Mathematics and Information Engineering

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Programme Director (MIEG)

The Chinese University of Hong Kong

Major Allocation
15 March, 2019
About MIEG programme

MIEG Programme
Jointly offered by the Faculty of Science and Faculty of Engineering

Managed by
- Department of Mathematics (Faculty of Science)
- Department of Information Engineering (Faculty of Engineering)

Curriculum:
- Higher level math courses: along with math majors (rigorous treatment)
- Engineering Courses: mainly with IERG and some with CSCI students

Admission to this programme
- Broadbased students/Enrichment Math students: Faculty of Science
- Broadbased students: Faculty of Engineering
About MIEG programme
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Objectives:
1. Acquire Analytical Problem Solving Skills
2. Ability to develop Innovative and Creative Solutions
3. Attain Solid Foundation for Research

Mathematics
- Analysis
- Calculus
- Differential Equations
- Discrete Math
- Probability
- Algorithms
- Signal Processing
- Communications

Information Science
- Machine Learning
- Big Data
- Software Engineering
- Networking
- Cyber Security
## Information Science + Mathematics

Major Requirement including Faculty Package (87 units)

<table>
<thead>
<tr>
<th>Year</th>
<th>Fundamentals</th>
<th>Advanced</th>
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<tr>
<td>1</td>
<td><strong>Engineering Faculty Package</strong> or <strong>Enrichment Mathematics Study Scheme</strong></td>
<td><strong>Web-scale Information Analytics</strong></td>
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<td>* plus Extra Foundation Courses</td>
<td><strong>Programming Big Data Systems</strong></td>
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<td><strong>Probabilistic Models &amp; Inference Algorithms</strong></td>
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<td><strong>for Machine Learning</strong></td>
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<td><strong>Internet of Things</strong></td>
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<td>2</td>
<td><strong>Discrete Mathematics, Probability &amp; Statistics</strong> · <strong>Foundation of Modern Math</strong>&lt;br&gt;<strong>Advanced Calculus I &amp; II</strong> · <strong>Basic Analog &amp; Digital Circuits</strong>&lt;br&gt;<strong>Data Structures, Signals &amp; Systems</strong> · <strong>Intro to Systems Programming</strong>&lt;br&gt; * plus an Extra Foundation Course &amp; Major Elective Courses</td>
<td><strong>Building Scalable Internet-based Services</strong></td>
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<td><strong>Social Media &amp; Human Info Interaction</strong></td>
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<td><strong>Multimedia Coding and Processing</strong></td>
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<td><strong>Simulation &amp; Statistical Analysis</strong></td>
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<td><strong>Digital Communication</strong></td>
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<td><strong>Advanced Topics in Blockchain</strong></td>
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<td><strong>Applied Cryptography</strong></td>
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<td><strong>Digital Forensics</strong></td>
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<td><strong>Random Processes</strong></td>
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<td><strong>Network Economics</strong></td>
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<td><strong>Graph Theory</strong></td>
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<td><strong>Numerical Analysis</strong></td>
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<td><strong>Linear Programming</strong></td>
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<td><strong>Mathematical Modeling</strong></td>
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<td>3</td>
<td><strong>Information &amp; Software Engg Practice</strong>· <strong>Mathematical Analysis I</strong>&lt;br&gt;<strong>Complex Variables with Applications</strong>· <strong>Computer Networks</strong>&lt;br&gt;<strong>Information Infrastructure Design Lab</strong>· <strong>Linear Algebra II</strong>&lt;br&gt;<strong>Principles of Communication Systems</strong>· <strong>Communications Lab</strong>&lt;br&gt; * plus Major Elective Courses</td>
<td>and MORE!</td>
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<td>4</td>
<td><strong>Final Year Project I</strong> and <strong>Final Year Project II</strong>&lt;br&gt;<strong>Design and Analysis of Algorithms</strong>&lt;br&gt; * plus major electives</td>
<td><em>Plus University Core Requirement, Including English Language, Chinese Language, General Education, Physical Education &amp; IT Training.</em></td>
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What are some of the areas you can specialize in?

A wide range of major electives allow you to specialize in

- Communications Systems and Computer Networks
- Multimedia (Image and Video) Processing, Machine Learning (Artificial Intelligence)
- Coding and Information Theory
- Theory of Computation
- Data Sciences (Big Data), Optimization
- Formal and Abstract Mathematics
To which graduate programs have some of the alumni gone?

Data (2010 - 2018)

M.S./Ph.D. in Electrical (Information) Engineering


M.S./Ph.D. in Computer Science and Mathematics


M.S./Ph.D. in Finance


Remark

More than 60 percent of the alumni of this program goes to graduate schools. The rest find jobs in a variety of industries like finance, programming, etc.
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**M.S./Ph.D. in Computer Science and Mathematics**

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The secret behind the numbers

- You reap what you sow
  - In other words, the curriculum is demanding
- It is designed for the top students (Yearly intake: \( \approx 15 \))
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Some students (in the past) have underestimated the curriculum
- They ran into difficulties in later years
- They were not prepared for formal math
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Important: If you are considering this programme, please read: http://www.mie.cuhk.edu.hk/advice.shtml
NEW! Major Admission Scheme for MIEG


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- Selected MIEG/IERG option in major allocation **and** selected to be considered for MIEG

  - Yes → Allocated to IERG/MIEG by the Faculty?
    - Yes → Allocated to MIEG (email in 2 days)
      - Yes → Admitted into MIEG
      - No → Admitted into IERG
    - No → Not in MIEG
  - No → Admitted into IERG
Ask yourself:

- Am I interested in learning fundamentals of information and computer sciences?
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- Am I mathematically inclined?
Recap

Ask yourself:

- Am I interested in learning fundamentals of information and computer sciences?
- Am I mathematically inclined?
- Do I want to pursue higher studies?

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Ask yourself:

- Am I interested in learning fundamentals of information and computer sciences?
- Am I mathematically inclined?
- Do I want to pursue higher studies?

If the answer to these questions is a resounding YES, then MIEG is the right programme for you.

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Our advice

Your next step: gather lots of information

- From Alumni
- From Webpage: http://www.mie.cuhk.edu.hk
- From me (send email to make an appointment)
  - My email: chandra@ie.cuhk.edu.hk
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