CIR-MAJ

Curriculum Information Record for a Major/Degree

Department of Physics
Effective from Semester B 2024/25
For Students Admitted/Changed to the Major
In 2020/21

The information provided on this form is the official record of the major/degree. It will be used for City University's database, various City University publications (including websites) and documentation for students and others as required.

In specifying the curriculum for a major/degree, "catalogue term" is used to determine the set of curriculum requirements that a student is following. By mapping the student record and the version of curriculum rules applicable, the graduation requirements of individual students will be evaluated accordingly. The catalogue terms of curriculum requirements that students will follow are summarized below (BUS/04/A5R):

Requirements	Catalogue Term
a) Common Requirements • Gateway Education • University Language • College/School requirement	The same as student's admission term
b) Major • For normative 4-year degree students who will join the majors allocation exercise	Effective term of the declared major
• For advanced standing students and 4-year degree students who already have a major at the time of admission	The same as student's admission term
• For students who have changed major	Effective term of the changed major
c) Stream	Follow the effective term of the associated major

Prepared / Last Updated by

Name:	Prof W C Yu	Academic Unit:	PHY
Phone/email:	7702/wingcyu	Date:	30 Oct 2024

City University of Hong Kong

Curriculum Information Record for a Major/Degree

Department of Physics
Effective from Semester B 2024/25
For Students Admitted/Changed to the Major
In 2020/21

Part I Major/Degree Overview

Major

(in English) : Applied Physics

(in Chinese) : 應用物理學

Degree

(For students admitted to the University in 2015/16 and thereafter)

(in English) : Bachelor of Science

(in Chinese) : 理學士

(For students admitted to the University in 2014/15 and before)

(in English) : Bachelor of Science (Honours)

(in Chinese) : 榮譽理學士

Award Title[#]

(For students admitted to the University in 2015/16 and thereafter)

(in English) : Bachelor of Science in Applied Physics

(in Chinese) : 理學士(應用物理學)

(For students admitted to the University in 2014/15 and before)

(in English) : Bachelor of Science (Honours) in Applied Physics

(in Chinese) : 應用物理學榮譽理學士

 # Please make reference to the "Guidelines on Award Titles" approved by the Senate when proposing new award titles or changes to existing award titles (Senate/86/A5R).

.

1. Normal and Maximum Period of Study

	Normative 4-year Degree	Advanced Standing I (Note 1)	Advanced Standing II (Senior-year Entry) (Note 2)
Normal period of study	4 years	3 years	2 years
Maximum period of study	8 years	6 years	5 years

2. Minimum Number of Credit Units Required for the Award and Maximum Number of Credit Units Permitted

Degree Requirements	**Normative 4-year Degree**	**Advanced Standing I**	**Advanced Standing II (Senior-year Entry)**
Gateway Education requirement *****	30 credit units	21 credit units	12 credit units
College/School requirement *****	6 credit units	waived	waived
Major requirement	66/65^ credit units (Core: 45/48; 50/53^ Elective: 21/18; 15/12^)	66/65^ credit units (Core: 45/48; 50/53^; Elective: 21/18; 15/12^)	60/59^ credit units (Core: 39/42; 44/47^ Elective: 21/18; 15/12^)
Free electives / Minor (if applicable)	18/19^ credit units	3/4^ credit units	0/1 ^credit unit
Minimum number of credit units required for the award	**120 credit units**	**90 credit units**	**72 credit units**
Maximum number of credit units permitted	**144 credit units**	**114 credit units**	**84 credit units**

****** For details, please refer to the Curriculum Information Record for Common Requirements.*

^ For students who are approved for taking the Enhanced Option of computation and maths courses.

3. Aims of Major

This major is to provide Bachelor-level education to students with diverse backgrounds, to prepare them to pursue a career in areas such as environmental physics, optics, materials technology, and biomedical physics in the industrial, commercial, governmental or educational sectors. On completion of the major, graduates will be able to integrate knowledge learned in the major to support in at least an original discovery or creative design relevant to applied physics.

Note 1: For students with recognised Advanced Level Examination or equivalent qualifications.
Note 2: For Associate Degree/Higher Diploma graduates admitted to the senior year.

4. Intended Learning Outcomes of Major (MILOs)

(Please state what the student is expected to be able to do on completion of the major according to a given standard of performance.)

Upon successful completion of these major, students should be able to:

No.	*MILOs*	*Discovery-enriched curriculum related learning outcomes (please tick where appropriate)*		
		A1	*A2*	*A3*
1.	Apply knowledge of mathematics, physics, and engineering appropriate to the degree in Physics (with the focus on one or more of the areas in applied physics: environmental physics, optics, materials technology, and biomedical physics). This includes: (a) to design a component, a process or a system to meet desired needs within realistic constraints. (b) to identify, formulate, and solve physics and engineering problems.	✓	✓	
2.	Design and conduct experiments, as well as analyze, interpret and present results.		✓	✓
3.	Use the techniques, skills, and modern Physics and engineering tools including computer/IT tools necessary for practices appropriate to the degree in Physics along with an understanding of their processes and limitations.		✓	✓
4.	Appreciate the impact of Physics and engineering applications in a global and societal context, especially the importance of health, safety and environmental considerations to both workers and the general public.	✓	✓	
5.	Appreciate professional and ethical responsibility.			
6.	Appreciate basic laws and principles of physics and to use this knowledge to explain everyday life examples and phenomena, to explain science to people not in the science and engineering discipline, and to educate the public in physics.	✓		
7.	Work in a multidisciplinary team.		✓	
8.	Communicate effectively.		✓	
9.	Recognize the need for, and to engage in life-long learning, including the ability to stay abreast of contemporary issues.	✓	✓	
10.	Create an original discovery or design that are motivated from the major of study.	✓	✓	✓

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishments of discovery/innovation/creativity through producing/constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Part II Major Requirement

(The catalogue term of the major requirement that students will follow will be the effective term of the declared/allocated major.

For normative 4-year degree students who will join the major allocation exercise, the catalogue term of major requirement will be one year after admission.

For advanced standing students and 4-year degree students who already have a major at the time of admission, the catalogue term of major requirement will be the same as their admission term.)

1. Core Courses

- Normative 4-year Degree (45 or 48 credit units; 50 or 53 credit units^)

- Advanced Standing I (45 or 48 credit units; 50 or 53 credit units^)

- Advanced Standing II (39 or 42 credit units; 44 or 47 credit units^)

Course Code	Course Title	Level	Credit Units	Remarks
PHY1202	General Physics II	B1	3	Advanced Standing I and II Students with acceptable qualifications may apply for exemption on a case by case basis. They are required to complete any 3 CU course to replace the exempted credits.
PHY1203	General Physics III	B1	3	Advanced Standing I and II Students with acceptable qualifications may apply for exemption on a case by case basis. They are required to complete any 3 CU course to replace the exempted credits.
PHY2191	Electricity and Magnetism	B2	3	
PHY2212	Measurement and Instrumentation	B2	3	Advanced Standing II students are not required to take this course.
PHY2213	Advanced Measurement and Instrumentation	B2	3	Advanced Standing II students are not required to take this course.
PHY3202	Modern Physics	B3	3	
PHY3204	Waves and Optics	B3	3	
PHY3205	Electromagnetism	B3	3	The course title has been revamped as "Electrodynamics" effective from Semester A 2020/21.
PHY3231	Advanced Instrumentation Lab	B3	3	
PHY3251	Quantum Physics	B3	3	The course title has been revamped as "Quantum Mechanics effective from Semester A 2021/22.
PHY3272	Introduction to Solid State Physics	B3	3	
PHY3290	Thermodynamics	B3	3	
PHY4216/ PHY4217/ CSCI4003	Project/ Dissertation/ Co-operative Education Placement Project for Science Students	B4	3/ 6/ 6	- Students taking *PHY4216 Project* are required to take 3 more credits of elective course. - *CSCI4003 Co-operative Education Placement Project for Science Students* (6 CUs) can be used to replace *PHY4217 Dissertation* (6 CUs). Students taking CSCI4003 are required to take CSCI4001simultaneously.

.

Select ONE from the following blocks of computation and maths courses:

Ordinary Option

Course Code	Course Title	Level	Credit Units	Remarks
MSE3114	Computation Methods for Physicists and Materials Engineers	B3	3	The course has been replaced by PHY3115 Introduction to Computational Physics effective from Semester A 2022/23.
MA2158	Linear Algebra and Calculus	B2	3	Advanced Standing students may be required to complete MA1200 Calculus and Basic Linear Algebra I and MA1201 Calculus and Basic Linear Algebra II (the pre-requisite courses) before they are allowed to enroll *MA2158 Linear Algebra and Calculus*. They are advised to apply and sit for the placement test organized by MA department before the commencement of Semester A of their admitted academic year.

Enhanced Option
*(Students have to meet the specified criteria**and obtain the prior approval from the Department for taking this option.)*

Course Code	Course Title	Level	Credit Units	Remarks
MA2503	Linear Algebra	B2	4	
MA2508	Multi-variable Calculus	B2	4	
MA3511	Ordinary Differential Equations	B3	3	

*** Eligibliity for the Enhanced Option:*

Normative 4-year Degree

(1) Students who plan to pursue the Joint Bachelor's Degree Program between CityU and ColumbiaU **OR**

(2) Students who obtained *Grade B+ or above for MA1301 Enhanced Calculus & Linear Algebra II* or *Grade A- or above for MA1201 Calculus & Linear Algebra II*.

Advanced Standing Students

(1) Students who obtained *Grade B+ or above for MA1301 Enhanced Calculus & Linear Algebra II* or *Grade A- or above for MA1201 Calculus & Linear Algebra II* **OR**

(2) Students who passed 85% of the combined MA Placement test for MA1200 Calculus & Basic Linear Algebra I and MA1201 Calculus & Basic Linear Algebra II.

^For students who are approved for taking the Enhanced Option of computation and maths courses.

2. Electives

- Normative 4-year Degree (21 or 18 credit units; 15 or 12 credit units^)

- Advanced Standing I (21 or 18 credit units; 15 or 12 credit units^)

- Advanced Standing II (21 or 18 credit units; 15 or 12 credit units^)

Course Code	Course Title	Level	Credit Units	Remarks
CSCI3001	Grand Challenges in the World	B3	3	
MSE2102	Introduction to Materials Engineering	B2	3	
MSE3171	Materials Characterization Techniques	B3	3	
MSE4121	Thin Film Technology and Nanocrystalline Coatings	B4	3	
MSE4127	Smart Sensors: From Engineering to Applications	B4	3	
PHY2100	Mathematical Methods in Physics	B2	3	
PHY3115	Introduction to Computational Physics	B3	3	For students taking the Enhanced Option only
PHY3116	Introduction to Soft Matter Physics	B3	3	
PHY3220	Financial Engineering from a Scientist's Perspective	B3	3	The course title has been revamped as "From Physics to Finance" effective from Semester B 2024/25.
PHY4172	Computational Physics	B4	3	
PHY4230	Radiation Safety	B4	3	
PHY4232	Radiotherapy Physics	B4	3	
PHY4233	Imaging Physics	B4	3	
PHY4254	Fundamentals of Laser Optics	B4	3	
PHY4265	Semiconductor Physics and Devices	B4	3	
PHY4273	Special Topics in Physics	B4	3	
PHY4274	Radiation Biophysics	B4	3	
PHY4275	Radiological Physics and Dosimetry	B4	3	
PHY4283	Physics in Medicine	B4	3	
PHY4285	Introduction to Scattering Sciences	B4	3	

^ *For students who are approved for taking the Enhanced Option of computation and maths courses.*

Part III Admission Requirements for Entry to the Major, if any

(Admission requirements here refers to specific requirements for students already admitted to the College/School/Department with an undeclared major. Academic units can state the prerequisites required for admission to the major.)

Nil

Part IV Accreditation by Professional / Statutory Bodies

Nil

Part V Additional Information

Nil

Part VI Curriculum Map

(The curriculum map shows the mapping between courses and the MILOs. It should cover all courses designed specifically for the major.)

Course			MILOs										DEC		
Code	**Title**	**Credit**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**A1**	**A2**	**A3**
Core Courses															
PHY1202	General Physics II	3	✓	✓		✓		✓		✓	✓		✓	✓	✓
PHY1203	General Physics III	3	✓	✓		✓		✓		✓	✓		✓	✓	✓
PHY2191	Electricity and Magnetism	3	✓		✓			✓		✓			✓	✓	
PHY2212	Measurement and Instrumentation	3	✓	✓	✓				✓				✓	✓	✓
PHY2213	Advanced Measurement and Instrumentation	3	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓
PHY3202	Modern Physics	3	✓			✓		✓					✓	✓	
PHY3204	Waves and Optics	3	✓			✓		✓						✓	
PHY3205	Electromagnetism%	3	✓	✓		✓			✓	✓				✓	
PHY3231	Advanced Instrumentation Lab	3	✓	✓	✓			✓		✓	✓		✓	✓	✓
PHY3251	Quantum Physics^	3	✓			✓		✓					✓	✓	
PHY3272	Introduction to Solid State Physics	3	✓			✓		✓						✓	
PHY3290	Thermodynamics	3	✓			✓		✓						✓	
PHY4216/ PHY4217/ CSCI4003	Project/ Dissertation/ Co-operative Education Placement Project for Science Students	3/ 6/ 6	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓
Ordinary Option															
MSE3114#	Computational Methods for Physicists and Materials Engineers	3	✓		✓	✓		✓			✓		✓	✓	✓
MA2158	Linear Algebra and Calculus	3	✓	✓	✓								✓	✓	✓
Enhanced Option*															
MA2503	Linear Algebra	4	✓							✓			✓	✓	✓
MA2508	Multi-variable Calculus	4	✓							✓			✓	✓	✓
MA3511	Ordinary Differential Equations	3	✓							✓			✓	✓	✓

.

Course			MILOs										DEC		
Code	**Title**	**Credit**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**A1**	**A2**	**A3**
Electives															
CSCI3001	Grand Challenges in the World	3	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MSE2102	Introduction to Materials Engineering	3	✓	✓		✓		✓		✓	✓			✓	✓
MSE3171	Materials Characterization Techniques	3	✓	✓	✓				✓				✓	✓	✓
MSE4121	Thin Film Technology and Nanocrystalline Coatings	3	✓		✓	✓			✓		✓		✓	✓	✓
MSE4127	Smart Sensors: From Engineering to Applications	3	✓	✓	✓	✓		✓			✓			✓	
PHY2100	Mathematical Methods in Physics	3	✓		✓								✓	✓	✓
PHY3115*	Introduction to Computational Physics	3	✓		✓	✓		✓			✓		✓	✓	✓
PHY3116	Introduction to Soft Matter Physics	3	✓			✓		✓			✓			✓	
PHY3220	Financial Engineering from a Scientist's Perspective+	3	✓			✓	✓	✓	✓		✓		✓	✓	✓
PHY4172	Computational Physics	3	✓	✓	✓			✓	✓	✓			✓	✓	✓
PHY4230	Radiation Safety	3	✓		✓	✓		✓					✓	✓	✓
PHY4232	Radiotherapy Physics	3	✓	✓		✓	✓	✓	✓					✓	
PHY4233	Imaging Physics	3	✓	✓		✓	✓	✓	✓					✓	
PHY4254	Fundamentals of Laser Optics	3	✓			✓		✓					✓	✓	
PHY4265	Semiconductor Physics and Devices	3	✓			✓		✓					✓	✓	
PHY4273	Special Topics in Physics	3	✓			✓							✓	✓	✓
PHY4274	Radiation Biophysics	3	✓			✓		✓					✓	✓	
PHY4275	Radiological Physics and Dosimetry	3	✓		✓	✓		✓					✓	✓	
PHY4283	Physics in Medicine	3	✓	✓		✓	✓	✓	✓					✓	
PHY4285	Introduction to Scattering Sciences	3	✓		✓	✓		✓			✓		✓	✓	✓

A1 : *Attitude*
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2 : *Ability*
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3 : *Accomplishments*
Demonstrate accomplishments of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

% The course title has been revamped as “Electrodynamics” effective from Semester A 2020/21.
^ The course title has been revamped as “Quantum Mechanics” effective from Semester A 2021/22.
+ The course title has been revamped as “From Physics to Finance” effective from Semester B 2024/25.
***** For students who are approved for taking the Enhanced Option of computation and maths courses.
# The course has been replaced by PHY3115 Introduction to Computational Physics effective from Semester A 2022/23.