

## MATHEMATICAL PHYSICS – SPECIALIZATION (SCIENCE) – BACHELOR OF SCIENCE (HONOURS)

Plans of study for students who were admitted to a Mathematical Physics Plan after May 2018

MAPH-P-BSH

**Subject:** Administered by the Departments of Mathematics and Statistics and Physics, Engineering Physics and Astronomy.

**Plan:** Consists of 105.0 units as described below. **Program:** The Plan, together with sufficient electives to total 120.0 units, will lead to a Bachelor of Science (Honours) Degree.

Requirements for this program have been modified. Please consult the <u>2020-2021 Calendar</u> for the previous requirements.

Code	Title	Units			
1. Core					
Mathematics a	Mathematics and Statistics:				
A. Complete tl	A. Complete the following:				
MATH 110	Linear Algebra	6.00			
MATH 120	Differential and Integral Calculus	6.00			
B. Complete the following:					
MATH 210	Rings and Fields	3.00			
C. Complete the following:					
MATH 231	Differential Equations	3.00			
MATH 280	Advanced Calculus	3.00			
MATH 281	Introduction to Real Analysis	3.00			
D. Complete the following:					
STAT 268	Statistics and Probability I	3.00			
STAT 269	Statistics and Probability II	3.00			
E. Complete the following:					
MATH 326	Functions of a Complex Variable	3.00			
MATH 328	Real Analysis	3.00			
MATH 334	Mathematical Methods for Engineering and Physics	3.00			
Physics:					
F. Select 6.00 units from the following:		6.00			
PHYS 104	Fundamental Physics				
PHYS 106	General Physics				
G. Complete the following:					
PHYS 206	Dynamics	3.00			
PHYS 212	Vibrations and Waves	3.00			
PHYS 213	Computational Methods in Physics	3.00			
PHYS 239	Electromagnetism	3.00			

PHYS 250 Foundations of Experimental Physics H. Select 18.00 units from the following: PHYS 321 Advanced Mechanics PHYS 344 Introduction to Quantum Mechanics PHYS 345 Quantum Physics of Atoms, Nuclei and Particles PHYS 350 General Laboratory PHYS 372 Thermodynamics I. Complete the following: PHYS 432 Electromagnetic Theory PHYS 590 Research Thesis 2. Option Mathematics and Statistics: A. Select 3.00 units from the following: MATH 341 Differential Geometry MATH 421 Fourier Analysis MATH 427 Introduction to Deterministic Dynamical Systems MATH 429 Functional Analysis and Quantum Mechanics MATH 436 Partial Differential Equations B. Select 9.00 units from the following: BIOM at the 300 level or above MATH at the 300 level or above Physics: C. PHYS at the 400 level or above Electives Elective Courses  15		· · · · · · · · · · · · · · · · · · ·	
PHYS 250 Foundations of Experimental Physics H. Select 18.00 units from the following: PHYS 321 Advanced Mechanics PHYS 344 Introduction to Quantum Mechanics PHYS 345 Quantum Physics of Atoms, Nuclei and Particles PHYS 350 General Laboratory PHYS 372 Thermodynamics I. Complete the following: PHYS 432 Electromagnetic Theory PHYS 590 Research Thesis 2. Option Mathematics and Statistics: A. Select 3.00 units from the following: MATH 341 Differential Geometry MATH 421 Fourier Analysis MATH 427 Introduction to Deterministic Dynamical Systems MATH 429 Functional Analysis and Quantum Mechanics MATH 436 Partial Differential Equations B. Select 9.00 units from the following: BIOM at the 300 level or above MATH at the 300 level or above Physics: C. PHYS at the 400 level or above Electives Elective Courses  15	PHYS 242	Relativity and Ouanta	3.00
H. Select 18.00 units from the following: PHYS 321 Advanced Mechanics PHYS 344 Introduction to Quantum Mechanics PHYS 345 Quantum Physics of Atoms, Nuclei and Particles PHYS 350 General Laboratory PHYS 372 Thermodynamics I. Complete the following: PHYS 432 Electromagnetic Theory PHYS 590 Research Thesis 2. Option Mathematics and Statistics: A. Select 3.00 units from the following: MATH 341 Differential Geometry MATH 421 Fourier Analysis MATH 427 Introduction to Deterministic Dynamical Systems MATH 429 Functional Analysis and Quantum Mechanics MATH 436 Partial Differential Equations B. Select 9.00 units from the following: BIOM at the 300 level or above MATH at the 300 level or above Physics: C. PHYS at the 400 level or above Electives Elective Courses  15		•	3.00
PHYS 321 Advanced Mechanics PHYS 344 Introduction to Quantum Mechanics PHYS 345 Quantum Physics of Atoms, Nuclei and Particles PHYS 350 General Laboratory PHYS 372 Thermodynamics I. Complete the following: PHYS 432 Electromagnetic Theory PHYS 590 Research Thesis  2. Option  Mathematics and Statistics: A. Select 3.00 units from the following: MATH 341 Differential Geometry MATH 421 Fourier Analysis MATH 427 Introduction to Deterministic Dynamical Systems MATH 429 Functional Analysis and Quantum Mechanics MATH 436 Partial Differential Equations B. Select 9.00 units from the following: BIOM at the 300 level or above MATH at the 300 level or above Physics: C. PHYS at the 400 level or above  Electives Elective Courses  15			18.00
PHYS 345 Quantum Physics of Atoms, Nuclei and Particles PHYS 350 General Laboratory PHYS 372 Thermodynamics I. Complete the following: PHYS 432 Electromagnetic Theory PHYS 590 Research Thesis  2. Option  Mathematics and Statistics: A. Select 3.00 units from the following: MATH 341 Differential Geometry MATH 421 Fourier Analysis MATH 427 Introduction to Deterministic Dynamical Systems MATH 429 Functional Analysis and Quantum Mechanics MATH 436 Partial Differential Equations B. Select 9.00 units from the following: BIOM at the 300 level or above MATH at the 300 level or above STAT at the 300 level or above Physics: C. PHYS at the 400 level or above  Electives Elective Courses			
Particles PHYS 350 General Laboratory PHYS 372 Thermodynamics I. Complete the following: PHYS 432 Electromagnetic Theory PHYS 590 Research Thesis  2. Option  Mathematics and Statistics: A. Select 3.00 units from the following: MATH 341 Differential Geometry MATH 421 Fourier Analysis MATH 427 Introduction to Deterministic Dynamical Systems MATH 429 Functional Analysis and Quantum Mechanics MATH 436 Partial Differential Equations B. Select 9.00 units from the following: BIOM at the 300 level or above MATH at the 300 level or above STAT at the 300 level or above Physics: C. PHYS at the 400 level or above Electives Elective Courses	PHYS 344	Introduction to Quantum Mechanics	
PHYS 372 Thermodynamics  I. Complete the following:  PHYS 432 Electromagnetic Theory  PHYS 590 Research Thesis  2. Option  Mathematics and Statistics:  A. Select 3.00 units from the following:  MATH 341 Differential Geometry  MATH 421 Fourier Analysis  MATH 427 Introduction to Deterministic Dynamical Systems  MATH 429 Functional Analysis and Quantum Mechanics  MATH 436 Partial Differential Equations  B. Select 9.00 units from the following:  BIOM at the 300 level or above  MATH at the 300 level or above  Physics:  C. PHYS at the 400 level or above  Electives  Elective Courses	PHYS 345		
I. Complete the following: PHYS 432 Electromagnetic Theory 3 PHYS 590 Research Thesis 6  2. Option  Mathematics and Statistics: A. Select 3.00 units from the following: 3 MATH 341 Differential Geometry MATH 421 Fourier Analysis MATH 427 Introduction to Deterministic Dynamical Systems  MATH 429 Functional Analysis and Quantum Mechanics  MATH 436 Partial Differential Equations  B. Select 9.00 units from the following: 9 BIOM at the 300 level or above MATH at the 300 level or above Physics: C. PHYS at the 400 level or above  Electives  Elective Courses 15	PHYS 350	General Laboratory	
PHYS 432 Electromagnetic Theory PHYS 590 Research Thesis  2. Option  Mathematics and Statistics: A. Select 3.00 units from the following: MATH 341 Differential Geometry MATH 421 Fourier Analysis MATH 427 Introduction to Deterministic Dynamical Systems MATH 429 Functional Analysis and Quantum Mechanics MATH 436 Partial Differential Equations  B. Select 9.00 units from the following: BIOM at the 300 level or above MATH at the 300 level or above STAT at the 300 level or above Physics: C. PHYS at the 400 level or above  Electives  Elective Courses	PHYS 372	Thermodynamics	
PHYS 590 Research Thesis  2. Option  Mathematics and Statistics:  A. Select 3.00 units from the following:  MATH 341 Differential Geometry  MATH 421 Fourier Analysis  MATH 427 Introduction to Deterministic Dynamical Systems  MATH 429 Functional Analysis and Quantum Mechanics  MATH 436 Partial Differential Equations  B. Select 9.00 units from the following:  BIOM at the 300 level or above  MATH at the 300 level or above  STAT at the 300 level or above  Physics:  C. PHYS at the 400 level or above  Electives  Elective Courses	I. Complete the	e following:	
2. Option  Mathematics and Statistics:  A. Select 3.00 units from the following:  MATH 341 Differential Geometry  MATH 421 Fourier Analysis  MATH 427 Introduction to Deterministic Dynamical Systems  MATH 429 Functional Analysis and Quantum Mechanics  MATH 436 Partial Differential Equations  B. Select 9.00 units from the following:  BIOM at the 300 level or above  MATH at the 300 level or above  STAT at the 300 level or above  Physics:  C. PHYS at the 400 level or above  Electives  Elective Courses	PHYS 432	Electromagnetic Theory	3.00
Mathematics and Statistics:  A. Select 3.00 units from the following:  MATH 341 Differential Geometry  MATH 421 Fourier Analysis  MATH 427 Introduction to Deterministic Dynamical Systems  MATH 429 Functional Analysis and Quantum Mechanics  MATH 436 Partial Differential Equations  B. Select 9.00 units from the following:  BIOM at the 300 level or above  MATH at the 300 level or above  STAT at the 300 level or above  Physics:  C. PHYS at the 400 level or above  Electives  Elective Courses	PHYS 590	Research Thesis	6.00
A. Select 3.00 units from the following:  MATH 341 Differential Geometry  MATH 421 Fourier Analysis  MATH 427 Introduction to Deterministic Dynamical Systems  MATH 429 Functional Analysis and Quantum Mechanics  MATH 436 Partial Differential Equations  B. Select 9.00 units from the following:  BIOM at the 300 level or above  MATH at the 300 level or above  STAT at the 300 level or above  Physics:  C. PHYS at the 400 level or above  Electives  Elective Courses	2. Option		
MATH 341 Differential Geometry MATH 421 Fourier Analysis  MATH 427 Introduction to Deterministic Dynamical Systems  MATH 429 Functional Analysis and Quantum Mechanics  MATH 436 Partial Differential Equations  B. Select 9.00 units from the following: 9 BIOM at the 300 level or above MATH at the 300 level or above STAT at the 300 level or above  Physics: C. PHYS at the 400 level or above  Electives  Elective Courses	Mathematics a	nd Statistics:	
MATH 421 Fourier Analysis  MATH 427 Introduction to Deterministic Dynamical Systems  MATH 429 Functional Analysis and Quantum Mechanics  MATH 436 Partial Differential Equations  B. Select 9.00 units from the following:  BIOM at the 300 level or above  MATH at the 300 level or above  STAT at the 300 level or above  Physics:  C. PHYS at the 400 level or above  Electives  Elective Courses	A. Select 3.00 u	nits from the following:	3.00
MATH 427 Introduction to Deterministic Dynamical Systems  MATH 429 Functional Analysis and Quantum Mechanics  MATH 436 Partial Differential Equations  B. Select 9.00 units from the following:  BIOM at the 300 level or above  MATH at the 300 level or above  STAT at the 300 level or above  Physics:  C. PHYS at the 400 level or above  Electives  Elective Courses	MATH 341	Differential Geometry	
Systems  MATH 429 Functional Analysis and Quantum Mechanics  MATH 436 Partial Differential Equations  B. Select 9.00 units from the following:  BIOM at the 300 level or above  MATH at the 300 level or above  STAT at the 300 level or above  Physics:  C. PHYS at the 400 level or above  Electives  Elective Courses	MATH 421	Fourier Analysis	
Mechanics  MATH 436 Partial Differential Equations  B. Select 9.00 units from the following:  BIOM at the 300 level or above  MATH at the 300 level or above  STAT at the 300 level or above  Physics:  C. PHYS at the 400 level or above  Electives  Elective Courses	MATH 427		I
B. Select 9.00 units from the following:  BIOM at the 300 level or above  MATH at the 300 level or above  STAT at the 300 level or above  Physics:  C. PHYS at the 400 level or above  Electives  Elective Courses	MATH 429		
BIOM at the 300 level or above MATH at the 300 level or above STAT at the 300 level or above Physics: C. PHYS at the 400 level or above  Electives  Elective Courses	MATH 436	Partial Differential Equations	
MATH at the 300 level or above STAT at the 300 level or above Physics: C. PHYS at the 400 level or above  Electives Elective Courses	B. Select 9.00 u	nits from the following:	9.00
STAT at the 300 level or above Physics: C. PHYS at the 400 level or above  Electives  Elective Courses	BIOM at the	300 level or above	
Physics: C. PHYS at the 400 level or above  Electives  Elective Courses	MATH at the	300 level or above	
C. PHYS at the 400 level or above  Electives  Elective Courses 15	STAT at the 3	300 level or above	
Electives Elective Courses 15	Physics:		
Elective Courses 15		400 level or above	3.00
	Electives		
Total Units 120	Elective Course	25	15.00
iotal offits	Total Units		120.00

## 3. Note

A. A maximum of 6.0 units from courses offered by other Faculties and Schools may be counted toward the program and/or Plan Requirements. This includes courses in BMED, COMM, GLPH, LAW, NURS and courses in the Faculty of Engineering and Applied Science.

**queensu.ca/academic-calendar**Bachelor of Science (Honours)