ELEC6036 Digital signal processing (6 credits)
This course provides an introduction to the state-of-the-art in digital signal processing (DSP) including a wide variety of topics such as discrete-time linear time invariant systems, sampling theory, Fourier transforms, discrete-time/discrete Fourier transform, and discrete-time linear prediction. The course will cover the fundamental aspects of project management, including management tools.
Assessment: 80% coursework, 20% final exam

STAT6017 Introduction to astrochemistry and astrobiology (6 credits)
Specifically, the course covers the following topics: Bayes theorem, z-transform, discrete-time/discrete Fourier transform, probability and random processes, the module will cover different aspects of astrochemistry and astrobiology, including the study of the building blocks of life? This course will explore the tools, methods, and major results of astrochemistry and astrobiology, exploring in the process the origins of the life.
Assessment: 50% coursework, 50% final exam

ELEC6015 Pattern recognition and machine learning (6 credits)
The course provides an introduction to the state-of-the-art in pattern recognition and machine learning, covering topics such as: supervised learning, unsupervised learning, and reinforcement learning.
Assessment: 25% coursework, 75% written examination

Finance

Tuition Fees
The course fee is $12,000. The fee shall normally be paid in two instalments as follows:

• First instalment: at the time of registration
• Second instalment: 2 months prior to the course start date

Minimum Requirements
A bachelor’s degree in a relevant science (e.g., Physics, Astronomy, Geosystems Engineering) and Electrical, Mechanical, or Computer Engineering.

Application
Students must submit an application to the course director, supervised by a member of our faculty. A final (oral) presentation is required and a report must be submitted.
Assessment: 25% oral presentation, 75% final report
The Department of Physics is offering an exciting new Taught Master Programme in the field of Space Science. Modern Space Science is a highly multi-disciplinary field that encompasses a broad range of sub-disciplines, from astrophysics, to space engineering, electronics, remote sensing, and space exploration. China has recently been investing heavily in Space Science, launching 39 satellites in 2018 alone, over twice as many as in 2017 and more than any other country in the world. Given its status as a global metropolis, its strong, inter-continental links, and its location in the "Greatest Bay Area" (GBA), Hong Kong is ideally placed to capitalize on the growth in China in the area of Space Science. The establishment, in the 2016, of the Laboratory for Space Research (LSR) under the Faculty of Science at The University of Hong Kong (HKU), combined with our strong ties to leading space institutes across the world and in Mainland China makes HKU the ideal place for a Taught Master Programme in Space Science.

Our programme aims to strengthen this high-energy physics collaboration between research institutes, universities, and industrial partners in China and worldwide.

Programme highlights
- English as the medium of instruction
- Either 1 year full-time (2 years part-time):
  - offered by the Department of Physics, with contributions from the Chinese University of Hong Kong (CUHK), Department of Mathematical Sciences, and Department of Electronic Engineering and Computer Science
  - key partners in Mainland China (ZJU, NU, NJ, NU, and Dongguan Science & Technology Bureau, Beijing Institute of Space Measuring Technology, and DFH Satellite Company LTD (China)), Dongguan Science & Technology Bureau, Greater Bay Area Alliance (GBA, China), Joint Innovation Centre
- Highly multidisciplinary platform, covering broad areas of physics and the development of space science and technology
- Strong emphasis on Chinese Space Science experiences
- Elite guest lecturers
- Includes space science visits and top science survey in the Mainland and globally
- Promising employment opportunities in public and private sectors
- Scholarships available

Programme Curriculum
Our MSc programme is composed of 30 credits of courses. Students must enrol in courses of their choice for the "Core Courses". Mishap in the first semester. Students may choose their elective courses; however, the number of credits for electives cannot exceed six credits. If a student wishes to take more than six credits of electives, they must undertake the "Capstone Project" (6 credits). Core Courses include "Space science overview" (6 credits), "Space flight propulsion" (6 credits), and "Remote sensing" (6 credits).

Core Courses (18 credits)
- SPSC7011 Space flight propulsion (6 credits)
- SPSC7012 Introduction to space weather in the solar system (6 credits)
- SPSC7014 Remote-sensing theory (6 credits)
- SPSC7022 Detection and measurement of space particles (6 credits)
- SPSC7010 Introduction to space science and technology (6 credits)
- SPSC7006 Space science entrepreneurship (6 credits)
- SPSC7018 Space science overview (6 credits)

Elective Courses (12 credits)
- SPSC7011 Introduction to space plasma physics (6 credits)
- SPSC7012 Microwave and radar (6 credits)
- SPSC7013 Theory of waves and collision (6 credits)
- SPSC7014 Introduction to planetary science (6 credits)
- SPSC7021 Introduction to astrophysics and astronomy (6 credits)
- SPSC7015 Introduction to space science (6 credits)
- SPSC7016 Overview of space astrophysics (6 credits)
- SPSC7017 Project management for space science (6 credits)
- SPSC7018 Introduction to high energy astrophysics (6 credits)
- SPSC7019 Science data analysis (6 credits)
- SPSC7020 Space science overview (6 credits)
- SPSC7021 Space science overview (6 credits)
- SPSC7022 Detection and measurement of space particles (6 credits)
- SPSC7023 Space science overview (6 credits)
- SPSC7024 Space science overview (6 credits)
- SPSC7025 Space science overview (6 credits)
- SPSC7026 Space science overview (6 credits)

Elective Courses (12 credits)
- SPSC7011 Introduction to space plasma physics (6 credits)
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- SPSC7027 Space science overview (6 credits)
- SPSC7028 Space science overview (6 credits)

Elective Courses
- Elective Courses*: (18 credits)
  - SPSC7005 Space science entrepreneurship (6 credits)
  - SPSC7004 Radiation detection and measurement (6 credits)
  - SPSC7003 Remote sensing (6 credits)
  - SPSC7002 Space flight propulsion (6 credits)
  - SPSC7001 Space flight propulsion (6 credits)
  - SPSC7015 Introduction to planetary science (6 credits)
  - SPSC7013 Habitable planets and the origin of life (6 credits)
  - SPSC7012 Climate change (6 credits)
  - SPSC7011 Overview of space astrophysics (6 credits)

Core Courses
- Core Courses (36 credits):
  - SPSC7022 Detection and measurement of space particles (6 credits)
  - SPSC7012 Remote sensing (6 credits)
  - SPSC7011 Space flight propulsion (6 credits)
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Programme highlights

- English as the medium of instruction
- Either 1 year full-time (2 years part-time)
- Offered by the Department of Physics, with contributions from the Centre for Space and Planetary Science, the Department of Statistics and Actuarial Science and the Department of Electrical and Electronic Engineering for the Autumn semester.
- Key partners in Mainland China (ZJU, NJU, CASC) and Europe (CNRS, INAF vs. ASI, MPI for Solar System Research vs. NASA, etc.)
- Highly multi-disciplinary, skilling up broad areas of knowledge and applying them to Space science and technology
- Strong focus on Chinese Space Science programs
- Elite guest lecturers
- Internship opportunities in top space science labs in the Mainland and globally
- Promising employment opportunities in public and private sectors
- Scholarships available

Programme Curriculum

Our MSc programme is composed of 50 credits of courses. Students must enrol in a total of 60 credits of “core” compulsory courses, weighted equally in the first semester. Students may then choose from a variety of elective courses and in the second semester, students may choose to enrol in 40 credits of “elective” courses out of a broad range of courses. In addition, students must enrol in at least 30 credits of “core” compulsory courses, of which 6 credits are from “core” compulsory courses. In the second semester, students must enrol in 20 credits of “core” compulsory courses, of which 6 credits are from “core” compulsory courses. The remaining 20 credits must be from “elective” courses. The programme is offered by the Department of Physics, with contributions from the Centre for Space and Planetary Science, the Department of Statistics and Actuarial Science and the Department of Electrical and Electronic Engineering.

Core Courses (18 credits)

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<thead>
<tr>
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<tbody>
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<td>SPSC7001</td>
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<td>Introduction to space weather (6 credits)</td>
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<td>SPSC7003</td>
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<td>SPSC7006</td>
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Course Description

Core Courses

- Space flight propulsion (6 credits)
- Introduction to space weather (6 credits)
- Introduction to space plasma physics (6 credits)
- Satellite navigation and control systems (6 credits)
- Satellite data analysis (6 credits)
- Introduction to space transportation (6 credits)
- Introduction to planetary science (6 credits)
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Elective Courses

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- Introduction to space weather (6 credits)
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Our programme aims to strengthen our high-energy astrophysics, planetary sciences, statistics, and engineering, while leveraging our connections with elite Mainland and global partners. Our MSc will provide a foundation to enter this exciting field, with promising employment opportunities, both in the public and private sector, in China, and worldwide.

Curriculum

Programme Highlight

• English as the medium of instruction
• Either 1 year full-time (2 years part-time)
• Offered by the Department of Physics, with contributions from the Chinese University of Hong Kong, Department of Statistics and Actuarial Science and the Department of Chemical and Biomolecular Engineering, School of Engineering, for the first term.
• Key partners: (Mainland China) ZUN, NAOC, and China Academy of Space Technology; (Europe) Institute of Space Sciences (IAC) in Spain.
• Fully multidisciplinary subject, conveying broad areas of knowledge, and training in space science and technology.
• Strengthens on Chinese Space Science programme.
• Elite guest lecturers
• In-depth exploration of top science topics in the Mainland and globally
• Promising employment opportunities, in public and private sectors
• Scholarships available

Programme Curriculum

Our MSc programme is composed of 32 credits of courses. Students must enroll in 6 courses (2 core courses) in their first semester. Students may then choose their second semester’s courses after consultation with their advisors. Students must complete a final project worth 6 credits.

Core Courses (18 credits)

Space Science and Technology

• SPSC7010 Advanced astrophysics (6 credits)
• SPSC7011 Advanced planetary science (6 credits)
• SPSC7013 Advanced space astrophysics (6 credits)
• SPSC7014 Advanced remote sensing (6 credits)
• SPSC7015 Advanced space weather (6 credits)
• SPSC7016 Advanced space plasma physics (6 credits)

Elective Courses (12 credits)

• SPSC7017 Introduction to space plasma physics (6 credits)
• SPSC7018 Introduction to space plasma physics (6 credits)
• SPSC7019 Space traffic and orbital debris management (6 credits)
• SPSC7020 Space policy and space law (6 credits)

Elective Courses* (18 credits)

• SPSC7021 Radiative transfer (6 credits)
• SPSC7022 Quantum mechanics (6 credits)
• SPSC7023 Radiation detection and measurement (6 credits)
• SPSC7024 Space science entrepreneurship (6 credits)
• SPSC7025 Space science ethics (6 credits)

Core Courses (36 credits): The final project will typically be undertaken over the course of the second semester. Students must complete a final project worth 6 credits.

Course Description

Core Courses

• SPSC7010 Advanced astrophysics (6 credits)
• SPSC7011 Advanced planetary science (6 credits)
• SPSC7013 Advanced space astrophysics (6 credits)
• SPSC7014 Advanced remote sensing (6 credits)
• SPSC7015 Advanced space weather (6 credits)
• SPSC7016 Advanced space plasma physics (6 credits)

Elective Courses

• SPSC7017 Introduction to space plasma physics (6 credits)
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Assessment: 40% coursework, 20% midterm exam, 40% final exam

Elective Courses

• SPSC7017 Introduction to space plasma physics (6 credits)
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• SPSC7018 Introduction to space plasma physics (6 credits)
• SPSC7019 Space traffic and orbital debris management (6 credits)
• SPSC7020 Space policy and space law (6 credits)

Elective Courses* (18 credits)

• SPSC7021 Radiative transfer (6 credits)
• SPSC7022 Quantum mechanics (6 credits)
• SPSC7023 Radiation detection and measurement (6 credits)
• SPSC7024 Space science entrepreneurship (6 credits)
• SPSC7025 Space science ethics (6 credits)

Assessment: 40% coursework, 20% midterm exam, 40% final exam
Tuition Fees
The course fee is HK$21,000. The fee shall normally be payable in two instalments over 2 years. Applicants Who are employed full-time will be entitled to the following benefits:

(a) A discount of 10% on the course fee, and
(b) A certificate of attendance from the University.

Support for Students
The Hong Kong government offers a number of awards and scholarships to support students in various fields. For more information, please visit the University’s website or contact the relevant department.

Application
To apply for the course, students should submit the following documents:

(a) A completed application form
(b) A copy of your academic transcript
(c) A personal statement
(d) Two letters of recommendation

The application deadline is 31 March 2020. Applications received after this date will be considered on a case-by-case basis.

Contact Information
Department of Physics
The University of Hong Kong
Pokfulam Road
Hong Kong

Tel: +852 3943 7726
Fax: +852 2857 2206

E-mail: adminfo@phys.hku.hk

Website: https://www.physics.hku.hk/

Enquiries
Department of Physics
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Fax: +852 2857 2206

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**Spafo**

**ELEC6000** Pattern recognition and machine learning

This course will provide fundamental knowledge on the principles and techniques of pattern recognition and machine learning.

**ELEC6040** Digital signal processing II - communication

This course provides an introduction to the fundamental concepts of digital signal processing (DSP) including a variety of topics such as discrete-time linear time invariant systems, sampling, modulation, and signal processing transforms, and digital filter design. Furthermore, the course will also discuss in detail about other advanced topics in digital signal processing such as multi-dimensional signal processing and random processes, and applications, and adaptive signal processing.

**ELEC6060** Data compression (2 credits)

This course presents an in-depth treatment of the state-of-the-art compression techniques for typical digital media including files, digital images, videos, and audio. Specifically, the course will focus in detail on the coding and quantization techniques commonly used for such media, and audio. Finally, the course will cover basic concepts and terminologies of common image, video, and audio standards.

**ELEC6080** Estimation and detection (4 credits) 

The course aims at enabling the fundamental understanding of the digital communication systems. After an overview on basic probability and random processes, the module will introduce fundamental methodologies and their optimal decision rules, with an emphasis on digital communication systems. Then, performance analyses will be conducted under additive white Gaussian noise channel and fading channel. Furthermore, the course will also discuss in detail about other advanced topics in digital communication such as multi-dimensional signals and systems, random processes, and applications, and adaptive signal processing.

**SPSC7017** Introduction to astrochemistry and astrobiology (6 credits)

This course will explore the tools, methods, and major results of astrochemistry and astrobiology, exploring the role of the origins of life. Assessment: 80% coursework, 20% final exam.

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**Department of Physics**

**ELEC6000** Digital communications (6 credits)

This course aims at providing fundamental knowledge on the principles and techniques of pattern recognition and machine learning.

**ELEC6040** Digital signal processing II - communication

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