CU Physics Admission Talk
for NSS Students

October 2011
Physics at CUHK: 4-year Curriculum
物理系四年制課程

For information on Physics Curriculum in 2012, see
http://www.phy.cuhk.edu.hk/ugadm/334/

For enquiries on Physics Curriculum, send e-mail to:
4-year-physics@phy.cuhk.edu.hk

Department Webpage: http://www.phy.cuhk.edu.hk
Physics at CUHK: 4-year Curriculum
物理系四年制課程

- Build on the tradition of excellence
- Designed to deliver Physics Program Learning Outcomes: Knowledge, Professional & Generic Skills, Values & Attitude
- Two Streams of Study: Physics Stream and Enrichment Stream in Physics
- 50/53 compulsory units provide solid physics background and basket of skills
- At least 21/18 elective units provide flexibility in learning to fit to students’ academic plan and career goal
In the past two years, CU Physics Programme was reviewed successively by a Review Panel (consisted of members outside physics department) and a Visiting Committee (formed with 3 well-known physicists from top US universities) and received very positive comments:

- **strong commitment to the quality of the physics programme design and teaching.**

- **inculcates a broad array of skills and knowledge, graduates are able to rise to professional challenges in a wide variety of jobs.**

- **the programme management and overall quality assurance is exemplary.**

- **has a deservedly outstanding reputation for the quality of teaching.**

- **devote enormous time and effort to the conception, presentation, and evaluation of their classroom. This is certainly to be commented and should be preserved under any plans to go forward.**
EAS (Form 6, your peers) students picked CUHK Physics for the past 10 years:

<table>
<thead>
<tr>
<th>Year</th>
<th>EAS Students Admitted [Offers made]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>7 [9]</td>
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<tr>
<td>2003</td>
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<td>2004</td>
<td>11 [13]</td>
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<tr>
<td>2005</td>
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<td>2007</td>
<td>3 [4]</td>
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<td>2008</td>
<td>5 [5]</td>
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<tr>
<td>2009</td>
<td>10 [10]</td>
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<tr>
<td>2010</td>
<td>7 [7]</td>
</tr>
<tr>
<td>2011</td>
<td>6 [7]</td>
</tr>
</tbody>
</table>

36 EAS students graduated, 27 went on to further studies with 17 now in PhD programs around the world!
In recent years, more than half of Physics graduates continue to pursue higher degrees in Physics or related subjects. Each year, about 10 of them are awarded financial supports in the form of teaching assistantships and scholarships to pursue higher degrees abroad including the graduate schools of the following universities:

**USA:**
- Boston Univ.
- Caltech
- UC Berkeley
- UC Santa Barbara
- UC San Diego
- Univ. of Chicago
- Carnegie Mellon Univ.
- Florida State Univ.
- Indiana Univ.
- Johns Hopkins Univ.
- Univ. of Colorado, Boulder

**UK:**
- Univ. of Cambridge
- Univ. of Oxford
- Univ. of Manchester

**Europe:**
- Univ. of Copenhagen
- Dresden Univ. of Technology
- Univ. of Twente (The Netherlands)

**Canada:**
- Univ. of British Columbia
- Univ. of Toronto

**Japan:**
- Univ. of Tokyo
- Osaka Univ.
In 2011, Graduate Schools that gave offers to CUHK Physics Students:

Northwestern University
Univ. of Cambridge
Univ. of Illinois, Urbana Champaign
U. of Chicago
Univ. of Tokyo
Univ. of Maryland
Osaka University
Emory University
Ohio State University
Kansas State University
Univ. of Toronto
Georgia Tech
CUHK
We build the 4-year Curriculum on this Foundation of Excellence!
PHYSICS PROGRAMME OBJECTIVES

Values & Attitude
- Rigorous and resolute
- Pursuit of excellence
- Strong sense of responsibility
- Proactive
- Motivated in self-learning
- Self confidence

Professional and Generic SKILLS
- Basic skills for research and self learning: math / computational / experimental
- Physicists’ problem solving and analytical skills
- Communication, interpersonal
- Reading
- Time management

KNOWLEDGE
- Solid and balanced training in physics
- Mathematical and experimental methods
To graduate: at least 123 Units

- Physics Major: 71 units
- Free electives: 13 units
- 39 units: [Languages, University GE, College GE, IT, PE]
Units required for ALL CUHK Undergraduates

Chinese: 6 units

New GE Courses: 6 units

IT: 1 unit

Other GE and College GE: 15 units

English: 9 units

Total: 39 units

PE: 2 units

Nominal 15 units per semester/Ceiling 18 units per semester
Major in Physics: 71 units (or more)

Provide learning experience essential for acquiring our learning outcomes

- **50 units** Compulsory
- **21 units** Elective

Provide flexibility and fit to your plan (further studies, career plan, etc.)
Major in Physics: 71 units (or more)

Provide learning experience essential for acquiring our learning outcomes

53 units Compulsory

18 units Elective

Enrichment Stream in Physics

Provide flexibility and fit to your plan (further studies, career plan, etc.)
Compulsory Courses: 50/53 units

**Research Component**, Presentation, Project Learning, and Capstone (Various Skills)
- 2 courses, 4 units or 3 courses, 7 units

**Experimental and Laboratory Skills**
- 4 courses, 5 units

**Upper-level Core Courses in Mechanics, Electromagnetic theory, Quantum Mechanics and its applications, Thermal & Statistical Physics**
- 5 courses, 15 units

**Student-Centred Learning**
- 2 courses, 2 units

**Introductory Calculus-Based Physics Series**
- 1+2 courses, 3+6 units

**Analytic Skills**
- 1+2 courses, 3+6 units, 2 courses from Math Dept

**Capstone experience (Subject Matter)**
- 1 course on Solid State Physics, 3 units

**Other Science Subject**
- 1 course, 3 units, typically Chemistry

Note: These 3 courses (9 units) are Science Faculty Package Courses.
“3 courses (7 units)” for Enrichment Stream in Physics only.
Elective Courses (Physics Stream): at least 21 units

**Advanced Core Courses:**
- Classical Mechanics,
- Quantum Mechanics,
- Electromagnetic Theory,
- Statistical Mechanics

**Series of courses on:**
- Computational Physics courses

**Series of courses on:**
- Methods of Theoretical Physics

**Series of courses on:**
- Experimental Physics

**Courses on:**
- Astronomy and Astrophysics,
- Nanoscience and Technology,
- Optical Physics,
- Meteorology

**Courses on:**
- Relativity, Nuclear and Particle Physics

**Topics in Contemporary Physics**
Elective Courses (Physics Stream): at least 21 units

More Project Learning / Research Opportunities:
- Short Experimental Projects and Theoretical Projects
- Senior Project II

Other Physics Learning Experience (claim units for off-campus work relevant to major, e.g., exchange, internship, etc.)

All Postgraduate Level Physics Courses (CU Physics has over 100 MPhil/PhD students, a variety of postgraduate level courses are offered)

Upper-level Courses offered by Other Programs (e.g., other sciences, engineering) for electives up to 6 units — more flexible, encourage students to plan for their career path
Elective Courses (Enrichment Stream): at least 18 units

These courses are particularly useful for those planning for graduate studies!

Advanced Core courses:
- Classical Mechanics
- Quantum Mechanics
- Electromagnetic Theory
- Statistical Mechanics

Upper-level Computational Physics courses:
- Introduction to Computer Simulation of Physical Systems
- Computational Physics

Upper-level Methods of Theoretical Physics:
- Methods in Theoretical Physics I and II

Upper-level Experimental Physics courses:
- Practical Electronics
- Basic Instrumentation

At least 2 courses, 6 units

Plus other Physics elective courses up to 6 units (or more)

Totally not less than 12 units
Learning Enhanced by Extracurricular Learning Opportunities

Max Wong did his SURE program at the California Institute of Technology.

Clare Huang did her SURE program at Brown University — Clare is now a PhD student at the University of Chicago.

Lam Ting Fai and his research group mates at U. Illinois (Urbana-Champaign).

SURE – Summer Undergraduate Research Exchange: Students to do summer research in top universities and labs in US and Europe

http://www.phy.cuhk.edu.hk/sure/
Learning Enhanced by Extracurricular Learning Opportunities

Charles Lieou was selected to join OPUS in 2009 — Charles is now a PhD student at UC Santa Barbara.

Nyuko Choi and Kenny Ng at UC Berkeley — Nyuko is now doing her PhD at Princeton and Kenny is now doing his PhD at Ohio State University.

Tang Ho Kin enjoyed his OPUS at Peking University.

OPUS – Overseas Program for Undergraduate Students:
Exchange for one semester at top universities plus summer research
http://www.phy.cuhk.edu.hk/opus/index.html
Learning Enhanced by Extracurricular Learning Opportunities

**STAR – Summer Teacher Apprenticeship:**
*Students are trained and assigned to secondary schools as teaching assistants between May and July*


**Internships** at Hong Kong Observatory, Space Museum, etc.


Ample opportunities to engage in research within the department through **projects** and **summer research**
Questions & Answers

Q: How can I get in and choose Physics as major of study?

Study hard in HKDSE

- With 1X-physics and M1 or M2 in Math will give you a smooth transition into Physics curriculum
- Combined Science (with physics) can also start Physics curriculum (need to work harder)
- A remedial course will be provided by Physics Dept to bridge the gap between Combined Science and 1X-physics if needed, although not absolutely necessary

Apply the program “Science” – JS4601 through JUPAS

- Fulfill the requirement of the Broad-based admission
- The total number of students admitted will be over 400
- No quota set for physics majors (and other science majors)

Declare Physics as major

- May declare in early Year 1 (with some criteria on HKDSE scores on particular subject)
- May declare by end of Year 1 (based on one major course)
- May declare no later than end of Year 2 (based on taking a set of courses, no need to pass all of them, thus guaranteed entrance to preferred major)

For details on Science Board-based Admission, please visit:
Questions & Answers

Q: How can I choose and graduate as Enrichment Stream in Physics?

- Declare Physics as major
- Students may declare to specialize in the Enrichment Stream in Physics after declaring Physics as their major

Follow the study scheme designed for the Enrichment Stream

- Compulsory courses: 53 units
- Advanced core courses: at least 6 units
- Elective courses: including selected upper-level courses in computational physics, methods in theoretical physics, experimental physics

Graduate with fulfillment of the graduate requirement

- Graduate requirement for Enrichment Stream in Physics: Final cumulative major GPA 3.0 or above
- Students who are unable to fulfill Enrichment Stream’s graduate requirement may graduate as Physics Stream
Objective of CU Physics Programme: Knowledge, Professional/Generic Skills, Attitudes & Values

堅實基礎 + 均衡訓練
物理基礎知識及應用
物理學家之解難及思考方法
研究及自學的基本技巧，包括：
數學、實驗、電算、溝通技巧、閱讀
嚴謹、堅毅、研究、及追求卓越之態度
一生受用的技能：
分析、自學、責任、人際、交流、時間管理、
自信、主動、轉移數理、實驗、電算等知識
Physics at CUHK: 4-year Curriculum

物理系四年制課程

For information on Physics Curriculum in 2012, see http://www.phy.cuhk.edu.hk/agadm/334/

For enquiries on Physics Curriculum, send e-mail to: 4-year-physics@phy.cuhk.edu.hk

Department Webpage: http://www.phy.cuhk.edu.hk
(物理系網址)
Questions & Answers

Q: What are the Science Faculty Package Courses?

- Courses to fit to students with different HKDSE science preparations
- Guide students to start their preferred major
  - A major course or a course most relevant to the major
  - A course in other science discipline useful for the major
  - A course in other science discipline for broadening students’ knowledge in science
- 5 groups of courses designed to:
  - serve students with different HKDSE preparations
  - provide essential background for a major
  - broaden scope regardless of potential major
- Faculty package requirement for Physics Programme — Part of Physics Programme
  - University Physics I – Introduction to Mechanics, Fluids and Waves, University Mathematics, and any faculty package courses from Life Science, Chemistry and Statistic (typically Principles of Modern Chemistry)
- Package Course Patterns are flexible and commutative, students have access to several majors by the end of Year 1
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title (English)</th>
<th>Course Title (Chinese)</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group A: Life Sciences</strong></td>
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<tr>
<td>LSCI1000</td>
<td>Biochemistry of Health and Disease</td>
<td>健康與疾病之生物化學</td>
<td>3</td>
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<tr>
<td>LSCI1001</td>
<td>Basic Concepts in Biological Sciences</td>
<td>生物科學基本概念</td>
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<tr>
<td>LSCI1002</td>
<td>Introduction to Biological Sciences</td>
<td>生物科學入門</td>
<td>3</td>
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<td><strong>Group B: Chemistry</strong></td>
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<tr>
<td>CHEM1070</td>
<td>Principles of Modern Chemistry</td>
<td>現代化學概論</td>
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<tr>
<td>CHEM1280</td>
<td>Introduction to Organic Chemistry and Biomolecules</td>
<td>有機化學及生物分子入門</td>
<td>3</td>
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<td><strong>Group C: Mathematics</strong></td>
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<td>MATH1010</td>
<td>University Mathematics</td>
<td>大學數學</td>
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<td>MATH1520</td>
<td>University Mathematics for Applications</td>
<td>大學應用數學</td>
<td>3</td>
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<td>MATH1030</td>
<td>Linear Algebra I</td>
<td>線性代數（一）</td>
<td>3</td>
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<td><strong>Group D: Physics</strong></td>
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<tr>
<td>PHYS1001</td>
<td>Essential Physics</td>
<td>基礎物理</td>
<td>3</td>
</tr>
<tr>
<td>PHYS1002</td>
<td>General Physics</td>
<td>普通物理</td>
<td>3</td>
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<tr>
<td>PHYS1111</td>
<td>University Physics I – Introduction to Mechanics, Fluids and Waves</td>
<td>大學物理（一）：力學、流體與波動導論</td>
<td>3</td>
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<td>STAT1011</td>
<td>Introduction to Statistics</td>
<td>統計導論</td>
<td>3</td>
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<tr>
<td>STAT1012</td>
<td>Statistics for Life Sciences</td>
<td>生命科學統計</td>
<td>3</td>
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