



PHYSICS MAJOR – Teacher Education Program (PHPS) (Certification in Physical Science)
(Gen Ed 2002) (New Professional Sequence effective Fall 2007)
BACHELOR OF SCIENCE DEGREE REQUIREMENTS

I. MAJOR REQUIREMENTS (38 Credits)

A. Required Physics Courses (24 Credits)

- PHYS 191 University Physics I (4)
PHYS 192 University Physics II (4)
PHYS 210 Mechanics (4)
PHYS 240 Electricity and Magnetism (4)
PHYS 350 Optics (4)
PHYS 460 Modern Physics (4)

B. Elective Physics Courses - Choose a minimum of 14 credit hours from the list below.

- PHYS 242 Circuit Theory (3)
PHYS 245 Electronics and Digital Circuits (3)
PHYS 247 Microprocessors and Applications (3)
PHYS 280 Astronomy (4)
PHYS 310 Advanced Mechanics (3)
PHYS 320 Thermodynamics (3)
PHYS 340 Adv. Electricity and Magnetism (3)
PHYS 377 Mathematical Physics (3)
PHYS 380 Observational Astronomy (4)
PHYS 410 Fluid Mechanics (3)
PHYS 430 Computer Simulations of Physical Systems (3)
PHYS 462 Nuclear Physics (4)
PHYS 464 Quantum Mechanics (3)
PHYS 470 Solid State Physics (3)
PHYS 480 Astrophysics (3)
PHYS 490 Literature Research in Physics (2)
PHYS 495 Laboratory Research in Physics (1-4)
GEOS 112 Physical Geology (4)

II. COLLATERAL COURSES. Complete the following: (40-42 Credits)

- MATH 122 Calculus I (4)
MATH 221 Calculus II (4)
MATH 222 Calculus III (4)
MATH 420 Differential Equations (4)
CMPT 183 Foundations Of Computer Science I (3)
CHEM 120 General Chemistry I (4)
CHEM 121 General Chemistry II (4)
CHEM 230 Organic Chemistry I (3)
CHEM 231 Organic Chemistry II (3)
CHEM 232 Experimental Organic Chemistry I (2)
CHEM 233 Experimental Organic Chemistry II (2)

One of the following:

- CHEM 310 Analytical Chemistry (5)
CHEM 470 Biochemistry I (3)

III. GENERAL EDUCATION REQUIREMENTS

32-35 SEMESTER HOURS

IV. TEACHER EDUCATION AND PROF. SEQ.

42 SEMESTER HOURS

TOTAL FOR GRADUATION

152-157 SEMESTER HOURS

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III. GENERAL EDUCATION REQUIREMENTS (32-35 Credits)

Core:

- A. New Student Seminar (1) ..... (MATH 102)
- B. Interdisciplinary Core
  - B1. Scientific Issues (3)..... \_\_\_\_\_
  - B2. Interdisciplinary National Issues (3) ... \_\_\_\_\_
  - B3. Interdisciplinary Global Issues (3) ..... \_\_\_\_\_

Distribution:

- C. Communication
  - C1. Writing/Literature (6) ..... \_\_\_\_\_
  - C2. Communication (3). ..... \_\_\_\_\_
- D. Fine and Performing Arts (3) ..... \_\_\_\_\_
- E. World Languages (3-6)..... \_\_\_\_\_
- F. Humanities
  - F1. World Literature or General Humanities (3) .. \_\_\_\_\_
  - F2. Philosophy/Religion (0) ..... (EDFD 220\*)
- G. Computer Science (0-credit included in major)..... (CMPT 183)
- H. Mathematics (0-credit included in major) .... (MATH 122,221)
- I. Natural/Physical Science (0-credit included in major)..... (PHYS 191)
- J. Physical Education (1)..... \_\_\_\_\_
- K. Social Science
  - K1. American or European History (0) ... (EDFD 221\*)
  - K2. Non-Western Cultures (3) ... \_\_\_\_\_
  - K3 Social Science(0)..... (EDFD 200\*)
- L. General Education Elective (0)..... (CURR/EDFD/READ 210\*)

\* These 12 credits are counted in the 42 credits of the Professional Sequence IV.

IV. Teacher Education Requirements and Professional Semester (42)

Requirements for Teacher Certification in Physical Science.

Each student must apply for admission to the teacher education program in physical science. Applications will be considered as early as the second semester of the sophomore year. There are enrollment periods in both the Fall and Spring semesters. Application forms are available from the Center of Pedagogy in University Hall. To be eligible for admission, a student must have a minimum 2.75 cumulative grade point average ( GPA ), a minimum 2.50 GPA in physics major and collateral courses and have successfully completed 12 semester hours or more of physics major courses. These courses do not have to be taken at Montclair State University. Also, prior to applying, a student must have completed Psychological Foundations of Education or Educational Psychology, Philosophical Orientation to Education, Historical Foundation of Education, Public Purposes of Education, and the GER speech requirement. In addition, in order to remain in the teacher education program students must maintain a 2.75 overall GPA and 2.5 GPA in the major.

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In addition to General Education, Major and collateral courses, students seeking teacher certification must complete the following required Professional Sequence:

Freshman Year ( first or second Semester )

EDFD 200 Psychological Foundations of Education ( 3 Cr. )\*\* (meets Gen. Ed. K3. Requirement) or  
PSYC 200 Educational Psychology ( 3 Cr. )\*\* (meets Gen. Ed. L. Requirement)

Sophomore Year ( third or fourth semester )

EDFD 220 Philosophical Orientation to Education ( 3 Cr. )\*\*  
EDFD 221 Historical Foundation of Education (3 Cr.) \*\*

CURR 210 Public Purposes of Education (3 Cr.) or  
EDFD 210 Public Purposes of Education (3 Cr.) or  
READ 210 Public Purposes of Education (3 Cr.)

Fall Semester Junior Year ( fifth semester )

CURR 305 Teaching for Equity and Diversity (3 Cr.) or  
EDFD 305 Teaching for Equity and Diversity (3 Cr.) or  
READ 305 Teaching for Equity and Diversity (3 Cr.)

CURR 310 Inclusion in Middle & Secondary Schools (1 Cr.)

CURR 312 Educating English Language Learners (1 Cr.) or  
EDFD 312 Educating English Language Learners (1 Cr.) or  
READ 312 Educating English Language Learners (1 Cr.)

Spring Semester Junior Year ( sixth semester )

CURR 314 Assessment of Learning (1 Cr.)  
CURR 316 Integrating Technology Across the School Curriculum (1 Cr. )  
READ 411 Language and Literacy Across the Curriculum (3 Cr.)

Fall Semester Senior Year ( seventh semester )

CURR 450 Fieldwork (3 Cr.)  
CURR 451 Teaching for Learning I (3 Cr.)  
PHED 401 The Teaching of Science in Secondary Schools (3 Cr.)

Spring Semester Senior Year ( eighth semester) - The Professional Semester

CURR 452 Teaching for Learning II (3 Cr.)

CURR 453 Student Teaching (8 Cr.) or  
CURR 414 In-service Student Teaching (8 Cr.)

Special Requirements:

1. Only grades of "C-" or above are acceptable in professional sequence courses (including the methods courses).

2. Teacher education students must successfully complete an **Examination in Physiology and Hygiene**.

This requirement may be satisfied by presenting evidence of college study in such areas as Biology, Personal Health Problems, Community Health, School Health, Family Health, Health Counseling or Health Administration or by passing an examination at the county superintendent's office administered by the New Jersey State Department of Education. A list of courses, which satisfy this requirement, is available in the Center of Pedagogy in University Hall.

**3. The PRAXIS II: Content Knowledge exams are required of all students seeking N.J. certification in Physical Science. A hard copy of passing Praxis scores must be submitted to the Center of Pedagogy prior to the student teaching semester.**

**Chemistry: Content Knowledge (20241)**

**Physics: Content Knowledge (10261)**

**General Science: Content Knowledge (10431)**

4. Students are permitted to take no more than 12 credits during the student teaching semester.

\*\* These courses satisfy Gen. Ed. Requirements (III).

## Suggested Sequence for Four-Year Plan

The following sequence assumes exemption from all basic skills requirements as a result of meeting or exceeding the required scores on the MSU Basic Skills Placement Test.

### First Year

#### Fall (Freshman) or First Semester (17 credits)

PHYS 191 University Physics I (4)  
ENWR 105 College Writing I: Intellectual Prose (3)  
MATH 122 Calculus I (4) \*  
CHEM 120 General Chemistry I (4)  
MATH 102 New Student Experience for  
Mathematical Sciences (1)  
Physical Education Requirement (1)

#### Spring (Freshman) or Second semester (18 credits)

PHYS 192 University Physics II (4)  
ENWR 106 College Writing II: Writing and Literary  
Study (3)  
MATH 221 Calculus II (4)  
CHEM 121 General Chemistry II (4)  
EDFD 200 Educational Psychology (3)

### Second Year

#### Fall (Sophomore) or Third Semester (17 credits)

PHYS 210 Mechanics (4)  
MATH 222 Calculus III (4)  
CHEM 230 Organic Chemistry I (3)  
Speech Requirement (3)  
EDFD 221 Historical Foundation of Education (3)

#### Spring (Sophomore) or Fourth Semester (19 credits)

PHYS 240 Electricity and Magnetism (4)  
CHEM 231 Organic Chemistry II (3)  
GNED 202 Interdisciplinary National Issues (3)  
Public Purposes of Education (3)  
EDFD 220 Philosophical Orientation to Education (3)  
CMPT 183 Foundations of Computer Science I (3)\*\*

### Summer School (18 credits)

GNED 201 Scientific Issues (3)  
Language Requirement (6)

General Education Courses (9)

### Third Year

#### Fall (Junior) or Fifth Semester (17 credits)

PHYS 350 Optics (4)  
Physics Elective Course (3)  
CHEM 232 Experimental Organic Chemistry I (2)  
GNED 303 Interdisciplinary Global Issues (3)  
Teaching for Equity and Diversity (3)  
CURR 310 Inclusion in Middle&Secondary Schools (1)  
Educating English Language Learners (1)

#### Spring (Junior) or sixth Semester (18 credits)

PHYS 460 Modern Physics (4)  
Physics Elective Courses (3)  
CHEM 233 Experimental Organic Chemistry II (2)  
MATH 420 Differential Equations (4)  
CURR 314 Assessment of Learning (1)  
CURR 316 Integrating Technology Across School (1)  
READ 411 Language & Literacy Across Curriculum(3)

### Fourth Year

#### Fall (Senior) or Seventh Semester (20 or 22 credits)

Physics Elective Courses (8)  
CHEM 310 Analytical Chemistry (5) or  
CHEM 470 Biochemistry I (3)  
CURR 450 Fieldwork (3)  
CURR 451 Teaching for Learning I (3)  
PHED 401 The Teaching of Science in Secondary Schs(3)

#### Spring (Senior) or Eighth Semester (11 credits)

CURR 452 Teaching for Learning II (3)  
CURR 453 Student Teaching (8)

\* Students who do not have a strong (4 year) background in high school mathematics, including exponential, logarithmic, and trigonometric functions are advised to take MATH 112 Precalculus Mathematics or MATH 111 Applied Precalculus before Calculus I.

\*\* Prerequisite MATH 112 Precalculus Mathematics, or MATH 111 Applied Precalculus, or equivalent.

## NOTES

THIS WORKSHEET, THE MONTCLAIR STATE UNIVERSITY UNDERGRADUATE CATALOG, AND THE SEMESTER SCHEDULE OF COURSES BOOKLETS CONTAIN THE IMPORTANT ADVISING AND ACADEMIC INFORMATION NECESSARY FOR AN ACCURATE UNDERSTANDING OF THE DEGREE REQUIREMENTS. STUDENTS WITH QUESTIONS ARE URGED TO CONSULT THE DEPARTMENT COORDINATOR OF UNDERGRADUATE ADVISING.

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**FAILURE TO BE AWARE OF AND FOLLOW UNIVERSITY ACADEMIC AND ADMINISTRATIVE POLICIES AS OUTLINED HERE AND IN THE UNIVERSITY UNDERGRADUATE CATALOG AND SEMESTER SCHEDULE OF COURSES BOOKLETS MAY RESULT IN LOSS OF CREDIT AND/OR DELAYED GRADUATION.**

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RESTRICTIONS - The following courses MAY NOT BE TAKEN FOR GRADUATION CREDIT BY MATHEMATICS MAJORS: CMPT 107, CMPT 108, CMPT 273, MATH 103, MATH 109, MATH 100, MATH 113, MATH 114, MATH 116, MATH 117, MATH 118, MATH 270, BSED 273, FINQ 270, MGMT 273.

PASS/FAIL LIMITATIONS - Those courses that meet the major, collateral, teacher certification, or general education requirements may not be taken pass/fail.

MULTICULTURAL AWARENESS REQUIREMENT - All students are required to take one course that satisfies the university multicultural awareness requirement. Refer to the current university undergraduate catalog for a complete listing of acceptable courses.

PREREQUISITES - It is the student's responsibility to ensure that courses are taken in the academically correct order. A current list of prerequisites for these and other courses may be found in the current university undergraduate catalog or through the office of the offering department.

BASIC SKILLS - Students placed into basic skills courses as a result of the MSU Basic Skills Placement Test are required to enroll in those courses the first semester and continue in sequence each semester until required work is completed. All basic skills course work is counted in the cumulative grade-point-average, but only ENGL 100 "Basic Composition" may be used toward the 120 credit degree requirement.

FINAL EVALUATION - Students who are eligible for graduation must file an "Application for Final Evaluation" in the Office of the Registrar according to the following deadlines: October 1 for May graduation, March 1 for August graduation, June 1 for January graduation.

RESIDENCE REQUIREMENTS - A minimum of 32 credits must be taken at MSU. This must include at least 18 credits of mathematical science courses in the major, of which at least 12 credits must be at the junior (300-399) or senior level (400-499). The last 24 credits must be taken at MSU and cannot be acquired through transfer.

FREE ELECTIVES - Free electives are defined as credits not applicable to general education or major requirements. The exact number of free electives required by an individual student is dependent upon the collateral sequence chosen in the major (see. p.1, and worksheet p. 2).

\*IN ALL CASES, THE MINIMUM NUMBER OF CREDITS REQUIRED TO GRADUATE IS 120 \*