

EOS 340/PHYS 340: Atmospheric Science Section 201801

Lecture TWF 12:30-13:20 Room: COR B107
Tutorial T 08:30-09:20 Room: ELL 061

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| | Instructor | Teaching Assistant |
| | Adam Monahan | Carsten Abraham |
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| Office Hours | WF 11:00-12:00 | |

Calendar Description: Introduction to the dynamic and thermodynamic processes governing the Earth's weather and climate. Emphasis on energy and temperature; cloud and precipitation processes; winds and weather systems; ocean-atmosphere interaction; El Niño; and past, present, and future climates.

Prerequisites: One of PHYS 102, PHYS 102A and PHYS 102B, PHYS 110 and PHYS 111, PHYS 112, PHYS 120 and PHYS 130; or permission of the department

Pre- or corequisites: 225 or two of MATH 200, 201, 204, 205; one of CHEM 245, PHYS 217, PHYS 317

Textbook: Monahan, A., *EOS 340: Atmospheric Science Lecture Notes*

Supplementary textbook: Stull, R., *Meteorology for Scientists and Engineers*
www.eoas.ubc.ca/books/PracticalMeteorology

Course Website: coursespaces.uvic.ca

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| Assessment: | Assignments | 25% |
| | Quizzes | 5 % |
| | Midterm exams | 2 × 15 % |
| | Final exam | 40 % |

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| Grading: | A+ (90-100) | A (85-89) | A- (80-84) | B+ (77-79) | B (73-76) |
| | B- (70-72) | C+ (65-69) | C (60-64) | D (50-59) | F (0-49) |

Assignments: There will be four assignments given throughout the term. The main purpose of these assignments is to apply the concepts discussed in the lectures. While students are strongly encouraged to work together on the assignments, each student must submit their own assignment: submission of work copied from another student will be treated as plagiarism and dealt with as per university policy (<https://web.uvic.ca/calendar2017-09/undergrad/info/regulations/academic-integrity.html#>). Late assignments will be accepted, but at a penalty of 10% per day.

Quizzes: Six in-class pop quizzes will be given over the course of the semester, consisting each of a single short question with a one- or two-word answer. Only the best five of these will be counted toward the final grade. No make-up quizzes will be given.

Attendance: Attendance in class is not required. Students arriving after the first five minutes of class will not be allowed into the lecture room.

Exams: There will be two 50-minute midterm exams in this course, held during the tutorial sessions of February 06 and March 06, as well as a final exam. All examinations are completely open book. You can bring in any printed material you want, and any handwritten material *provided you wrote it yourself*. You cannot bring in any handwritten material by another person (e.g. another person's graded assignment). Neither can you make use during the examinations of any electronic device which transmits or receives signals.

All requests for Deferred Status for final exams MUST be made at Records Services on a Request for Academic Concession form. No other arrangement is acceptable.

No supplemental examinations are offered in this course.

Lecture Schedule (dates are approximate)

| Date | Topic | |
|----------|--|-------------------------|
| 01/03/18 | Introduction | |
| 01/05/18 | Large-scale structure of the Earth's atmosphere | |
| 01/09/18 | Mass: Residence times and ideal gases | |
| 01/10/18 | Mass: Saturation vapour pressure | |
| 01/12/18 | Mass: Measures of humidity | |
| 01/16/18 | Mass: Condensation and cloud processes I | |
| 01/17/18 | Mass: Condensation and cloud processes II | |
| 01/19/18 | Mass: Precipitation processes | |
| 01/23/18 | Mass: Pressure gradient force & hydrostatic equilibrium I | |
| 01/24/18 | Mass: Pressure gradient force & hydrostatic equilibrium II | |
| 01/26/18 | Energy: Internal energy and adiabatic processes | Assignment 1 due |
| 01/30/18 | Energy: Blackbody radiation | |
| 01/31/18 | Energy: Radiative transfer I | |
| 02/02/18 | Energy: Radiative transfer II | |
| 02/06/18 | Energy: Radiative transfer III | Midterm 1 |
| 02/07/18 | Energy: Greenhouse effect & radiative energy budget I | |
| 02/09/18 | Energy: Greenhouse effect & radiative energy budget II | |
| 02/13/18 | <i>Reading Break</i> | |
| 02/14/18 | <i>Reading Break</i> | |
| 02/16/18 | <i>Reading Break</i> | |
| 02/20/18 | Energy: Surface energy budget & differential heating | |
| 02/21/18 | Energy: Static stability and convection I | |
| 02/23/18 | Energy: Static stability and convection II | Assignment 2 due |
| 02/27/18 | Energy: Static stability and convection III | |
| 02/28/18 | Momentum: Centrifugal and Coriolis forces I | |
| 03/02/18 | Momentum: Centrifugal and Coriolis forces II | |
| 03/06/18 | Momentum: Atmospheric force balances I | Midterm 2 |
| 03/07/18 | Momentum: Atmospheric force balances II | |
| 03/09/18 | Momentum: Atmospheric force balances III | |
| 03/13/18 | The global tropospheric circulation I | |
| 03/14/18 | The global tropospheric circulation II | |
| 03/16/18 | Synoptic-scale weather: Extratropical cyclones | Assignment 3 due |
| 03/20/18 | Synoptic-scale weather: Hurricanes | |
| 03/21/18 | Mesoscale thermal circulations | |
| 03/23/18 | Convective storms and tornadoes | |
| 03/27/18 | Special topic I | |
| 03/28/18 | Special topic II | |
| 03/30/18 | <i>Good Friday</i> | |
| 04/03/18 | Past and future climates I | Assignment 4 due |
| 04/04/18 | Past and future climates II | |
| 04/06/18 | Review | |

Special topic lectures (March 27 and 28) will be selected by class vote from the following topics: Ocean-Atmosphere Interaction, El Niño, and the Middle Atmosphere.