Special Topics in DSBA (https://uncc.instructure.com/calendar?event_id=789428&include_contexts=course_212415)	5:30pm to 8:15pm
	 Module 1 Labs (https://uncc.instructure.com/courses/212415/assignments/2125548)	due by 11:59pm
Fri Jan 26, 2024	 Week 2 Labs (https://uncc.instructure.com/courses/212415/assignments/2130745)	due by 11:59pm



[Project Pitch](https://uncc.instructure.com/courses/212415/assignments/2118038)

due by 5:29pm

(<https://uncc.instructure.com/courses/212415/assignments/2118038>)

Thu Feb 1, 2024



[202410-Spring 2024-DSBA-](https://uncc.instructure.com/calendar?event_id=789429&include_contexts=course_212415)

[6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789429&include_contexts=course_212415)

([https://uncc.instructure.com/calendar?](https://uncc.instructure.com/calendar?event_id=789429&include_contexts=course_212415)

[event_id=789429&include_contexts=course_212415](https://uncc.instructure.com/calendar?event_id=789429&include_contexts=course_212415))

5:30pm to 8:15pm

Fri Feb 2, 2024



[Week 3 labs](https://uncc.instructure.com/courses/212415/assignments/2133605)

due by 11:59pm

(<https://uncc.instructure.com/courses/212415/assignments/2133605>)

Thu Feb 8, 2024



[202410-Spring 2024-DSBA-](https://uncc.instructure.com/calendar?event_id=789430&include_contexts=course_212415)

[6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789430&include_contexts=course_212415)

([https://uncc.instructure.com/calendar?](https://uncc.instructure.com/calendar?event_id=789430&include_contexts=course_212415)

[event_id=789430&include_contexts=course_212415](https://uncc.instructure.com/calendar?event_id=789430&include_contexts=course_212415))

5:30pm to 8:15pm

Fri Feb 9, 2024



[Week 4 Labs](https://uncc.instructure.com/courses/212415/assignments/2136125)

due by 11:59pm

(<https://uncc.instructure.com/courses/212415/assignments/2136125>)

Sun Feb 11, 2024



[DataCamp - Computer Vision](https://uncc.instructure.com/courses/212415/assignments/2118035)

[Intro / Prep Material](https://uncc.instructure.com/courses/212415/assignments/2118035)

due by 11:59pm

(<https://uncc.instructure.com/courses/212415/assignments/2118035>)

Thu Feb 15, 2024



[202410-Spring 2024-DSBA-](https://uncc.instructure.com/calendar?event_id=789431&include_contexts=course_212415)

[6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789431&include_contexts=course_212415)

([https://uncc.instructure.com/calendar?](https://uncc.instructure.com/calendar?event_id=789431&include_contexts=course_212415)

[event_id=789431&include_contexts=course_212415](https://uncc.instructure.com/calendar?event_id=789431&include_contexts=course_212415))

5:30pm to 8:15pm

Fri Feb 16, 2024



[Week 5 labs](https://uncc.instructure.com/courses/212415/assignments/2138727)

due by 11:59pm

(<https://uncc.instructure.com/courses/212415/assignments/2138727>)

Thu Feb 22, 2024



[202410-Spring 2024-DSBA-](https://uncc.instructure.com/calendar?event_id=789432&include_contexts=course_212415)

[6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789432&include_contexts=course_212415)

([https://uncc.instructure.com/calendar?](https://uncc.instructure.com/calendar?event_id=789432&include_contexts=course_212415)

[event_id=789432&include_contexts=course_212415](https://uncc.instructure.com/calendar?event_id=789432&include_contexts=course_212415))

5:30pm to 8:15pm

Thu Feb 29, 2024



[202410-Spring 2024-DSBA-](https://uncc.instructure.com/calendar?event_id=789433&include_contexts=course_212415)

[6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789433&include_contexts=course_212415)

([https://uncc.instructure.com/calendar?](https://uncc.instructure.com/calendar?event_id=789433&include_contexts=course_212415)

[event_id=789433&include_contexts=course_212415](https://uncc.instructure.com/calendar?event_id=789433&include_contexts=course_212415))

5:30pm to 8:15pm



[202410-Spring 2024-DSBA-](https://uncc.instructure.com/calendar?event_id=789433&include_contexts=course_212415)

[6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789433&include_contexts=course_212415)

5:30pm to 8:15pm

Thu Mar 14, 2024

https://uncc.instructure.com/calendar?event_id=789435&include_contexts=course_212415




Mid Term

<https://uncc.instructure.com/courses/212415/assignments/2118037>

due by 8:30pm

Thu Mar 21, 2024

 [202410-Spring 2024-DSBA-6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789436&include_contexts=course_212415)
(https://uncc.instructure.com/calendar?event_id=789436&include_contexts=course_212415)

5:30pm to 8:15pm

Thu Mar 28, 2024

 [202410-Spring 2024-DSBA-6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789437&include_contexts=course_212415)
(https://uncc.instructure.com/calendar?event_id=789437&include_contexts=course_212415)

5:30pm to 8:15pm

Thu Apr 4, 2024

 [202410-Spring 2024-DSBA-6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789438&include_contexts=course_212415)
(https://uncc.instructure.com/calendar?event_id=789438&include_contexts=course_212415)

5:30pm to 8:15pm

Thu Apr 11, 2024

 [202410-Spring 2024-DSBA-6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789439&include_contexts=course_212415)
(https://uncc.instructure.com/calendar?event_id=789439&include_contexts=course_212415)

5:30pm to 8:15pm

Thu Apr 18, 2024

 [202410-Spring 2024-DSBA-6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789440&include_contexts=course_212415)
(https://uncc.instructure.com/calendar?event_id=789440&include_contexts=course_212415)

5:30pm to 8:15pm

Thu Apr 25, 2024



Project Presentation

<https://uncc.instructure.com/courses/212415/assignments/2118039>

due by 5:29pm

 [202410-Spring 2024-DSBA-6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789441&include_contexts=course_212415)
(https://uncc.instructure.com/calendar?event_id=789441&include_contexts=course_212415)

5:30pm to 8:15pm

Thu May 2, 2024

 [202410-Spring 2024-DSBA-6010-U90-Special Topics in DSBA](https://uncc.instructure.com/calendar?event_id=789442&include_contexts=course_212415)
(https://uncc.instructure.com/calendar?event_id=789442&include_contexts=course_212415)

5:30pm to 8:15pm



[Final Exam](#)

<https://uncc.instructure.com/courses/212415/assignments/2118034>



[Final Exam](#)

<https://uncc.instructure.com/courses/212415/assignments/2118036>
