George Mason University
Graduate Course Approval/Inventory Form
Please complete this form and attach a copy of the syllabus for new courses. Forward it as an email attachment to the Secretary of the Graduate Council. A printed copy of the form with signatures should be brought to the Graduate Council Meeting. Complete the Coordinator Form on page 2, if changes in this course will affect other units.

Please indicate:  _X_ NEW  ____ MODIFY  ____ DELETE

Local Unit:  SCS  Graduate Council Approval Date:

Course Designation:  CLIM  Course Number:  753

Full Course Title:  General Circulation of the Atmosphere

Abbreviated Course Title (24 characters max.):  Atmospheric Circulation

Credit hours:  3  Program of Record:  CLIM Ph.D.

Repeatable for Credit?  _D=Yes, not within same term  Up to hours
__T=Yes, within the same term  Up to hours
_X  N=Cannot be repeated for credit

Activity Code:  _X_ Lecture (LEC)  ___ Lab (LAB)  ___ Recitation (RCT)
__ Studio (STU)  ___ Internship (INT)  ___ Independent Study (IND)  ___ Seminar (SEM)

Catalog Credit Format:  3:3:0  Course Level:  GF(500-600)  ___ GA(700+)  _X_

Maximum Enrollment:  25  For NEW courses, first term to be offered:  Fall 2005

Prerequisites:  CLIM 710 and CLIM 711

Catalog Description (35 words or less):  Gives an observational overview and several theoretical perspectives of the atmospheric transport of energy, moisture and angular momentum; and how these transports fundamentally affect the climate on various time scales.

For MODIFIED or DELETED courses as appropriate:
Last term offered:  Previous Course Abbreviation:  Previous number:

APPROVAL SIGNATURES:
Submitted by:  _______________David M. Straus  email:  straus@cola.iges.org

Department/Program:  _______________ Date:  _______________

College Committee:  _______________ Date:  _______________

Graduate Council Representative:  _______________ Date:  _______________
GEORGE MASON UNIVERSITY  
Course Coordination Form

Approval from other units:

Please list those units outside of your own who may be affected by this new, modified, or deleted course. Each of these units must approve this change prior to its being submitted to the Graduate Council for approval.

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Graduate Council approval: ___________________________ Date: ____________

Graduate Council representative: ________________________ Date: __________

Provost Office representative: _________________________ Date: __________
1. COURSE DESIGNATION:

CLIM 753 General Circulation of the Atmosphere

Prerequisites: Introduction to the Physical Climate System (CLIM 710) and Introduction to Atmospheric Dynamics (CLIM 711)

Catalog description: Gives an observational overview and several theoretical perspectives of the atmospheric transport of energy, moisture and angular momentum; and how these transports fundamentally affect the climate on various time scales.

2. COURSE JUSTIFICATION:

Course objectives: Review of the observations of the transport of fundamental quantities (energy, moisture, angular momentum) by various components of the atmospheric circulation; study theoretical perspectives on these transports; give the students the ability to read and thoroughly understand modern journal articles on the general circulation

Course necessity: This course is a part of the CLIM course sequence for the Climate Dynamics Ph.D. program, and is appropriate for those students specializing in atmospheric dynamics. For those students, thesis research depends on understanding the role of various components of the atmospheric general circulation in global and regional climate, and on understanding the large-scale atmosphere-ocean and atmosphere-land interactions. This course has been taught as a Special Topics CSI Course in the Fall of 2003.

Course relationship to Existing Programs: The proposed course is an elective in the Climate Dynamics Ph.D. Program

Course relationship to Other Existing Courses: This course complements, but is no way redundant with, several other courses in the School of Computational Sciences, namely EOS 753 (Observing Earth and Its Climate), CSI 655 (Introduction to the Physics and Chemistry of the Atmosphere) and CSI 750 (Earth Systems and Global Changes).

3. APPROVAL HISTORY NA

4. SCHEDULING AND PROPOSED INSTRUCTORS

Time of initial offering: Fall 05

Proposed instructors: David M. Straus, V. Krishnamurthy

Contact: Dr. David M Straus
          Office: Off-Campus at:
                COLA, 4041 Powder Mill Dr., Suite 302
Course Syllabus: CLIM 753
General Circulation of the Atmosphere


Course content
(The time necessary for each Unit is given in weeks; one week means one 3-hour lecture, or two 1.5 hour lectures)

Unit 1 (1 week) Overview of atmospheric energy, moisture and angular moment transport. Decomposition of atmospheric flow into components (eddy and zonal mean flow, stationary and transient component).

Unit 2: (2 weeks) Stationary waves in mid-latitudes: Observations, transports and theories.

Unit 3: (2.5 weeks) Tropical stationary waves: the monsoonal circulations, the Walker Circulation, regional Hadley circulations (Indian, Pacific, Atlantic Oceans and Africa).

Unit 4: (2 weeks) The mean meridional circulation. Observations and Theories. The Hadley cell and its role in meridional transport. The necessity of eddies.

Unit 5: (2.5 weeks) Mid-latitude transient fluctuations: Observations, theories and modeling. Transport by high and low frequency fluctuations. Storm tracks, blocking and regimes.

Unit 6: (2 weeks) Tropical transient fluctuations: Kelvin, Rossby, Gravity waves. Theories and observations

Unit 7: (1 week) The Madden-Julian Oscillation. Theories and observations.

Unit 8: (1 week) Tropical / Extratropical interactions. Is the PNA forced by ENSO? Mid-winter suppression of baroclinic activity in storm tracks.

Unit 9: (1 week) Presentation of student papers.

Grading: There will be 3 homework sets, and a major student project (written and oral) to be presented during Unit 9. There is also a final exam. Final grade is based on: 1/3 homework, 1/3 student project and 1/3 final exam.