Montclair State University
Department of Mathematical Sciences

5-Year Combined BS Physics and MS Mathematics with Concentration Pure and Applied Mathematics Undergraduate Requirements (PMBM)

I. Major Requirements 38 sh

A. Physics Core (24 sh)

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. Physics Electives (14 sh)

Select a minimum of 14 sh 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/Magnetism	3
PHYS 368 Fluid Mechanics	3
PHYS 377 Mathematical Physics	3
PHYS 380 Observational Astronomy	4
PHYS 430 Cmpt Simulations of Phys 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
EAES 105 Physical Geology	4

II. Collateral Requirements 27 sh

MATH 122 Calculus I	4
MATH 221 Calculus II	4
MATH 222 Calculus III	4
MATH 420 Ordinary Differential Equations	4
CSIT 111 Fundamentals of Programming I	3
CHEM 120 General Chemistry I	4
CHEM 121 General Chemistry II	4

III. Complete the following 2 prerequisites for graduate courses (for the BS/MS): (7 sh)

MATH 335 Linear Algebra	4
MATH 431 Abstract Algebra	3

IV. GenEd Requirement 29 sh

A.	New Student Experience	*MATH 102*	1
C.	Communications		9
	C1. College Writing	*ENWR 105, 106*	
	C2. Speech	*CMST 101*	
D.	Fine and Performing Arts		3
F.	Humanities		6
	F1. World Literature/General Humanities		
	F2. Philosophy/Religion		
G.	Computer Science	*CSIT 111 (0)*	
H.	Math	*MATH 122, 221 (0)*	
I.	Natural/Physical Science	*PHYS 191 (0)*	
J.	Physical Education		1
K.	Social Science		9
	American/European History		
	Non-Western Culture		
	Social Science		
L.	Gen Ed Elective	*CHEM 120 (0)*	

V. World Languages and Cultures Requirement 3-6 sh

A. World Languages	3-6
B. World Cultures	0-3

VI. Graduate Requirements for BS/MS degree 12 sh

A. If equivalent courses haven't been taken previously, take the following. Only 6 sh can be used for credit (0–6sh)

MATH 515 Intermediate Analysis I	3
MATH 516 Intermediate Analysis II	3
MATH 518 Found. Of Abstract Algebra	3

B. Select 6 - 12 sh from the following list (6 -12 sh)

MATH 521 Real Variables I	3
MATH 525 Complex Variables I	3
MATH 530 Mathematical Computing	3
MATH 531 Abstract Algebra I	3
MATH 535 Linear Algebra I	3
MATH 560 Numerical Analysis	3
MATH 584 Operations Research	3
MATH 591 Applied Industrial Mathematics	3

VI. Free Electives 0-4 sh

Minimum total required for graduation 120 - 122sh

Montclair State University
Department of Mathematical Sciences
5-Year Combined BS Physics and MS Mathematics with Concentration Pure and Applied Mathematics
Graduate Requirements (MPBM)

I. Pure Mathematics	12 sh
MATH 521 Real Variables I	3
MATH 525 Complex Variables I	3
MATH 531 Abstract Algebra I	3
MATH 535 Linear Algebra I	3
II. Applied Mathematics	12 sh
MATH 530 Mathematical Computing	3
MATH 560 Numerical Analysis	3
MATH 584 Operations Research	3
MATH 591 Applied Industrial Mathematics	3
III. Comp Science, Math, and/or Stat Electives	6 sh
If equivalent courses haven't been previously taken, take the following. Only 6 sh can be used for credit:	
MATH 515 Intermediate Analysis I	3
MATH 516 Intermediate Analysis II	3
MATH 518 Found. Of Abstract Algebra	3
Select 0 – 2* courses from the following:	
MATH 520–569, 580–599, 620–669, 680–699; STAT 541–549, 590–599, 640–649, 690; and CMPT 570–599, 670–690	
MATH 520 Set Theory	3
MATH 522 Real Variables II	3
MATH 526 Complex Variables II	3
MATH 532 Abstract Algebra II	3
MATH 536 Linear Algebra II	3
MATH 537 Mathematical Logic	3
MATH 540 Probability	3
MATH 551 Topology	3
MATH 554 Projective Geometry	3
MATH 555 Differential Geometry	3
MATH 564 Ordinary Differential Equation	3
MATH 566 Partial Differential Equations	3
MATH 568 Applied Mathematics: Continuous	3
MATH 569 Applied Mathematics: Discrete	3
MATH 580 Combinatorial Mathematics	3
MATH 581 Graph Theory	3
MATH 590 Advanced Topics	3
MATH 595 Seminar (1-4 hours seminar)	1-4
MATH 690 Independent Study in Mathematics	3
STAT 541 Applied Statistics	3
STAT 542 Statistical Theory I	3
STAT 543 Statistical Theory II	3
STAT 544 Statistical Computing	3
STAT 545 Practicum in Statistics I	3
STAT 546 Non-Parametric Statistics	3
STAT 547 Design and Analysis of Exp	3
STAT 548 Applied Regression Analysis	3
STAT 549 Sampling Techniques	3
STAT 595 Topics in Statistics	3
STAT 597 Research Methods in Stat Science	3
STAT 640 Biostatistics I	3
STAT 641 Biostatistics II	3
STAT 642 Introduction to Stochastic Processes	3
STAT 645 Advanced Topics in Statistics	3
STAT 646 Multivariate Analysis	3
STAT 647 Practicum in Statistics II	3
STAT 648 Advanced Statistical Methods	3
STAT 649 Independent Study in Statistics	3
CMPT 574 Pixel and Image Processing	3
CMPT 575 Introduction to Computer Graphics	3
CMPT 576 Object-Oriented Software Dvlp	3
CMPT 578 Introduction to Artificial Intelligence	3
CMPT 580 Machine Org and Architecture	3
CMPT 581 Systems Software Design	3
CMPT 582 Theory Automata & Formal Lang	3
CMPT 583 Computer Algorithms	3
CMPT 584 Operating System Design	3
CMPT 585 Topics in Computer Science	3
CMPT 586 File Structures and Databases	3
CMPT 587 Microcomputers & Comp Interfaces	3
CMPT 588 Fund Programming Languages	3
CMPT 589 Comp Sim of Discrete Systems	3
CMPT 590 Comp Sim of Continuous Systems	3
CMPT 591 Compiler Theory and Construction	3
CMPT 592 Data Base Design & Implementation	3
CMPT 593 Structured System Dsgn & Analysis	3
CMPT 594 Software Engineering & Reliability	3
CMPT 596 Principles of Data Communication	3
CMPT 678 Neurocomputing	3
CMPT 680 Parallel Architectures & Algorithms	3
CMPT 683 Advanced Computer Algorithms	3
CMPT 690 Independent Study in Comp Sci	3
IV. Capstone Requirement	**3 sh**
MATH 698 Master's Thesis	
Graduate degree	
Minimum total required for graduation	**33 sh**

*2 courses if MATH 515 and 516 are not taken

Suggested Sequence for Five-Year Plan
Combined BS Physics and MS Mathematics with Concentration Pure and Applied Mathematics

First Year

Fall	Spring
PHYS 191 University Physics I (4)	PHYS 192 University Physics II (4)
ENWR 105 College Writing I (3)	ENWR 106 College Writing II (3)
MATH 122 Calculus I (4)	MATH 221 Calculus II (4)
CSIT 111 Fundamentals of Programming I (3)	CMST 101 Fundamentals Speech (3)
MATH 102 New Student Experience - Math Sciences (1)	General Education Course (3)
Total: 15	Total: 17

Second Year

Fall	Spring
PHYS 210 Mechanics (4)	PHYS 240 Electricity and Magnetism (4)
MATH 222 Calculus III (4)	CHEM 121 General Chemistry II (4)
CHEM 120 General Chemistry I (4)	MATH 335 Linear Algebra(4)
General Education course (3)	General Education course (6)
Physical Education Requirement (1)	
Total: 16	Total: 18

Third Year

Fall	Spring
PHYS 350 Optics (4)	PHYS 460 Modern Physics (4)
MATH 420 Differential Equations (4)	MATH 431 Abstract Analysis (3)
MATH 515 Intermediate Analysis I* (3)	MATH 516 Intermediate Analysis II *(3)
Language requirement (3)	Language requirement (3)
General Education Course (3)	Undergrad Physics Elective (4)
Total: 17	Total: 17

Fourth Year

Fall	Spring
MATH 521/535** (3)	MATH 525/531** (3)
MATH 530/560** (3)	Undergrad Physics Elective (4)
Undergrad Physics Elective (6)	General Education Course (3)
General Education Course (3)	Free Elective (2)
Total: 15	Total: 12

Fifth Year

Fall	Spring
MATH 535/521** (3)	MATH 531/525** (3)
MATH 560/530** (3)	MATH 584/591** (3)
MATH 591/584** (3)	MATH 698 Master's Thesis (3)
Total: 9	Total: 9

* MATH 515 and 516 must be taken is equivalent courses have not been taken previously. If material MATH 515 and 516 has been taken previously these courses will be replaced by graduate level math electives.

**The graduate schedule offers these core courses in alternating years. These requirements can be interchanged in the fourth and fifth years so they can be completed.

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: MATH 100, MATH 103, MATH 106, MATH 109, MATH 113, MATH 114, MATH 116, MATH 270, INFO 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 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. 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 *