Course Change Request

New Course Proposal

Date Submitted: 05/03/18 11:25 am

Viewing: **CLIM 614 : Land-Climate Interactions**

Last edit: 05/03/18 11:25 am

Changes proposed by: bklinger

In Workflow

1. **AOES Chair**
2. **SC Curriculum Committee**
3. SC Associate Dean
4. Assoc Provost-Graduate
5. Registrar-Courses
6. Banner

Approval Path

1. 05/07/18 1:51 pm Jim Kinter (ikinter): Approved for AOES Chair

Are you completing this form on someone else's behalf?
No

Effective Term: Spring 2019

Subject Code: CLIM - Climate Dynamics **Course Number:** 614

Bundled Courses:

Equivalent Courses:

Catalog Title: Land-Climate Interactions

Banner Title: Land-Climate Interactions

Will section titles vary by semester? No

Credits: 3

Schedule Type: Lecture

Hours of Lecture or Seminar per week: 3

Repeatable: May only be taken once for credit (NR)

Default Grade Mode: Graduate Regular

Recommended Prerequisite(s): BS or MS in mathematics or physical science, or permission of instructor.

Recommended Corequisite(s):

Required Prerequisite(s) / Corequisite(s) (Updates only):

Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):

And/Or	(	Course/Test Code	Min Grade/Score	Academic Level	)	Concurrency?

Registration Restrictions (Updates only):

Registrar's Office Use Only - Registration Restrictions:

Field(s) of Study:

Class(es):

Level(s):

Degree(s):

School(s):

Catalog Description: nterdisciplinary course providing detailed description of surface energy and water balance over land and radiative and turbulent transfer. Introduces numerical techniques for modeling land surface and applications in weather, climate, and hydrologic forecasting and simulation. Includes hands-on experience with land surface models in computer laboratory, including sensitivity experiments to reinforce theoretical concepts. Exposure to contemporary research through reading and reviewing seminal journal papers.

Justification:

This is a renumbering of CLIM 714. The course is being changed to 600 level to facilitate possible future cross-list with advanced (400 level) undergraduate course.

Does this course cover material which crosses into another department? No

Learning Outcomes:

o Understanding of surface water and energy balances between land and atmosphere.
o Understanding of the hydrologic, thermal, radiative and dynamical interactions between land and atmosphere.
o Ability to perform rigorous calculations and analysis of data.
o Familiarity with the evolution of the field of research and its current state of the art.

Attach Syllabus (PDFs only) clim714syllabus.pdf

Additional Attachments (PDFs only)

Staffing: Course will be taught by AOES faculty member Dr. Paul Dirmeyer, who originally developed it, and has been teaching it, as CLIM 714.

Relationship to Existing Programs: CLIM 614 will be a requirement for the Climate Dynamics PhD (replacing current CLIM 714 requirement) and for proposed Climate Science MS.

Relationship to Existing Courses: CLIM 614 replaces CLIM 714, which will be deactivated.

Additional Comments: Attached syllabus is from CLIM 714; CLIM 614 syllabus is identical except for course number.

Reviewer Comments

Key: 15915

CLIM 614 - Land-Climate Interactions

Description
This is an interdisciplinary course and a core course in the Climate Dynamics program, providing detailed descriptions of surface energy and water balances over land, radiative and turbulent transfer. Introduces numerical techniques for modeling the land surface and applications in weather, climate, and hydrologic forecasting and simulation. This course includes hands-on experience with analysis of climate data to reinforce theoretical concepts, and exposure to contemporary research through reading and reviewing seminal journal papers.

Learning Objectives
- Understanding of surface water and energy balances between land and atmosphere.
- Understanding of the hydrologic, thermal, radiative and dynamical interactions between land and atmosphere.
- Ability to perform rigorous calculations and analysis of data.
- Developing intuition and empirical understanding along with technical expertise.
- Familiarity with the evolution of the field of research and its current state of the art.

Materials
No required textbook – material from lecture notes. These supplemental textbooks may be useful:
Terrestrial Hydrometeorology by Jim Shuttleworth.
Ecological Climatology by Gordon Bonan.

Course Outline
Week 1: Introduction, Structural Concepts: Systems, Models, Scaling
Week 2: Mathematical Concepts: Budgets, Extinction, Conduction, Feedback, Sensitivity, Correlation
Week 3: Water and Carbon Balances at the Land Surface
Week 4: Energy Balance at the Land Surface
Week 5: Atmospheric Boundary Layer and Turbulence
Week 6: Radiative Transfer and Vegetation
Week 7: Soil Physics
Week 8: Spring Break
Week 9: Models of Land Systems and Seminal Research
Week 10: Land-Atmosphere Feedbacks and Coupling
Week 11: Assembling a Land Surface Model
Week 12: Comparisons of Land Surface Models over Small and Large Scales
Week 13: Eco-hydrology
Week 14: Land Variability, Land Use Change and Climate Change
Week 15: Analysis Project Results

Grading

Homework	50% (5 Assignments, 10% each)
Analysis Project	20%
Paper Presentation	15%
Final Exam	15%

Academic Policies
Students are expected to observe the university Honor Code and principles spelled out by the Office of Academic Integrity.
Students with disabilities should consult with the Office of Disability Services and speak with the instructor to discuss accommodation needs.

GMU is one of the most diverse campuses in the US. An inclusive and collaborative environment is maintained at all times in this course. For more about compliance, diversity and ethics on campus.