EXPANDED COURSE DESCRIPTION
EARTH, SPACE SCIENCE AND ENGINEERING
Lassonde School of Engineering
Earth and Space Science and Engineering
LE / ESSE 4140 3.0 SECTION M
NUMERICAL WEATHER PREDICTION
FALL 2017 / WINTER 2018

Last Modified Date: 08/18/2017

COURSE CALENDAR DESCRIPTION
The development of computational techniques for the solution of problems in atmospheric dynamics. The construction of numerical models for the prediction of weather. Three lecture hours per week, eight three-hour laboratory sessions. One term. Three credits. Prerequisites: LE/ESSE 3040 3.00; LE/EECS 1540 3.00 or equivalent FORTRAN programming experience. Prerequisite or corequisite: LE/ESSE 4130 3.00 strongly recommended. Prior to Fall 2014: Prerequisites: LE/EATS 3040 3.00; LE/CSE 1540 3.00 or equivalent FORTRAN programming experience. Prerequisite or corequisite: LE/EATS 4130 3.00 strongly recommended. Prior to Summer 2013: Prerequisite or corequisite: SC/EATS 4130 3.00 strongly recommended. Prior to Fall 2009: Prerequisites: SC/EATS 3040 3.00; AK/AS/SC/CSE 1540 3.00 (formerly COSC) or equivalent FORTRAN programming experience. Prerequisite or corequisite: SC/EATS 4130 3.00 strongly recommended.

INSTRUCTOR(S)

<table>
<thead>
<tr>
<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
<th>Contact Phone</th>
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<tbody>
<tr>
<td>Klaassen, Gary P</td>
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TOPICS AND CONCEPTS
Content:

- Finite differencing techniques and error analysis
- Analysis of finite difference approximations to advection and diffusion equations
- Development of criteria for computational stability and convergence.
- Aliasing and non-linear computational instability
- Galerkin spectral and finite element techniques
- Shallow water equations
- Geostrophic adjustment and model initialization
- Parameterization of physical processes
- Numerical Forecast Models

ADDITIONAL INFORMATION
Main Reference:

Recommended Texts:
Atmospheric Modelling, Data Assimilation and Predictability, E. Kalnay (Cambridge University Press, 2003)
Further References:


Graded Assessment:

Labs/Assignments: 50%

Exam (3 hrs): 50%

ACADEMIC INTEGRITY LINKS

- Senate Policy on Academic Honesty
- Academic Integrity

STUDENT LINKS

- Student Rights and Responsibilities
- Religious Observance
- Academic Accommodation for Students with Disabilities
- Counselling and Disability Services

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