March 17, 2011

MEMORANDUM

TO: Steve Halperin  
      Dean, College of Computer, Mathematical and Natural Sciences

FROM: Elizabeth Beise (Elizabeth Beise)  
      Associate Provost for Academic Planning and Programs

SUBJECT: Proposal to Establish a Minor in Planetary Sciences (PCC log no. 10034)

On March 4, 2011, the Senate PCC committee approved your proposal to add a Minor in Planetary Sciences. A copy of the approved agreement is attached.

The change is effective Fall 2011. The College should ensure that the minor is fully described in the Undergraduate Catalog and in all relevant descriptive materials, and that all advisors are informed.

MDC/

Enclosure

cc:  David Salness, Chair, Senate PCC Committee  
     Sarah Bauder, Office of Student Financial Aid  
     Reka Montfort, University Senate  
     Erin Howard, Office of Information Technology  
     Donna Williams, Institutional Research & Planning  
     Anne Turkos, University Archives  
     Linda Yokoi, Office of the Registrar  
     James Dietz, Undergraduate Studies  
     Paul Smith, College of Computer, Mathematical and Natural Sciences  
     Stuart Vogel, Astronomy  
     Michael Brown, Geology
THE UNIVERSITY OF MARYLAND, COLLEGE PARK
PROGRAM/CURRICULUM PROPOSAL

DIRECTIONS: Provide one form with original approval signatures in lines 1 - 4 for each proposed action. Keep this form to one-page in length. Forms and appropriate attachments should be submitted to the Office of Academic Affairs, who will assign a Log Number to each proposal. Also submit an electronic version of as much of the proposal as is possible.

DATE SUBMITTED: 11/4/2010

COLLEGE/SCHOOL: CMPS

DEPARTMENT/PROGRAM: GEOL

PROPOSED ACTION (A separate form for each) ADD _X_ DELETE _____ CHANGE _____

DESCRIPTION (Provide a succinct account of the proposed action. Details should be provided in an attachment. Provide old and new sample programs for curriculum changes.)

This is a proposal to add a Joint Minor in Planetary Sciences. See attached.

JUSTIFICATION/REASONS/RESOURCES (Briefly explain the reason for the proposed action. Identify the source of new resources that may be required. Details should be provided in an attachment.)

To reflect the growing synergies in the research efforts of the Departments of Astronomy and Geology, and serve the growing number of non-majors with interests in planetary sciences and whose primary studies dovetail with them. See attached.

APPROVAL SIGNATURES

1. Department Committee Chair

2. Department Chair

3. College/School PCC Chair

4. Dean

5. Dean of the Graduate School (if required)

6. Chair, Senate PCC

7. Chair of Senate

8. Vice President for Academic Affairs & Provost

VPAAP Rev. 3/1/04
The University of Maryland, College Park Program/Curriculum Proposal

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Approval Signatures

1. Department Committee Chair ___________________________ Eric McCumber ___________ 11/4/10

2. Department Chair ___________________________ Scot W. Cowen _______ 11/4/10

3. College/School PCC Chair ___________________________ Paul J. Smith _______ 12/10/10

4. Dean ___________________________ ___________________________ ___________________________

5. Dean of the Graduate School (if required) ___________________________ ___________________________

6. Chair, Senate PCC ___________________________ ___________________________ ___________________________

7. Chair of Senate ___________________________ ___________________________ ___________________________

8. Vice President for Academic Affairs & Provost ___________________________ ___________________________

PCC Log No.

VPAAP Rev. 3/1/04
Proposal for a new Joint Minor in Planetary Sciences

1. This is a proposal to create a new minor.

2. **Reasons for the minor**: In recent decades, the success of robotic missions throughout the Solar System, including the deployment of orbital and fly-by spacecraft, landers, rovers, and impactors, has fundamentally altered how we study planets. Information obtained remotely by astronomical methods is now supplemented by the type of “hands-on” data that geologists are familiar in analyzing. The result has been the rise of planetary sciences – a productive interdisciplinary synergy of astronomy, geology and other sciences in Solar System studies. This proposal addresses both the growing importance of planetary science in the research programs of both departments, and the growth of student interest in a field that has naturally followed such high-profile planetary exploration missions as the Mars Exploration Rovers and the Cassini/Huygens mission to Saturn. The proposed minor would exploit the considerable talent and long-standing research expertise of the faculties in the departments of Astronomy and Geology, including geochemical studies of the origins of the Solar System, and leading roles in the Deep Impact and EPOXI comet exploration missions. Moreover, it addresses the recent growth of our geophysics community which has significantly expanded the scope of our planetary sciences to include the geodynamics of Solar System bodies.

Despite its prominence on campus and broad popular appeal, planetary science has not been an easy field for interested students to access, as relevant courses are distributed between departments and often titled in ways that concealed their relevance to the topic. As a result, the study of planetary science has generally been pursued only by exceptionally determined students. The Joint Minor in Planetary Sciences is intended to assemble relevant courses into a coherent and intelligible curriculum in Solar System studies and highlight their distinctiveness as a discipline.

3. **Objectives of the minor**: This minor will provide students with a broad understanding of the application of the methods of astronomy and geology to the study of the Solar System, and develop the students’ appreciation of how issues in the study of planets connect with larger issues in those sciences. It is intended for all students with an interest in the study of the Solar System, be it professional or avocational. In addition to Astronomy and Geology majors, we expect it especially to dovetail with the professional goals of Environmental Science and Policy, Environmental Science and Technology, Chemistry, Physics, Physical Sciences, and Secondary Education majors.

Building on a three-course base of fundamental knowledge of astronomy, geology and an introduction to the Solar System, the program is completed by three advanced courses addressing specific topics adding depth to the student’s knowledge of planetary astronomy and to the geologic tools of the planetary scientist. Students are required to sample from optional courses from both departments. The Joint Minor in Planetary Sciences does not require significant prerequisite knowledge, however some optional course may require prerequisites of 100-level courses in chemistry, mathematics, or geology.
Courses required for the proposed minor are:

Required:

• One of the following:
  ASTR100 Introduction to Astronomy (3)
  ASTR101 General Astronomy (4)
  ASTR120 Introductory Astrophysics - Solar System (3)

• One of the following:
  GEOL 100/110 Physical Geology/Physical Geology Lab (4)
  GEOL 120/110 Environmental Geology/Physical Geology Lab (4)

• One of the following:
  ASTR330 Solar System Astronomy (3)
  ASTR430 The Solar System (3)

Plus three from the following. At least one choice must be from Geology and one from Astronomy. At least six credits must be at the 300 – 400 level:

• ASTR220 Collisions in Space (3)
• ASTR380 Life in the Universe - Astrobiology (3)
• ASTR498 Special Problems in Astronomy (3)
• GEOL322 Mineralogy (4)
• GEOL340 Geomorphology (4)
• GEOL437 Global Climate Change, Past and Present (3)
• GEOL499 Special Problems in Geology (3)
• Or another appropriate astronomy or geology course approved in advance by the Astronomy or Geology advisor (3-4)

Depending on the optional course taken, there is a total of 19 - 22 required credits (see prerequisites). All courses presented for the minor must be passed with a grade of C or better.

4. Oversight and Record Keeping

Oversight of this minor program will be through the normal academic processes of the Departments of Astronomy and Geology. The departments’ Undergraduate Directors will ensure that students are properly advised and that records are appropriately kept.

5. Prerequisites

In principle, a student could complete the minor without having to take any prerequisite course not on the list of required courses. Depending on the optional courses chosen, a person may have to take as many as three supporting prerequisites. Required courses for the minor are without prerequisites with the exception of:

• ASTR120 (MATH115)
• ASTR330 (ASTR100, ASTR101, or ASTR120)
• ASTR430 (ASTR121, PHYS270 and PHYS271 or PHYS273)
Of these, only ASTR120 and ASTR430 have supporting prerequisites not already required for the minor, and for each, less technical alternatives are offered. The goal of including them as alternatives is to insure that more technically sophisticated students are not discouraged from pursuing the minor. Prerequisites for optional courses are:
- ASTR380 Life in the Universe – Astrobiology ASTR100, ASTR101, or ASTR120.
- ASTR498 Special Problems in Astronomy. Astronomy or Physics major or permission of department.
- GEOL322 Mineralogy: GEOL100 or GEOL120, GEOL110, CHEM131 and CHEM132 or CHEM135 and CHEM136)
- GEOL340 Geomorphology: GEOL100 or GEOL120, GEOL110
- GEOL437 Global Climate Change, Past and Present: MATH115 MATH140, GEOL100 or GEOL120, CHEM131 and CHEM132 or CHEM135 and CHEM136)
- GEOL499 Special Problems in Geology. GEOL100 or GEOL120, GEOL110, GEOL102, or equivalent; and permission of department.

6. Anticipated enrollment:

On the basis of enrollment of non-majors in introductory-level courses including ASTR100 and GEOL212, and conversations with interested students, we estimate approximately 8 - 10 students are likely to be planetary sciences minors on an ongoing basis, if this option were available to undergraduates. For comparison, Geology currently has roughly 42 undergraduate majors, plus 11 students currently declared in all of its current minors. Astronomy currently has 73 majors and 80 minors.