

Montclair State University
 Department of Physics and Astronomy

BS Physics w/ Concentration in Physical Science Education

I. GenEd Requirement	14 sh	PHYS 464 Quantum Mechanics	3
A. New Student Seminar	1	PHYS 470 Solid State Physics	3
C. Communication	6	PHYS 480 Astrophysics	3
C1. Writing		PHYS 495 Research/Indep. Study in Phys	1-4
C2. Literature			
Complete 3 sh from Categories D, F1, and F2:	3	C. Collateral Requirements	(30 sh)
D. Fine and Performing Arts		CSIT 104 Computational Concepts	3
F. Humanities		CHEM 120 General Chemistry I	4
F1. Great Works and Their Influences		CHEM 121 General Chemistry II	4
F2. Philosophical./Relig. Perspec.		MATH 122 Calc. I or AMAT 120 Applied Calc. A	4
G. Computer Science	<i>CSIT 104</i> (0)	MATH 221 Calc. II or AMAT 220 Applied Calc. B	4
H. Mathematics	<i>MATH 122 or AMAT 120</i> (0)	MATH 222 Calculus III	4
I. Natural/Physical Science	<i>PHYS 191</i> (0)	CHEM 230 Organic Chemistry I	3
J. Physical Education	1	CHEM 232 Experimental Org. Chemistry I	2
K. Social Science		Plus an additional 2 sh of CHEM courses	2
Complete 3 credits from Categories K1, K2, or II. B (World Cultures)	3	IV. Teacher Education Program Requirements	37 sh
K1. American & European History			
K2. Global and Cultural Perspectives		A. PRE-PROFESSIONAL SEQUENCE	(6 sh)
K3. Social Science Perspectives	<i>EDFD 200</i> (0)	(Freshman Year/First Semester Sophomore Year)	
L. Interdisciplinary Studies	<i>SASE 210</i> (0)	EDFD 200 Psychological Foundations of Ed. (GenEd K3)	3
		SASE 210 Pub. Purposes of Ed.: Dem. & School. (GenEd L)	3
II. World Languages & Cultures Requirements	3 sh	(Second Semester Sophomore Year)	
A. World Languages	3	Apply to the Teacher Education Program – One Teacher Education prerequisite course may be taken while applying this semester.	
B. World Cultures	(0)		
(3 sh must be completed from World Cultures or Gen. Ed. K1 or K2 courses.)		B. PROFESSIONAL SEQUENCE	(31 sh)
III. Major Requirements	66 sh	(First Semester Junior Year)	
A. Physics Core	(33 sh)	SASE 320 Curriculum Design for Inclusive Classrooms	3
PHYS 191 University Physics I	4	SASE 321 Assessment Practices for Inclusive Classrooms	3
PHYS 192 University Physics II	4	(Second Semester Junior Year)	
PHYS 198 Introductory Physics Seminar	1	SASE 322 Language & Learning in Content-Area Teaching	3
PHYS 210 Intermediate Mechanics	3	(First Semester Senior Year)	
PHYS 220 Oscillations, Waves, & Optics	3	Clinical Practice Year, Part One: Clinical Practice I Semester	
PHYS 230 Intermediate Physics Laboratory	4	Note that some students are able to combine this semester with the previous semester.	
PHYS 300 Junior/Senior Physics Seminar	1	SASE 450 Clinical Practice I	3
PHYS 320 Statistical and Thermal Physics	3	SASE 451 Seminar in Inclusive Pedagogies	3
PHYS 330 Advanced Physics Laboratory	4	PHED 401 The Teaching of Science in Secondary Schools	4
PHYS 340 Electricity and Magnetism	3	(Last Semester – all other coursework required for graduation must be completed before this semester.)	
PHYS 360 Modern Physics	3	Clinical Practice Year, Part Two: Clinical Practice II Semester	
B. Physics Electives	(3 sh)	SASE 452 Advanced Seminar in Inclusive Pedagogies	3
PHYS 180 Astronomy for Everyone	4	SASE 453 Clinical Practice II	9
PHYS 245 Fundamentals of Electronics	4		
PHYS 280 Astronomy for Physicists	4	V. Free Electives	0 sh
PHYS 310 Advanced Mechanics	3		
PHYS 325 Computational Physics	3		
PHYS 341 Electronics and Digital Circuits	4		
PHYS 350 Modern Optics	4		
PHYS 368 Fluid Mechanics	3		
PHYS 377 Mathematical Physics	3		
PHYS 380 Observational Astronomy	4		
PHYS 399 Special Topics in Physics	1-4		
PHYS 451 Radiation and Medical Physics	3		
PHYS 461 Special & General Relativity	3		
PHYS 462 Nuclear Physics	4		
		Revised May 1, 2020	Total credits: 120

Suggested Sequence for Four-Year Plan
Physics Major – concentration in Physical Science Education (PHPS)

First Year

Fall (Freshman) or First Semester (16 credits)	Spring (Freshman) or Second semester (19 credits)
I. PHYS 191 University Physics I (4) H. MATH 122 Calc I or AMAT 120 App. Calc A (4)* CHEM 120 General Chemistry I (4) C1. Writing (3) A. New Student Seminar (1)	PHYS 192 University Physics II (4) PHYS 198 Introductory Physics Seminar (1) MATH 221 Calc II or AMAT 220 App Calc B (4) CHEM 121 General Chemistry II (4) C2. Literature (3) K3. Teacher Ed. Prereq. Course (EDFD 200) (3)**

Second Year

Fall (Sophomore) or Third Semester (13 credits)	Spring (Sophomore) or Fourth Semester (14 credits)
PHYS 210 Intermediate Mechanics (3)*** MATH 222 Calculus III (4) CHEM 230 Organic Chemistry I (3) L. Teacher Ed. Prereq. Course (SASE 210) (3)**	PHYS 340 Electricity and Magnetism (3)*** PHYS 320 Statistical and Thermal Physics (3)*** CHEM 232 Experimental Organic Chemistry I (2) G. CSIT 104 Computational Concepts (3) D, F1, or F2 Gen. Ed. Course (3)

Third Year

Fall (Junior) or Fifth Semester (16 credits)	Spring (Junior) or sixth Semester (16 credits)
PHYS 220 Oscillations, Waves, & Optics (3)*** PHYS 230 Intermediate Physics Lab (4) PHYS 300 Junior/Senior Physics Seminar (1) SASE 320 Curric. Design for Inclusive Classrooms (3) SASE 321 Assessment Prac. Inclusive Classrooms (3) Chemistry Elective Course (2)	PHYS 360 Modern Physics (3)*** Physics Elective (3) SASE 322 Lang. & Learning Content-Area Teach. (3) World Language I (3) K1, K2 Gen. Ed. or World Cultures Course (3) J. Physical Education (1)

Fourth Year

Fall (Senior) or Seventh Semester (14 credits)	Spring (Senior) or Eighth Semester (12 credits)
PHYS 330 Advanced Physics Lab (4) SASE 450 Clinical Practice I (3) SASE 451 Seminar in Inclusive Pedagogies (3) PHED 401 Teaching of Science in Secondary Schs (4)	SASE 452 Adv. Seminar in Inclusive Pedagogies (3) SASE 453 Clinical Practice II (9) (Students may not take any additional courses during the Clinical II semester.)

Note: After Year 1, General Education, World Languages/Cultures, and free electives can be taken in any sequence, excepting general education courses that serve as Teacher Education Prerequisite Courses.

*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 111 Applied Precalculus before Calculus I.

**Students may take either EDFD 200 or PSYC 200 or FSH 314, but not SASE 210 in Spring of Freshman year.

***The PHYS 210, 320, 340 and PHYS 220, 360 sequences are offered in alternate years and can be taken in Year 2 or Year 3. Most 200-level and higher physics courses are offered on an alternate-year schedule.

Additional Teacher Education Program Information

1. Candidates must meet the State's Basic Skills Requirement to be accepted into the Teacher Education Program. This requirement is fulfilled by achieving the requisite score on Praxis I, SAT, or ACT exams.
2. A Clinical Internship Application must be submitted the semester prior to the Clinical Practice I semester. The application currently is due March 1 for fall Clinical I and October 1 for spring Clinical I but this deadline is subject to change. Late applications cannot be accepted. All courses listed in the undergraduate program must be completed satisfactorily before being permitted to enroll in Clinical I.
3. A clinical internship audit is conducted by the Center of Pedagogy to verify that all requirements have been met prior to the Clinical I and II semesters, respectively. All requirements must be met by December 15th for spring Clinical I or by July 15th for fall Clinical I. Requirements include successful completion of all program coursework, submission of passing Praxis Subject Assessment test scores, completion of speech requirement, completion of the Physiology and Hygiene requirement, acceptable overall/major/content coursework GPA and grades as outlined in the Teacher Education Program handbook and demonstration of professional conduct.
4. Students are responsible for completing several requirements in addition to coursework in order to be recommended to the State of New Jersey for instructional certification. These other requirements must be completed prior to Clinical II (i.e., by the December 15th or July 15th Clinical II audit deadline) and include:
 - a. Physiology and Hygiene requirement--must take University-approved course or pass University-approved test.
 - b. Praxis II Exam—must pass all state-required Praxis Subject Assessment exams for the certification area.
 - c. Harassment, Intimidation and Bullying Prevention Requirement (completed in Clinical I semester)
5. Students must pass the edTPA in order to become certified in New Jersey. This is completed during the Clinical II semester.
6. Students also are responsible for:
 - a. Seeking advisement from their academic advisors for registration and completion of degree requirements. Students will be assigned undergraduate advisors while completing the undergraduate degree.
 - b. Consulting the Teacher Education Program Handbook regarding policies and procedures for the Teacher Education Program.
 - c. Filing the proper Audit forms in the Office of the Registrar for graduation.

ADDITIONAL CURRICULAR SUGGESTIONS

- ✓ Students who have taken high school courses in Calculus or Computer Science may receive advanced standing with credit based upon either the Advanced Placement Exams or departmental exams. Consult the Department Coordinator of Undergraduate Advising for further details.
- ✓ Students may elect to do independent study in advanced areas of physics under PHYS 495 "Research or Independent Study in Physics."
- ✓ Students can apply their Math courses towards a state Middle School Mathematics certification after completing their initial certification program. 15 credits in Mathematics are required for this certification, though the NJ Department of Education does not require any specific courses. The courses must be 100 level or higher and must appear on a 2-year or 4-year college transcript. Students will be able to use Calculus I, II, and III and other mathematics collateral courses for this certification. PSYC 202, Adolescent Psychology, is also required.

NOTES

This worksheet, the Montclair State University undergraduate catalog, and the semester schedule 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.

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.

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

WORLD CULTURES REQUIREMENT - All students are required to take one course that satisfies the university world cultures 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 128 credits 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 physics 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.

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