



Department of Physics

香港城市大學
City University of Hong Kong

Master of Science in Physics with Data Modelling and Quantum Technologies

理學碩士（物理學數據建模與量子技術）

Student Handbook
2025-2026

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1 Programme Aims

The programme aims to provide an opportunity for university graduates in physical science or engineering disciplines to obtain post-graduate level training in physics with highly marketable professional skills specialized in the sub-fields of data modelling and quantum technologies. It also provides an opportunity for scientists and engineers in industry to upgrade their knowledge or skills through pursuing graduate level studies of various topics of physics. The graduates of this programme will gain knowledge of physical principles and how these principles can be applied to practical problems in specific related professions. The training and knowledge provided are suitable for employment in data modelling and quantum technologies in Hong Kong, China and oversea countries. It is also expected that this programme will serve as a bridge providing a good base for students to pursue Ph.D. studies in related fields (Physics, Materials Science, Computer Science, Electrical Engineering, Mechanical Engineering).

2 Programme Intended Learning Outcomes (PILOs)

Upon successful completion of this Programme, students should:

No.	PILOs	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
		A1	A2	A3
1.	Have acquired an extensive and in-depth physical knowledge of and analytical skills in various fields in physics, quantum technology and data modelling.		✓	
2.	Have developed the ability to apply the knowledge of physics, quantum technology and data modelling to generate creative and ethical solutions in the working environment.		✓	
3.	Be able to communicate effectively with physics, quantum technology and data modelling related professions.		✓	
4.	Be able to apply textbook theories to physics, quantum technology and data modelling problems.	✓	✓	
5.	Be able to design and conduct experiments, as well as to critically analyze and interpret data.	✓		✓
6.	Be able to identify, formulate, solve engineering or scientific problems and generate new ideas in the relevant subfields of physics, quantum technology and data modelling.	✓		✓
7.	Have developed necessary skills to present research findings in a logical manner to the scientific community.	✓	✓	✓
8.	Recognize the need for, and an ability to engage in life-long learning.	✓		

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.

3 Programme Structure (Combined Mode: Full-time or Part-time)

The programme is offered in a 2-year part-time mode which extends over 4 semesters, or in one year full-time mode consisting of three semesters.

Local students taking programmes in combined mode can attend full-time (12-18 credit units per semester) or part-time (no more than 11 credit units per semester) study in different semesters without seeking approval from the University. For non-local students, they will be admitted to the programme for either full-time or part-time studies. Non-local students must maintain the required credit load for their full-time or part-time studies and any changes will require approval from the University.

4 Programme Requirement and List of Courses Offered in 2025-26

To complete the programme, students have to acquire a total of 30 credit units (CUs), of which 12 CUs must be acquired from core courses in graduate level **general physics, quantum technology, and data modelling**. The remaining 18 CUs can be acquired from a list of elective courses.

Highly motivated students may be eligible to enroll in a 9 credit course “**Advanced Research in Physics**” to acquire necessary skills for carrying out independent research in physics. Students will have the valuable opportunity to work with faculties on cutting edge research in condensed matters physics, quantum information, soft matter physics as well as applied physics in the specialized field of biomedical physics or energy materials physics.

4.1 Core Courses (12 credit units)

Course Code	Course Title	Credit Units	Specialized Area	2025-2026 Semester
PHY5503	Introduction to Quantum Technology	3	Core course on quantum technology	A
PHY5504	Data Acquisition and Processing Skills for Physicists I	3	Core course on data modelling	A
PHY6604	Machine Learning in Physics	3	<ul style="list-style-type: none">• Core course on data modelling and machine learning• Student should learn Python programming before taking the course. One way to achieve this is to take PHY5504 Data Acquisition and Processing Skills for Physicists I.	B
PHY6505	Modern Topics in Physics	3	Core course on general physics	B

4.2 Electives (18 credit units)

Course Code	Course Title	Credit Units	Specialized Area	2025-2026 Semester
PHY5501	Modern Characterization Techniques for Materials Physics	3	<ul style="list-style-type: none"> • Semiconductor characterization techniques • A key component to semiconductor device technologies 	A
PHY5502	Frontiers in Physics	3	All areas	Summer
PHY5505	Data Acquisition and Processing Skills for Physicists II	3	<ul style="list-style-type: none"> • Key course on data modelling • Students taking this course should have taken PHY5504 Data Acquisition and Processing Skills for Physicists I 	B
PHY5506	Data Analysis and Modelling in Physics	3		-
PHY5507	Physical Methods in Financial Data Modelling	3		-
PHY6180	Modern Scattering Methods in Materials Science	3	All areas	-
PHY6251	Advanced Quantum Mechanics	3	<ul style="list-style-type: none"> • General graduate level physics • Students taking this course should have acquired some basic knowledge of quantum physics, e.g., have taken the course PHY3251 Quantum Physics or equivalent courses. 	A
PHY6252	Statistical Mechanics	3	General graduate level physics	A
PHY6253	Introduction to Biophysics	3	Biomedical physics	A
PHY6255	Introduction to Quantum Optics	3	<ul style="list-style-type: none"> • General graduate level physics • Students taking this course should have acquired some basic knowledge of quantum physics, e.g., have taken the courses PHY3205 Electrodynamics or equivalent and PHY3251 Quantum Physics or equivalent courses. 	B

PHY6501	Advanced Instrumentation and Measurement Methods for Experimental Physics	3		B
PHY6502	Advanced Computational Methods for Simulation and Modelling	3		B
PHY6503	Mathematical Methods for Scientists and Engineers	3		A
PHY6504	Physics at Nanoscale	3	Key course on semiconductor physics and nanomaterials	B
PHY6506	Advanced Electrodynamics	3	General graduate level physics	-
PHY6521	Advanced Solid State Physics	3	General graduate level physics	B
PHY6526	Energy Materials: Physics and Applications	3	Energy materials physics	A
PHY6528	Advanced Research in Physics	9		A+B
PHY6603	Introduction to Quantum Information	3	<ul style="list-style-type: none"> • General graduate level physics • Students taking this course should have acquired some basic knowledge of quantum physics, e.g., have taken the courses PHY3205 Electrodynamics or equivalent and PHY3251 Quantum Physics or equivalent courses. 	B

5 Maximum Study Period

MScPDMQT students will have to complete their studies within the stipulated maximum period of study, which is 2.5 year for full-time mode and 5 years for part-time/combined mode. The maximum period of study is inclusive of programme transfer and any periods of leave of absence and suspension of studies.

6 Academic Regulations

Students should observe the University's Academic Regulations for Master's Degrees at all times. For further details and most updated information, please always refer to the website of Chow Yei Ching School of Graduate Studies (SGS) (<https://www.cityu.edu.hk/sgs/student/masters/regulation>).

7 Academic Honesty

Students must pursue their studies with academic honesty. Academic honesty is central to the conduct of academic work. Students are expected to present their own work, give proper acknowledgement of other's work, and honestly report findings obtained. As part of the University's efforts to educate students about academic honesty, all students are expected to complete the Online Tutorial and Quiz on Academic

Honesty and make a Declaration on their understanding of academic honesty.

Students who commit an act of academic dishonesty which is regarded as a **serious academic offence** in the University may lead to disciplinary action with a penalty including without limitation, expulsion from the University, debarment from re-admission, deprivation of an academic award already conferred or revocation of a certification granted.

Academic dishonesty includes but is not restricted to the following behaviors:

- Plagiarism, e.g., the failure to properly acknowledge the use of another person's work or submission for assessment material that is not the Student's own work or submission of substantially the same material (even a portion) for credit in more than one assessment task without proper acknowledgement;
- Misrepresentation of a piece of group work as the Student's own individual work;
- Collusion, i.e., allowing another person to gain advantage by copying one's work or working with another student during an individual assessment;
- Unauthorized access to an examination/test paper;
- Possession/use of unauthorized material in assessment;
- Unauthorized communication during assessment;
- Use of fabricated data claimed to be obtained by experimental work, or data copied or obtained by unfair means;
- Impersonating another Student at a test or an examination or allowing oneself to be impersonated;
- Contract cheating, e.g., employing or using services provided by a third party in graded coursework or at a test or an examination;
- Use of fraudulent documents and/or information to gain advantage for any academic work, e.g. submission of a fraudulent medical certificate to request for a make-up examination.

For details of the rules on Academic Honesty, students should refer to the website of Office of the Provost (<https://www.cityu.edu.hk/pvdp/ah/index.htm>).

8 Assessment and Progression

The assessment system consists of a combination of assessments in course work and written examination. The assessment criteria vary according to the different components of a course but students are provided with as many opportunities as possible to demonstrate their competence.

Course work consists of student performance in written assignments, tutorials, projects and laboratories. Formal written examination(s) are normally held at the end of each semester.

Students should check the updated assessment criteria for different courses under the section of "Programmes and Courses" of the SGS's website (<https://www.cityu.edu.hk/sgs/student/masters>).

When a student's Semester Grade Point Average (SGPA) or Cumulative Grade Point Average (CGPA) falls below 2.00, he/she will be considered as having academic difficulties. The students should then consult the Academic Advisors or Programme Leaders for advice. If the CGPA is too low, the Dean may terminate the student's study.

8.1 Mitigation

A student who reasonably believes that his/her ability to attend an examination, or in-course assessment with a weighting of 20% or above, has been adversely affected by circumstances beyond his/her control must submit the case, with documentary evidence, to the Department via AIMS, **as soon as possible but no later than 5 working days of the scheduled date for completing the affected examination or**

assessment. It is the student's responsibility to hand in the original copies of all the required documents to the Department by the aforesaid deadline as well.

Upon receipt of a mitigation request (including the original copies of the required documents), the Department will investigate the case, in consultation with the course-offering academic unit (if appropriate). Only compelling reasons such as illness, hospitalization, accident, family bereavement or other unforeseeable serious personal or emotional circumstances will be considered. If the case is substantiated, the Assessment Panel will then decide if a make-up examination or coursework or other alternative assessment will be offered to the student concerned. **Only one make-up examination will be arranged per course per semester.**

Further details can be obtained from the SGS's website, under the section of "Students" → "Master's Programmes" → "Assessment" → "Illness or Other Circumstances Affecting Assessment (Examination/Coursework)"

(<https://www.cityu.edu.hk/sgs/student/masters/assessment/illness>)

8.2 Award Classifications

The various classifications are based on the CGPAs. The general guidelines are as follows:

Classification of Award	CGPA
Distinction	3.50 or above
Credit	3.20-3.49
Pass	2.00-3.19

8.3 Academic Regulations on Termination of Study

The Dean may terminate the studies of a student under the following circumstances:

- (i) the student's SGPA is below 1.00 for two consecutive enrolled semesters; or
- (ii) the student's academic progress is unsatisfactory and is unable to meet the conditions stipulated by the home academic unit after being put on Academic Probation for two consecutive semesters.

Students' studies will be terminated if they **FAIL** to pass a required course, or its equivalent/substitute course, after **three** attempts.

Further details can be obtained from the SGS's website

(<https://www.cityu.edu.hk/sgs/student/masters/regulations/acadreg>).

9 Late Add/Drop Policy

Students can add or drop a course during the add/drop period prescribed by the University. After the add/drop deadline, requests for late drop of courses will **NOT** be entertained unless under exceptional circumstances (e.g. medical grounds). Such late requests must be submitted no later than the end of the teaching period for the relevant semester/term for approval by the Heads of both the course-offering academic unit and the home academic unit.

10 Laboratory Safety

- 10.1 New research students/staff are NOT ALLOWED TO WORK in a laboratory before the completion of the safety training.
- 10.2 Students/staff SHOULD NOT WORK ALONE in a laboratory; when he/she needs to work with hazardous chemicals, e.g., strong acids and alkalis or on electricity connection, there MUST be at

- least one more person in the same room. All research personnel should seek the help of a companion when he/she must work in the laboratory outside normal office hours, otherwise he/she is required to utilize the Personal Alarm System in PHY labs. Experiments should not be left unattended.
- 10.3 Prior approval from your supervisor is needed to stay in a laboratory beyond 11:00 p.m. Form can be downloaded from <https://www.cityu.edu.hk/phy/students/Safety%20in%20Laboratories>.
 - 10.4 SMOKING, EATING & DRINKING ARE STRICTLY FORBIDDEN. Do not bring food or drinks into a laboratory.
 - 10.5 DO NOT RUN OR PLAY in laboratories.
 - 10.6 Loose clothing is potentially hazardous. Secure ties and tie up long hair. You are also advised to wear laboratory coat.
 - 10.7 Familiarise yourselves with the FIRE EXITS and ESCAPE ROUTES. These are posted in every laboratory.
 - 10.8 Familiarise yourself with EMERGENCY PROCEDURES. These are posted at the entrance of each laboratory.
 - 10.9 Wastes & solvents must be disposed of properly. Consult your supervisor or the technicians in case of doubt.
 - 10.10 All accidents must be reported to the technical officer/supervisor immediately.
 - 10.11 Wearing EYE PROTECTION is mandatory when working with hazardous chemicals or operating UV instruments or LASERS, and in laboratories where such notices are posted. Consult your supervisor or the technicians for the appropriate type of eye-protection equipment. In other areas, you are encouraged to wear eye protection as a good safety practice. Users of laser classes 3B and 4 are reminded to undergo eye-sight tests arranged by the university. This should be carried out before the first use of laser and again before leaving the university.
 - 10.12 Before commencement of a new experiment, you should complete a RISK ASSESSMENT and obtain approval from your supervisor. Risk Assessment Form can be downloaded from <https://www.cityu.edu.hk/phy/students/Safety%20in%20Laboratories>.
 - 10.13 There is a separate set of rules governing the use of Radiation Laboratories. These are posted at the entrance of the Radiation Laboratory. All users must observe these rules.

For further details of safety guidelines, please refer to the PHY department website (<https://www.cityu.edu.hk/phy/students/Safety%20in%20Laboratories>).

11 Communication Channels

There are various channels of communication between students and the Department. On an informal basis, students having academic difficulties with a course are encouraged to approach the lecturer or tutor concerned. Tutors are also available for students having general academic problems.

A formal consultative process between students and staff exists in the Department in the form of a Joint Staff/Student Consultative Committee (JSSCC), to which two student representatives from each cohort of each mode will be nominated. The Committee meets at least once a year. During the meeting, discussions are confined to matters of a general academic nature and the welfare of students. Students can express their views on the content and organization of the programme and identify any areas of difficulty.

Besides the JSSCC, students are also represented in the Programme Committee. One student representative from each programme cohort will be elected as member of the Committee. The Programme Committee meets at least once a year and is charged with the responsibility of monitoring the operation and performance of the programme.

Students are also welcome to approach the Programme Leaders or course leaders whenever they encounter any study-related difficulties.

Programme Leader

Prof. DAI Liang

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12 Useful Information

12.1 Course Registration for Semester A 2025/26

- For 2025-26, students will be pre-registered in some of the core courses in both Semester A and B.
- The web registration period for Semester A will start from **25 August 2025 and end on 8 September 2025** but you need to check your time ticket from “AIMS”. For details on course registration, please refer to “Course Registration” under SGS website (<https://www.cityu.edu.hk/sgs/student/masters/coursereg>).
- Please check your curriculum requirements, review your study plan and then make appropriate adjustments to your course registration after consulting the Academic Advisors if necessary.
- Add/Drop of courses can be made through AIMS for web-enabled courses during the web registration period.
- If a student drops a course after the add/drop period, an ‘X’ grade will be assigned for the course. The ‘X’ grade will be printed on the student’s transcript.

Important notes

How to do the Add/ Drop on web

- Go to CityUHK home page (www.cityu.edu.hk).
- Log onto “AIMS” under “Quick Links”, and then click “Course Registration”.
- Choose “Add or Drop Classes”.

For details on course registration arrangements for 2025-26, please refer to “Course Registration” under SGS website (<https://www.cityu.edu.hk/sgs/student/masters/coursereg>).

12.2 How to access your personal class schedule

- Go to CityUHK home page (www.cityu.edu.hk).
- Log onto “Portal” under “Quick Links”. *If you have problems in logging in, please follow the instructions in “Having problems logging in?”.*
- Select “View Student Schedule” under the “Courses I am taking” box.
- Click the “View Detail Schedule” button at the bottom of your timetable to display details of your class schedule.

12.3 How to access the interactive online learning classroom and get instructors’ handouts through Canvas

- Go to CityUHK home page (www.cityu.edu.hk).
- Log onto “Canvas” under “Quick Links”.
- Click “Courses” to see all the courses you have registered in current and previous semesters.

More Information on Canvas and other digital learning support is available at the “Digital Learning Support” website (<https://www.cityu.edu.hk/dlsupport/>).

12.4 How to check curriculum requirements and course syllabuses

- Go to CityUHK home page (www.cityu.edu.hk).
- Click “Academics”, and then click “Programme and Course Catalogue”.

12.5 How to access your student email account

- Go to CityUHK home page (www.cityu.edu.hk).
- Click “Email” under “Quick Links”
- Click “@my.cityu.edu.hk”
- Click “M365 Sign-in page”

**For email communication, please state your full name, student number, contact telephone number and programme.*

**Always check and clear your email account, and make sure it does not exceed the quota (a maximum of 25GB).*

12.6 How to access DegreeWorks

DegreeWorks is a web-based academic advising and degree audit tool for students. It matches a student’s academic record against the curriculum requirements. It offers a user-friendly interface that helps students learn easily what courses they still need to take to fulfill the requirements of College/School, GE, major, minor, etc. It also facilitates communication between students and advisors.

Students are encouraged to use the “Planner” function in DegreeWorks. “Planner” helps you create a long term study plan for your degree completion. Using this tool, you can easily discuss your academic goals and plan with your Advisor.

- Go to CityUHK home page (www.cityu.edu.hk).
- Log onto “AIMS”.
- Click "DegreeWorks" under "Study Plan" tab
- Then you can view the Student advising worksheet and advising notes, and access other features available in DegreeWorks.

Important notes

Students are advised to go through all materials available on SGS’s website to learn more about DegreeWorks.

- Go to the SGS home page (<https://www.cityu.edu.hk/sgs/>).
- Click “Students”.
- Choose “Master's Programmes”
- Click “DegreeWorks”
- Read “Frequently Asked Questions for DegreeWorks (for Student)” (<https://www.cityu.edu.hk/sgs/student/masters/degreeworks/faq/student>)

13 Student Development Services (SDS)

The SDS offers many student-centred services to students. It provides support and assistance for students in the following areas:

- Counselling Services
 - Psychological Counselling
 - Personal Development
 - Special Educational Needs (SEN)
- PE & Sports
- Financial Assistance
- Scholarships
- Career & Leadership

If you need any advice on your personal issues other than academic concerns, you may approach SDS to schedule a counselling appointment:

Tel.: 3442 8478

Email: sds@cityu.edu.hk

Address: Student Development Services, 6/F, Bank of China (Hong Kong) Complex

14 Administrative Support from General Office

Address: G5120, Green Zone, 5/F, Yeung Kin Man Academic Building

Office Hours: Monday to Friday

8:45 am - 12:45 pm

2:00 pm - 5:30 pm

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Website: www.cityu.edu.hk/phy

15 Appendix: Academic Staff Profile

STAFF

*Head of Department of Physics and
Chair Professor of Physics*

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Chair Professor of Physics

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AREAS OF SPECIALISM

- Synchrotron X-ray science
- Neutron scattering
- Phase transition
- Materials physics
- Energy materials
- Correlated electron system

- Integrated photonics
- Sensors and sensing systems
- Numerical methods

- Superconductivity
- Quantum Magnetism
- Strongly correlated systems
- Neutron scattering

- Atomic physics
- Nonlinear optics
- Quantum optics
- Quantum information

Prof Junling Wang

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- 2D and 3D ferroelectric and multiferroic materials, and their applications in spintronic devices.

Prof. X L Wang

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- Neutron and synchrotron scattering
- Phase transformation, deformation, magnetism, residual stress determination
- Metallic glasses, nanostructured materials, magnetic shape memory alloys

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- Surface, interface and microstructures of functional materials
- Vapor-solid interactions
- Computational materials science
- Nanoscience

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- Plasma science and engineering
- Surface engineering of functional materials
- Biomaterials and nanobiology
- Energy and sensor materials
- Nanostructured thin films and interfaces

Professors

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- Polymer knots
- Interactions between antimicrobial peptides and cell membranes
- Nanopore translocation of DNA
- Effects caused by macromolecular crowding

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- Biophysics
- Spectroscopy
- Imaging

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- Oxide thin films and heterostructures
- Pulsed laser deposition
- Oxide interface physics
- Novel materials synthesis

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- Low-dimensional systems

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- Neutron and Synchrotron X-ray Scattering
- Energy Storage and conversion
- Battery materials
- Phase transition

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- Condensed matter physics
- Angle Resolved Photoemission Spectroscopy
- Synchrotron-Based Large facility experiments
- Topological physics
- Unconventional Superconductivity
- Correlation effect

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- Plasmonics
- Metamaterials
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- Opto-mechanics
- Computational electrodynamics

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