CHEMICAL PHYSICS (CHPY)

Administered by the Office of the Dean, College of Engineering and Physical Sciences on behalf of the Department of Chemistry and the Department of Physics

Note: admission, including internal or external transfer, to the Chemical Physics major (regular and Co-op) has been suspended. For more information, please contact the Office of the Dean, College of Engineering and Physical Sciences on behalf of the Department of Chemistry and the Department of Physics.

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Major Requirements (Honours)

This is a major within the degree: Bachelor of Science (calendar.uoguelph.ca/undergraduate-calendar/degree-programs/bachelor-science-bsc/)**.**

Students may enter this major in Semester 1 or any semester thereafter. A student wishing to declare the major may wish to consult the Faculty Advisor. A minimum of 20.00 credits is required. At least 1.00 credits must be from Liberal Education electives.

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at https://www.uoguelph.ca/bsc/revised_SS/.

Code	Title	Credits
Semester 1		
CHEM*1040	General Chemistry I	0.50
CIS*1300	Programming	0.50
IPS*1500	Integrated Mathematics and Physics I	1.00
Select 0.50 credits from the following:		
BIOL*1070	Discovering Biodiversity	0.50
BIOL*1080	Biological Concepts of Health	0.50
BIOL*1090	Introduction to Molecular and Cellular Biology	0.50
Semester 2		
CHEM*1050	General Chemistry II	0.50
IPS*1510	Integrated Mathematics and Physics II	1.00
MATH*1160	Linear Algebra I	0.50
Select 0.50 credits from the following:		
BIOL*1070	Discovering Biodiversity	0.50
BIOL*1080	Biological Concepts of Health	0.50
BIOL*1090	Introduction to Molecular and Cellular Biology	0.50
Semester 3		
CHEM*2060	Structure and Bonding	0.50
MATH*2200	Advanced Calculus I	0.50
MATH*2270	Applied Differential Equations	0.50
PHYS*2330	Electricity and Magnetism I	0.50
0.50 Liberal Education electives		0.50
Semester 4		
CHEM*2070	Structure and Spectroscopy	0.50
CHEM*2480	Analytical Chemistry I	0.50
PHYS*2180	Experimental Techniques in Physics	0.50
PHYS*2310	Mechanics	0.50
PHYS*2340	Electricity and Magnetism II	0.50
Semester 5		
CHEM*3860	Quantum Chemistry	0.50
PHYS*3130	Mathematical Physics	0.50
PHYS*3230	Quantum Mechanics I	0.50
CHEM*2820	Thermodynamics and Kinetics	0.50
or PHYS*2240	Thermal Physics	
Select 0.50 credits from the following:		
IPS*3000	Science Communication [1]	0.50
0.50 electives		0.50
Semester 6		
CHEM*3430	Analytical Chemistry II: Instrumental Analysis	0.50
NANO*3600	Computational Methods in Materials Science	0.50
PHYS*3000	Optics: Fundamentals and Applications	0.50
PHYS*4040	Quantum Mechanics II	0.50
CHEM*3870	Molecular Spectroscopy [2]	0.50
or CHEM*4880	Topics in Advanced Physical Chemistry	
Semester 7		
CHEM*3440	Analytical Chemistry III: Analytical Instrumentation	0.50
PHYS*4120	Atomic and Molecular Physics	0.50
PHYS*4240	Statistical Physics II	0.50
PHYS*4001	Research in Physics (or 0.50 electives) [3]	0.50
Select 0.50 credits from the following:		
IPS*3000	Science Communication [1]	0.50
0.50 electives		0.50
Semester 8		
CHEM*3870	Molecular Spectroscopy [2]	0.50
or CHEM*4880	Topics in Advanced Physical Chemistry	
PHYS*4002	Research in Physics (and 0.50 electives) [3]	1.00
or CHEM*4900	Chemistry Research Project I	
0.50 electives		0.50

1

IPS*3000 Science Communication is required for graduation.

2

One of CHEM*3870 Molecular Spectroscopy or CHEM*4880 Topics in Advanced Physical Chemistry is required for graduation

3

Students must complete either (PHYS*4001 Research in Physics, PHYS*4002 Research in Physics in semester 7 and 8) or (CHEM*4900 Chemistry Research Project I in semester 8)

A minimum of 1.00 credits of Liberal Education electives is required for completion of this program. The list of Liberal Education electives for B.Sc. students can be found at: https://www.uoguelph.ca/bsc/

Credit Summary

(20.00 Total Credits)

Code	Title	Credits
First year science credits		5.00
Required science courses semesters 3 – 8		12.00
Liberal Education electives		1.00
Free electives - any approved elective for B.Sc. students.		2.00
Total Credits		**20**

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

Note: admission, including internal or external transfer, to the Chemical Physics major (regular and Co-op) has been suspended. For more information, please contact the Office of the Dean, College of Engineering and Physical Sciences on behalf of the Department of Chemistry and the Department of Physics.

Co-op Requirements (Honours)

This is a major within the degree: Bachelor of Science (calendar.uoguelph.ca/undergraduate-calendar/degree-programs/bachelor-science-bsc/**).**

The Co-op program in Chemical Physics is a five year program, including five work terms. Students must follow the academic work schedule as outlined below (also found on the Co-operative Education website: https://www.recruitguelph.ca/cecs/).

Academic and Co-op Work Term Schedule

Year	Fall	Winter	Summer
1	Academic Semester 1	Academic Semester 2	Off
2	Academic Semester 3 COOP*1100	Academic Semester 4	COOP*1000 Work Term I
3	COOP*2000 Work Term II	Academic Semester 5	COOP*3000 Work Term III
4	Academic Semester 6	COOP*4000 Work Term IV	COOP*5000 Work Term V
5	Academic Semester 7	Academic Semester 8	N/A

Please refer to the Co-operative Education program policy with respect to work term performance grading, work term report grading and program completion requirements.

For additional program information students should consult with their Co-op Co-ordinator and Co-op Faculty Advisor, listed on the Co-operative Education web site.

Credit Summary

(22.50 Total Credits)

Code	Title	Credits
First year science credits		5.00
Required science courses semesters 3 – 8		10.50
Approved science electives		0.50
Liberal Education electives		1.00
Free electives - any approved elective for B.Sc. students		3.00
Co-op Work Terms		2.50
Total Credits		**22.5**

Of the total credits required, students are required to complete 16.00 credits in science of which 2.00 credits must be at the 4000 level and an additional 4.00 credits must be at the 3000 or 4000 level.

Recommended Program Sequence

Students lacking Grade 12 or 4U Biology, Chemistry or Physics should follow the revised schedule of study for this major found at https://www.uoguelph.ca/bsc/revised_SS/.

Code	Title	Credits
Semester 1 - Fall		
CHEM*1040	General Chemistry I	0.50
CIS*1300	Programming	0.50
IPS*1500	Integrated Mathematics and Physics I	1.00
Select 0.50 credits from the following:		
BIOL*1070	Discovering Biodiversity	0.50
BIOL*1080	Biological Concepts of Health	0.50
BIOL*1090	Introduction to Molecular and Cellular Biology	0.50
Semester 2 - Winter		
CHEM*1050	General Chemistry II	0.50
IPS*1510	Integrated Mathematics and Physics II	1.00
MATH*1160	Linear Algebra I	0.50
Select 0.50 credits from the following:		
BIOL*1070	Discovering Biodiversity	0.50
BIOL*1080	Biological Concepts of Health	0.50
BIOL*1090	Introduction to Molecular and Cellular Biology	0.50
Summer Semester		
No academic semester or work term		
Semester 3 - Fall		
CHEM*2060	Structure and Bonding	0.50
COOP*1100	Introduction to Co-operative Education	0.00
MATH*2200	Advanced Calculus I	0.50
MATH*2270	Applied Differential Equations	0.50
PHYS*2330	Electricity and Magnetism I	0.50
0.50 Liberal Education electives		0.50
Semester 4 - Winter		
CHEM*2070	Structure and Spectroscopy	0.50
CHEM*2480	Analytical Chemistry I	0.50
PHYS*2180	Experimental Techniques in Physics	0.50
PHYS*2310	Mechanics	0.50
PHYS*2340	Electricity and Magnetism II	0.50
Summer Semester		
COOP*1000	Co-op Work Term I	0.50
Fall Semester		
COOP*2000	Co-op Work Term II	0.50
Semester 5 - Winter		

CHEM*3430	Analytical Chemistry II: Instrumental Analysis	0.50
1.00 electives [3]		1.00
Select 0.50 credits from the following:		
CHEM*3870	Molecular Spectroscopy [2]	0.50
0.50 electives [3]		0.50
Select 0.50 credits from the following:		
CIS*2500	Intermediate Programming	0.50
0.50 electives [3]		0.50
Summer Semester		
COOP*3000	Co-op Work Term III	0.50
Semester 6 - Fall		
CHEM*3860	Quantum Chemistry	0.50
IPS*3000	Science Communication	0.50
PHYS*3130	Mathematical Physics	0.50
PHYS*3230	Quantum Mechanics I	0.50
CHEM*2820	Thermodynamics and Kinetics	0.50
or PHYS*2240	Thermal Physics	
Winter Semester		
COOP*4000	Co-op Work Term IV	0.50
Summer Semester		
COOP*5000	Co-op Work Term V	0.50
Semester 7 - Fall [4]		
CHEM*3440	Analytical Chemistry III: Analytical Instrumentation	0.50
PHYS*4240	Statistical Physics II	0.50
1.00 electives [3]		1.00
Select 0.50 credits from the following:		
CHEM*3640	Chemistry of the Elements I	0.50
CHEM*3750	Organic Chemistry II	0.50
0.50 electives [3]		0.50
Semester 8 - Winter [4]		
NANO*3600	Computational Methods in Materials Science	0.50
PHYS*3000	Optics: Fundamentals and Applications	0.50
PHYS*4040	Quantum Mechanics II	0.50
0.50 electives [3]		0.50
Select 0.50 credits from the following:		0.50
CHEM*3870	Molecular Spectroscopy [2]	0.50
CHEM*4880	Topics in Advanced Physical Chemistry [2]	0.50
0.50 electives [3]		0.50

2

One of CHEM*3870 Molecular Spectroscopy or CHEM*4880 Topics in Advanced Physical Chemistry is required for graduation

3

A minimum of 1.00 credits of Liberal Education electives is required for completion of this program. The list of Liberal Education electives for B.Sc. students can be found at: https://www.uoguelph.ca/bsc/.

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A minimum of 2.00 credits in science courses at the 4000 level is required for graduation.