

PHY 2505S
ATMOSPHERIC RADIATIVE TRANSFER AND REMOTE SOUNDING
JANUARY – APRIL 2012
GENERAL INFORMATION

LECTURER: Prof. Kaley Walker

Office: Room MP 712, Department of Physics

Telephone: 416 978 8218

E-mail: kwalker@atmosp.physics.utoronto.ca

Office hour: Fridays 1-2 PM or by appointment

COURSE WEBSITE:

<http://www.atmosp.physics.utoronto.ca/~kwalker/phy2505/>

LECTURES: 2 hours / week

M and W 10 – MP606

REFERENCES (available on short-term loan from UofT libraries):

There is no required textbook for this course. In addition to the notes and handouts given in class, the following texts and other works on atmospheric physics and radiation may be useful references.

- *An Introduction to Atmospheric Radiation* (2nd edition), K. N. Liou (Academic Press, 2002) – Physics and Gerstein libraries.
- *A First Course in Atmospheric Radiation*, (2nd edition), G.W. Petty (Sundog Publishing, 2004) – Physics and Gerstein libraries

MARKING SCHEME (Deadlines to be discussed in class and posted on the course website):

30% Problem sets (2)

30% Term paper

10% Outline/bibliography for term paper

15% Seminar

15% Journal club presentation/discussion facilitation

PENALTIES FOR LATE WORK:

One mark will be deducted for each day that the work is delayed up to one week after which the work will not be accepted.

Requests for exemptions have to be made at least 24 hours before the deadline and may or may not be granted.

SUBMISSION OF WORK:

Work must be handed to the lecturer in person. Work put in the lecturer's mailbox or slid under her office door or submitted by e-mail will not be accepted. Accommodations will be made for students who are in the field.

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COURSE TOPICS

Review of radiative transfer
Radiative absorption and emission in general
Solar variability and determination of the solar constant
The spectrum of the atmosphere
The role of minor constituents and the greenhouse effect
Introduction to molecular spectroscopy (Rotational and ro-vibrational)
Spectral line shapes; approximations and modeling
Techniques and methodologies for atmospheric remote sounding
Uses of satellite instrumentation for atmospheric remote sensing
Scattering of radiation; applications to the atmosphere (as time permits)

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ASSIGNMENT DESCRIPTIONS

PROBLEM SETS:

There will be two problems set assignments during the term. While you may discuss the assignment with your classmates, you must prepare your answers to the problems independently. Marks will be given for showing workings as well as for final answers. Further information will be provided with each problem set.

TERM PAPER, OUTLINE/BIBLIOGRAPHY AND SEMINAR PRESENTATION:

The topic for your paper/presentation will be a current/recent remote sounding mission and selected results obtained from the mission. Before Reading Week, you must discuss the topic with your lecturer. By early March, you will complete an outline for the paper (including an “annotated” bibliography). Guidelines for the outline, term paper, and presentation will be provided later in the term.

“JOURNAL CLUB” PRESENTATION/DISCUSSION FACILITATION:

You will be responsible for presenting a journal article related to the course material (chosen by your lecturer) and leading a class discussion of this paper. These presentations will be spread throughout the term (as part of two lectures, at times to be agreed upon with your lecturer).

Guidelines on the format of the presentation and expectations for the discussion will be provided later in the term. Your mark will be assessed based on the presentation and facilitation of discussion of your paper and on your participation in discussion of the other papers.
