

PHYSICAL SCIENCES PROGRAM¹

University of Maryland
College Park, Maryland

The Physical Sciences Program is designed to meet the needs of a broad and diverse group: students whose interests cover a wide range of the physical sciences; students whose interests have not yet centered on any one science; students interested in a career in an interdisciplinary area within the physical sciences; students who seek a broader undergraduate program than is possible in one of the traditional physical sciences; students interested in meteorology; pre-professional students (pre-law [especially patent law], pre-medical); or students whose interest in business, technical writing, advertising or sales require a broad technical background. This program can also be useful for those planning science-oriented or technical work in the urban field; some of the Urban Studies courses should be taken as electives. Students contemplating this program as a basis for preparation for secondary school science teaching are advised to consult the Science Teaching Center staff of the College of Education for additional requirements for teacher certification.

The Physical Sciences Program consists of a basic set of courses in physics, chemistry and mathematics, followed by a variety of courses chosen from these and related disciplines: astronomy, geology, meteorology, computer science, and the engineering disciplines. Emphasis is placed on a broad program as contrasted with a specialized one.

Students are advised by members of the Physical Sciences Committee. This committee is composed of faculty members from each of the represented disciplines. The selection of a primary advisor depends upon the interest of the students. Usually the student will choose to work with one of the committee members representing the discipline the student has selected as the primary area of concentration to satisfy the distributive requirements of the program. Two secondary area advisors are also required.

¹Updated October 18, 2011

INSTRUCTIONS FOR PROGRAM APPROVAL

EFFECTIVE SPRING 2001

1. Declaring the Physical Sciences Major:
 - a. Meet with the general academic advisor for the Physical Sciences Program in **1120 Physics Building**.
 - b. Submit declaration-of-major paperwork to the College of Computer, Mathematics and Natural Sciences in **3400 A.V. Williams Building**.
 - c. **IMPORTANT: You must complete 18 of your 24 upper-level credits for your three distributive areas after you declare Physical Sciences as your major.**

2. Getting approval for your program proposal:
 - a. Select three (3) areas of concentration from ASTR, CHEM, CMSC, GEOL, ENxx, MATH, METO, and PHYS.
 - b. Determine which of the three areas of concentration will be your main area; then confer with the assigned advisor for this chosen field. Have a copy of your transcript available for review by each of the three advisors.
 - c. Confer with the advisors of the other two areas of interest in order to develop your program. Obtain the signature of the advisor in each area in PART I of the application. **The Signature must be that of the advisor on the Physical Sciences Committee.** The advisor in your main area should review and sign the program application last.
 - d. Complete the application (PARTS I AND II). Please attach a typed statement of your educational goals and an explanation of how your chosen program fits these goals.
 - e. Submit your application to the Physical Sciences Advisor (1120 Physics Building) for approval by the Physical Sciences Committee. The Committee meets once per semester, usually at the end of the semester.
 - f. **IMPORTANT: You must submit a program proposal within one semester of declaring Physical Sciences as your major. This policy is designed to prevent unnecessary delays in graduation. Your program must be approved by the Physical Sciences Committee prior to your graduation.**

IMPORTANT NOTE: Any changes to an approved program must have approval of both the committee member for the student's primary area of concentration and the Chairperson.

PHYSICAL SCIENCES COMMITTEE

Chairperson:	Dr. Theodore L. Einstein Physics Bldg.- Room 2310	x5-6147 einstein@umd.edu
Astronomy:	Ms. Grace Deming Space Sci. Bldg. - Room 1247	x5-1562 deming@umd.edu
Chemistry:	Dr. Michael Montague-Smith Chemistry Bldg. - Room 2102	x5-1791 mpms@umd.edu
Computer Science:	Ms. Brandi Adams A.V. Williams - Room 1123	x5-2760 bkadams@cs.umd.edu
Geology:	Dr. John Merck Geology Bldg. – Room 1119	x5-2808 jmerck@umd.edu
Engineering:	Ms. Nicole Hollywood Martin Hall – Room 1131	x5-9973 nlholly@umd.edu
Mathematics:	Ms. Ida Chan Math Bldg. - Room 1115	x5-4362 ichan@math.umd.edu
Meteorology:	Dr. Jeff Stehr Space Sci. Bldg. – Room 3417	x5-7638 stehr@umd.edu
Physics:	Dr. Theodore L. Einstein Physics Bldg. - Room 2310	x5-6147 einstein@umd.edu
Advisors:	Mr. Thomas Gleason Physics Bldg. - Room 1120C	x5-5979 tgleason@umd.edu
	Dr. Sonali Shukla Physics Bldg. – Room 1120E	x5-5949 sshukla1@umd.edu

THE CURRICULUM

The curriculum of the Physical Sciences Program has a high degree of flexibility to allow selection of courses to meet the interests and goals of the individual student. To earn a Bachelor of Science degree in the Physical Sciences Program, a student must satisfactorily complete the following requirements:

1. Basic Requirements. Courses are required in four foundational disciplines.
 - a) Chemistry: CHEM 135/136 and an additional science elective from an approved list. See the Physical Sciences Program advisor for more information. Note: students interested in atmospheric sciences must take CHEM135/136 and CHEM231/232.
 - b) Mathematics: MATH 140, 141 and one other math course for which MATH 141 is a prerequisite (11 or 12 credits)
 - c) Physics: PHYS 161, 260, 261, 270 and 271 (11 credits) or PHYS 171, 174, 272, 273, 275, 276 (14 credits). Students desiring a strong background in physics should take the 171-276 sequence, which leads directly into advanced physics courses.
 - d) Computer Science: CMSC 106, or CMSC 131, or PHYS 165, or ENEE 114 or ENEE 150. Students who are taking Computer Science as an area of concentration must also complete: CMSC 132, CMSC 216, and CMSC 250.
2. Distributive Requirements. Beyond the basic courses, students complete **24 upper level (300-400)** distributive credits. **All students must complete 18 of the 24 distributive credits as physical sciences majors.** The distributive credits must be divided among three areas of concentration with at least **6** credits in each area. The areas of concentration include the disciplines of chemistry, physics, mathematics (including statistics), astronomy, geology, meteorology, computer science or one of the engineering disciplines. Students who wish to select electrical engineering need the permission of the Associate Dean in the College of Engineering.
3. General Major Requirements. Programs in the Physical Sciences are usually sequential in nature, and students must be careful to satisfy prerequisites in all cases. Students are advised to develop a physical sciences curriculum with the help of the Physical Sciences advisors as soon as possible, but preferably by the end of the sophomore year.
 - a) All Physical Sciences students must have a planned program of study approved by the Physical Sciences Committee.
 - b) A grade of “C” or better must be earned in all program courses (basic prerequisite and distributive requirement courses).
4. The CORE Liberal Arts and Sciences Studies Program. The requirements of the CORE program are described under the Academic Regulations and Requirements section of the Undergraduate Catalog. The program requires a total of 43 credits.
5. Elective Requirements. In addition to meeting the requirements stated above, each

Physical Sciences student should plan a sufficient number of elective courses to meet the minimum 120 credits needed for graduation.

Engineering courses used for one of the options must all be from the same department, e.g., all must be ENME course. In the case of courses from the Department of Materials and Nuclear Engineering and the Department of Mechanical Engineering, a student may use a combination of ENME and ENMA courses. Selection of any ENxx courses is By Permission Only.

Certain courses offered in the fields included in the program are not suitable for Physical Sciences majors and cannot count as part of the requirements of the program. These include any courses corresponding to a lower level than the basic courses specified above (e.g. MATH 115), some of the special topics courses designed for non-science students, as well as other courses. A current listing of excluded courses is on page 6.

HONORS PROGRAM

The Physical Sciences Honors Program offers students the opportunity for research and independent study, and will lead to a BS degree with Honors or High Honors. The requirements are:

- a) Overall grade point average of 3.0 or better.
- b) A grade point average in Physical Sciences courses of 3.2 or better.
- c) An independent study course in the Physical Sciences Program - three credit minimum which may be distributed over two semesters (e.g. Astronomy 399 or 498, Chemistry 399, Computer Science 498, Geology 499, Mathematics 498, Meteorology 499 and Physics 399 or 499B).
- d) An honors thesis summarizing independent research submitted to the Physical Sciences Committee.
- e) An oral examination concerning the thesis and related subjects. The thesis advisor and two other faculty members (at least one a member of the Physical Sciences Committee) will comprise the examining committee.

SELECTION OF COLLEGE

Students majoring in Physical Sciences will receive their degrees from the College of Computer, Mathematical, and Natural Sciences. Students with primary concentration in a biological science must also take one additional course selected from one of the biological sciences, e.g. a 4-credit course offered by the Departments of Botany (not BOTN 100), Entomology, Microbiology (not MICB 100), or ZOO 101.

APPROVAL OF PROGRAM PLANS

All students must submit a program application outlining what courses they plan to take to satisfy the requirements of the Physical Sciences Program. These should include both the core courses and the distributive 300-400 level courses of 24 credits beyond the core. In preparing such a program plan, students should keep in mind that the Physical Sciences Committee will look for courses that will support the purpose or goals of the program. These plans should be submitted as early as possible, preferably by the end of the sophomore year. This is important because it will provide students with sufficient time to plan an appropriate program. The program plans will be approved by the Physical Sciences Committee and filed in the Physical Sciences Office. Any changes to the plan must be approved in writing by the student's advisor and the Chairperson.

Students planning to use any of the special topics, or special programs topics courses (including PHYS 318) as part of their Physical Sciences requirement must obtain written approval to do so from the Physical Sciences Program Committee. Many of these special topics courses are intended for non-science students and are not suitable for Physical Sciences majors.

In preparing a program plan, students should keep in mind that certain other courses are also not considered suitable for a Physical Sciences major. In particular, courses at lower levels than the core courses designed primarily for non-sciences students may be disallowed. Examples of the type of courses not allowable for the Physical Sciences major are the following. (This list is not necessarily complete but is revised every year.)

ASTR 300, 330, 340, 380

CHEM 398, 399

GEOL 331; GEOL 100 is only acceptable when accompanied by GEOL 110

MATH 400, 478, 481, 483, 484

PHYS 318

PHYSICAL SCIENCE PROGRAM APPLICATION PART I

(To be Typed or Completed in INK. Do NOT Staple.)

Name: _____ Date of Application: _____

UID: _____ Expected Date of Graduation: _____

			(Grade)		
Chemistry*:	CHEM 135	(3)	___		
	CHEM 136	(1)	___		
	Science Elective	(3 or 4)	___	_____	(From an approved list.)
Mathematics:	MATH 140	(4)	___		*240 or 241 or 246 or any MATH
	MATH 141	(4)	___		course that has MATH 141 as a
	MATH _____*	()	___		prerequisite
Physics :	PHYS 161	(3)	___		PHYS 171 (3) ___
	PHYS 260/261	(4)	___	OR	PHYS 174 (1) ___
	PHYS 270/271	(4)	___		PHYS 272 (3) ___
					PHYS 275 (2) ___
					PHYS 273 (3) ___
				PHYS 276 (2) ___	
Computer Science**:	One of the following:				
	CMSC 106	(4)	___		
	CMSC 131	(4)	___		
	PHYS 165	(3)	___		
	ENEE 150	(3)	___		
	_____	(3)	___		(other with committee approval)

* students interested in the study of atmospheric sciences must take CHEM135/136 and CHEM231/232 rather than CHEM135/136 and the Science Elective.

** students who choose Computer Science as an area of concentration may need to complete other introductory programming courses.

24 credits at 300-400 level are required in 3 areas of concentration - at least 6 credits in each area. You must complete 18 of 24 credits as a Physical Science major. Areas of concentration: ASTR, CHEM, CMSC, EN__, GEOL, MATH/STAT, AOSC, PHYS.

	Course	Credit	Grade	Pre-Req Courses
Primary Area : _____	_____	___	___	_____
_____	_____	___	___	_____
Signature _____ Date _____	_____	___	___	_____
Supporting Area 1 : _____	_____	___	___	_____
_____	_____	___	___	_____
Signature _____ Date _____	_____	___	___	_____
Supporting Area 2 : _____	_____	___	___	_____
_____	_____	___	___	_____
Signature _____ Date _____	_____	___	___	_____

Approvals: Primary Advisor: _____ Date: _____

Chairperson: _____ Date: _____

PHYSICAL SCIENCES PROGRAM APPLICATION PART I (continued)

CORE GENERAL EDUCATIONAL REQUIREMENTS

I. Fundamental Studies: (9 credits)

Mathematics Met by Program

English Composition (Freshman) _____

Junior level expository writing _____

II. Distributive Studies: (28 credits)

Humanities/Arts (3 courses) Literature: _____

Hist/Theory of Arts: _____

Humanities: _____

Math/Science (3 courses) Met by Program

Social Sciences (3 courses) History: _____

Beh/Soc Sci: _____

Beh/Soc Sci: _____

Diversity (1 course) _____

III. Advanced Studies: (6 credits)

Two upper level (300-400) level courses. Courses must be outside the student's major. May substitute a CORE approved Capstone course or a senior or honors thesis for one of the two requirements.

(1) _____

(2) _____

Current Registration (Spring, Summer, Fall Semester, 20__)

PART II: Goal Statement:

Please attach a separate sheet of paper containing a typed statement of your educational goals and an explanation of *how your chosen areas and course selections fit these goals*. Your essay should contain six paragraphs: the first describing your academic career objectives and how your plan of study will help you meet them, three paragraphs explaining how each of your three distributive areas contributes to these objectives, one paragraph discussing internship or related activity, and a final summary paragraph.