Master of Science (MSc) in Energy and Environment

School orientation

Dr. Denis Y. W. Yu, Programme Leader

Assistant Professor,
School of Energy and Environment
City University of Hong Kong
MSc orientation

MSc programme overview

Course requirements and offering
  • Students’ expectation
  • Course contents

Administrative business
  • Credit transfer; course add/drop
  • IT information
  • Academic honesty

Career development

People at SEE

Question & Answer

Refreshment and mingling
The present, and the future

Energy generation and consumption

Environmental pollution and climate

SEE’s mission - to turn individuals into **professionals** to lead the world in solving energy and environmental issues, through research, policy making, applications and education, etc.
Emphasis on both engineering and soft science with references to current events and news.
Programme goals and requirements

MSc course requirements: 30 credit units

**Plan A (10):**
- 5 core courses
- 5 electives

**Plan B (8+2):**
- 5 core courses
- 3 electives
- Dissertation (2 sem)

**Full-time:** typ 1 year (Max. 2.5 years)
- 4-5 courses per semester

**Part-time:** typ 2 years (Max. 5 years)
- 2 to 3 courses per semester.

<table>
<thead>
<tr>
<th># of courses offered</th>
<th>Sem A</th>
<th>Sem B</th>
<th>Summer Term</th>
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<tbody>
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<td>dissert.</td>
<td>7 +</td>
<td>6 +</td>
<td>1 + Dissert.</td>
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School of Energy and Environment, City University of Hong Kong
Student expectations

What you need to know before coming:

- Mathematics (algebra, calculus)
- Basic statistics
- Unit conversion
- Thermodynamics
- Physics - mechanics
- Current news & events

What you will learn:

- Technical details
  - Efficiencies
  - Technologies
  - Economics
  - Policy/law
  - Climate
  - Pollution etc.

- Transferable skills
  - Team building
  - Problem-solving skills
  - Presentation skills
  - Data analysis
  - Critical thinking
Course outlines (2016-17 Semester A)

CORE

SEE5211: Data Analysis in Environmental Applications
  Course leader: Dr. Zhi NING (Mon)

SEE6101: Energy Generation and Storage Systems
  Course leader: Dr. Denis Y.W. YU (Wed)

SEE5212: Environmental Pollution: Theories, Measurement and Mitigation
  Course leader: Prof. Peter BRIMBLECOMBE (Fri)

ELECTIVES

LW6959: Energy and Environmental Law (Tues)

SEE6213: Wastewater Engineering and Water Quality Assessment
  Course leader: Dr. Alicia AN (Tues)

SEE5101: Energy and Environmental Economics
  Course leader: Dr. Aude POMMERET (Thurs)

SEE6115: Carbon Audit and Management
  Course leader: Dr. Ian RIDLEY (Thurs)

SEE6999: Dissertation (Sem A + B)

Class time
19:00 – 21:50
Course outlines (2016-17 Semester B)

CORE

SEE6102: Energy Efficiency and Conservation Technologies
Course leader: Dr. Denis Y.W. YU

SEE6201: Environmental and Energy Policy
Course leader: Dr. Masaru YARIME

ELECTIVES

SEE5114: Energy, Environment and Sustainable Development
Course leader: Dr. Carol LIN

SEE5202: Climate Change: Science, Adaptation and Mitigation
Course leader: Dr. Keith NGAN

SEE6116: Building Performance Assessment
Course leader: Dr. Ian RIDLEY

SEE6203: Environmental Impact Assessment: Principles and Practice
Course leader: Dr. Alicia AN

SEE6999: Dissertation (Sem A + B or Sem B + Summer)
Course outlines (2016-17 Summer Term)

7 weeks + exam period (Early Jun to Early Aug)
2 nights per week

ELECTIVES

SEE6118: Emerging Energy Technologies
Course leader: Dr. Wey Yang TEOH

SEE6999: Dissertation (Sem B + Summer or Summer + Sem A)
What you will learn:
• Basic statistical concepts and advanced methods
• Applications of these methods to solve environmental problems.

How you will learn:
• Lectures are combination of theory and real-world live examples
• In-class tutorial for quick learning
• Homework assignments

What the expectations are:
• Hands-on practices in and out of class are important
• Ask questions when something is unclear
What you will learn:
• Where is our energy from?
• How is energy converted?
• Details of different technologies, including energy storage.

How you will learn:
• Lectures, demos, brainstorming
• Weekly homework assignments

What the expectations are:
• Understand physical concepts in energy conversion
• Ability to analyze generation and storage systems.

Fossil fuels
Biofuel
Nuclear
Geothermal
Wind
Water
Solar

Heat engines
Turbine
(mechanical)

Transport
Motion
Electricity
The theoretical understanding of air, water, and soil pollution creates a firm basis for creating policy and understanding its socio-political context.

**Expectations**

- Make micro-presentations (5 min) to the class
- Follow current environmental events
- Solve problems that are set in class
- Undertake extra reading
- Build a team to work on the group project

**Grading**

Group project and exam

**Transferable skills – will be part of the course**

1. Using the course in a career
2. Facilitating group discussions and collaborating on projects
3. Managing a project
4. Working as teams
Course Aims

- To provide students with the fundamental knowledge on wastewater engineering processes as well as the analytical techniques involved in assessing water quality.
- Topics: state-of-the-art processes: Membrane Technology, Rainwater Harvesting, Desalination, Wastewater reclamation, Energy Self reliance Sewage treatment Plant

Keyword Syllabus

- Composition and classification of wastewater
- Analytical techniques in water quality assessment
- Physical/Chemical unit operations
- Biological treatment – aerobic/anaerobic treatment, activated sludge
- Advanced oxidation processes – ozone, UV, Fenton, photo-Fenton, photocatalysis
- Water recycling and desalination
Course Aims

- To understand the impact of carbon emission to our environment;
- To appreciate the function of carbon audits as a means to help business sectors and corporations in estimating their carbon footprints thereby setting objectives to manage and reduce these carbon footprints;
- To learn the various methods/approaches of reducing energy consumption and carbon emissions;
- To understand the basic carbon audit processes and learn the necessary skills to undertake such audit.

Keyword Syllabus

- Climate change and potential challenges; Greenhouse gas emission and environmental impact; Energy management and auditing; Building energy consumption; Finance and life cycle assessments; Carbon management and auditing; Carbon audit guidelines in Hong Kong; International practice, trend and standard; Carbon footprint calculator.

Assessment:
- Assignment
- Test
- Final exam
Course Aims

- To introduce students a set of economic concepts that economists use to understand energy and environmental issues.
- To use the concepts to analyze energy and environmental problems, and to model their solutions.

Keyword Syllabus

- Economics and the environment
  Economy-environment interdependence, drivers of environmental impact, pursuit of sustainable development, welfare economics.
- Instruments for environmental policy
  Definition and classification of environmental policy instruments, Pigovian tax, tradable emission permits, incentive to innovate in green technologies.
- Energy economics
  Dynamic efficiency, non-renewable resources, studying the economic characteristics of energy sources.
SEE6999 Dissertation

- Credit Units: 6 (2 semesters)
- Independent research and development work, topic to be determined by student and a professor
- Aim: to develop expertise in a chosen subject area through the application of theories and techniques taught in the programme.

Areas of research areas

- Atmospheric and climate science
- Bioscience and application to energy and environment
- Energy conversion, generation and storage
- Energy and building environment
- Sustainable water resources
- Energy and environmental economics
- Energy and environmental policy and management
Modes of teaching

Lectures
Tutorial
Homework assignment
Readings
Group project
Presentation
In-class discussion
Experiments/demo
Field trips
Tests/Exams
Etc.

How to get the most out of the courses?

Listen
Think
Work hard

Language of instruction: English
## Important dates

<table>
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<tr>
<th>Dates</th>
<th>Events</th>
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<tbody>
<tr>
<td>25 August 2016</td>
<td>2016 MSc Orientation</td>
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<tr>
<td>27 August 2016</td>
<td>2016 Taught Postgraduate Student Orientation*</td>
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<tr>
<td>27 August 2016</td>
<td>Credit transfer application deadline</td>
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<tr>
<td>29 August 2016</td>
<td>Start of Semester A, 2016-2017</td>
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<tr>
<td>5 September 2016, 11:30p.m.</td>
<td>Deadline for Course Registration</td>
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<td>26 November 2016</td>
<td>Last day of teaching (Semester A, 2016-2017)</td>
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<td>5 –17 December 2016</td>
<td>Examination Period (Semester A, 2016-2017)</td>
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*Taught Postgraduate Student Orientation

27 Aug 2016 (Sat) **Session 1**: 2:30pm - 3:45pm, **Session 2**: 4:30pm – 5:45pm  
**Venue**: Wong Cheung Lo Hui Yuet Hall, 5th Floor, Academic 3

- School of Graduate Studied (SGS)  
  – information on payment of tuition fees, AIMS, Canvas, etc.
- Student Development Service (SDS)
- CityU Postgraduate Association (CUPA)
- Global Services Office (GSO) – information for non-local students, e.g. visa, weather and transportation facilities in HK
Important dates

Consultations on MSc programme and courses (Denis)

Tues Aug 30
6-7:30 pm
AC1 B5-422
3442-6885

Wed Aug 31
10-11 pm
(after SEE6101)
AC1 LT-4 or B5-422
3442-6885
3 important IT tools

**AIMS**
- Administrative platform
- Course add/drop
- Registration
- Fee payment
- Etc.

**Canvas**
- E-learning platform
- All course work/info
- Lecture notes
- Course discussion
- Homework, etc.
- Download learning materials before and after class

**CityU PORTAL**
https://www.cityu.edu.hk/portal/

**CityU email**
- Communication platform
- Check email from time to time for important information from SEE and course leaders
Credit Transfer

- If you have taken an equivalent course before in another institution, you can apply for credit transfer
- If successful, you can take fewer classes to graduate
- Only the core courses are available for credit transfer
  - Energy Generation and Storage Systems
  - Energy Efficiency and Conservation Technologies
  - Environmental and Energy Policy
  - Environmental Pollution: Theories, Measurement and Mitigation
  - Data Analysis in Environmental Applications

Application process:
- Print out application form on AIMS, fill in and sign
- Attach required documents: official transcripts, syllabi, course info, payment slip
- Application fee: $140 per application (non-refundable)
- Submitted by post or in person at the Taught Postgraduate Student Records Service Counter of SGS
- Deadline: 27 August 2016 (before start of 1st semester)

Add/drop Courses

All courses except dissertation
- add/drop online through AIMS

SEE6999 Dissertation
- Print Add/Drop Form in AIMS
- Fill in form and seek approval from professor and SEE

Full-time students (max 2.5 yrs):
Min. 12 credits (4 courses)
Max. 18 credits (5 courses + dissertation)
(per regular semester)

Part-time students (max 5 yrs):
Min. 3 credits (1 course)
Max. 11 credits (3 courses)
(per regular semester)

Deadline for courses registration (add/drop of courses): 5 September 2016, 11:30p.m.

Tuition fee will be charged on a per credit unit basis after course registration.
Academic honesty

Academic honesty – student’s work is original and authentic, with proper acknowledgement of other’s work

Examples of academic dishonesty:
• Plagiarism – failure to acknowledge reference
• Collusion – allow other to copy
• Fabrication or deliberate misrepresentation of data
• Failure to adhere to the rules regarding examinations, etc.

If you cheat, we will know

Academic dishonesty is a serious offense
⇒ Severe penalty up to and including expulsion from university

All CityU students are required to:
1. complete an online tutorial on academic honesty;
2. take an online quiz; and
3. fill out an online declaration; by 30 November 2016
Staff-Postgraduate Student Consultative Committee (SPSCC)

- A student representative of each cohort to serve as a liaison between students and SEE for feedbacks, comments, etc.
- Nomination will take place in mid-September
- Election will take place at the end of September
## Alumni of SEE

### CityU Postgraduate Alumni Association of School of Energy and Environment Limited

- Established in Apr 2014
- bridge up and network closely among the growing alumni body and the School through developing alumni activities and services. **Re-union gathering of postgraduate alumni and students**

<table>
<thead>
<tr>
<th>Position</th>
<th>Name of Alumnus</th>
<th>Cohort</th>
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<tbody>
<tr>
<td>Chairman</td>
<td>SIU Pui Fung, Bob</td>
<td>2010</td>
</tr>
<tr>
<td>Vice Chairman</td>
<td>WONG Wai Sen, Monique</td>
<td>2012</td>
</tr>
<tr>
<td>Treasurer</td>
<td>SUN Li</td>
<td>2012</td>
</tr>
<tr>
<td>Secretary</td>
<td>YANG Xiya</td>
<td>2012</td>
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Email: aas-paasee-c@my.cityu.edu.hk

http://www6.cityu.edu.hk/see/news/alumni_SEE.htm
End of year BBQ (2016)
Career Development

Organized activities: field trip, social events, career talks, symposia, workshops, etc.

- Examples of field trips in previous years:
  - Hong Kong Organic Waste Recycling Centre
  - Hong Kong Maritime Museum
  - Zero Carbon Building
  - Shatin Sewage Treatment Plant
  - China Light and Power – ElectriCity

- Examples of workshop/symposia/activities:
  - Workshop on CV Writing for International Employment
  - SEE Career Evening (AECOM / HKPC / ATAL)
  - Career Talks (CLP / Towngas)
  - Cultural Study Tour to South Korea (5 - 9 June 2016)
Career support

Career and Leadership Centre, City U HK

• Career events
• Workshops (CV writing, interview, etc.)
• Tips and information about job search
• Etc.

Some are open to MSc students

Joint Institutions Job Information System (JIJIS)
Self-assessment tools

Student Development Services (SDS), City U HK
http://www.cityu.edu.hk/sds/home/index.htm

Workshop, tests

http://www.cityu.edu.hk/sds/studentlan/psy/psy_testing_ass.htm
Call or email for tests

Additional cost for taking the tests

Psychological Testing / Assessment

Assessment Tools
A range of psychological and career assessment tools are available to help you find out more about yourself and occupations. If you want to undertake any of the tests listed below, please enquire at 3442 8169 or email to sds@cityu.edu.hk.

Aptitude - Critical Reasoning Test Battery (CRTB2)
Career Interests - Strong Interest Inventory (SII)
Emotional Intelligence - Emotional Quotient Inventory (EQ-i)
Interpersonal Relationship - Fundamental Interpersonal Relations Orientation-Behaviour (Firo-B)
Personality - Sixteen Personality Factor Questionnaire (16PF)
Personality & Career - Myers Briggs Type Indicator (MBTI)
Psychological Health - General Health Questionnaire (GHQ28)
Team Work Style - Belbin Self-Perception Inventory (BSPI)
Whole Person Development - Student Developmental Task and Lifestyle Assessment (SDTLA)

The Critical Reasoning Test Battery (CRTB2) are often used by employers in graduate recruitments to ensure that they have the required level of verbal & numerical ability. CRTB2, specifically, is designed to assess critical reasoning ability both verbal & numeric.
Route to becoming a Chartered Engineer (CEng)

**MSc Degree accredited by IGEM (Institute of Gas Engineers and Managers) from United Kingdom**

*IGEM - A chartered professional body licensed by the UK Engineering Council (EC).*

Graduates satisfies academic requirement for IGEM membership*

If graduate works for gas industry in the future, he/she only require a professional examination to become Chartered Engineer (CEng), UK

* with an accredited BEng/BSc Degree from any of Washington Accord’s 17 Signatories

⇒ Can then become member of HKIE through reciprocal recognition agreement

School of Energy and Environment
MSc Programme

1 programme
2 emphases
10 courses
30 credit units
390 contact hours
Numerous sleepless nights

Together, we create infinite opportunities for a sustainable future

Welcome to see
SEE Faculty (22)

Atmosphere, climate

Bioscience

Economics, policy

Building, grid, machine

Water

Energy conversion, generation, storage

Prof. Peter BRIMBLECOMBE
Air pollution, cultural heritage

Prof. Chak K. CHAN
Dean(SEE)
Aerosol, air pollution

Prof. Johnny CHAN
Tropical cyclones, air pollution

Dr. Nicky LAM
Air pollution modeling, climate change

Dr. Keith NGAN
Atmospheric dynamics, numerical weather prediction

Dr. Zhi NING
Urban air quality, monitoring

Dr. Wen ZHOU
Monsoon, climate change
SEE Faculty (22)

Atmosphere, climate

Bioscience

Economics, policy

Building, grid, machine

Water

Energy conversion, generation, storage

Dr. Patrick LEE
Bioenergy, microbiology

Dr. Carol LIN
Biorefinery, biomass, food waste valorisation

Dr. Aude POMMERET
Environmental economics, macroeconomics

Dr. Masaru YARIME
Public policy, economics, sustainability study

Dr. Lin ZHANG
Energy policy, economics
SEE Faculty (22)

Atmosphere, climate

Bioscience

Economics, policy

Building, grid, machine

Water

Energy conversion, generation, storage

Dr. Chunhua LIU
Electric motor, smart grid, power transfer

Dr. Ian RIDLEY
Building performance, indoor air quality, comfort

Dr. Alicia AN
Desalination, membrane, water resources
SEE Faculty (22)

Atmosphere, climate

Bioscience

Economics, policy

Building, grid, machine

Water

Energy conversion, generation, storage

Dr. Walid DAOUD
Photocatalyst, thermoelectric, fiber

Prof. Michael LEUNG
Photocatalyst, fuel-cell, carbon capture, refrigeration

Dr. Jin SHANG
CO₂ capture, gas purification

Dr. Patrick SIT
First principle molecular dynamics, solar cell, catalysts

Dr. Wey Yang TEOH
Nanomaterials, catalysis, solar cell

Dr. Denis YU
Advanced battery materials and characterizations

Dr. Louis LOCK (adjunct prof)
Career counselor
Programme coordinators

Programme Leader

Dr. Denis Y.W. YU
Assistant Professor
Tel: 3442-6885
denisyu@cityu.edu.hk

Administrative staff

Ms. Ying Wai YU
Executive Officer
Tel: 3442-4426
yingwai.yu@cityu.edu.hk

Miss Kitty CHAN
Clerical Officer
Tel: 3442-2414
kitty.kychan@cityu.edu.hk

General Enquiry:
SEE General Office, G5-702, AC1, 5th floor, Green Zone
Tel: 3442 2414 / 3442 2410
Email: see.enquiry@cityu.edu.hk

Refreshment

• Talk to professors about specific courses and/or dissertation
• Talk to current students for tips on classes
• Talk to alumni on future opportunities