Developing students’ cross-disciplinary skills at the time of technological change

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Outline

• Introduction of NCTU
• How NCTU develops students' cross-disciplinary skills

• Introduction of CU
• The College of Liberal Arts and Sciences of CU

• About the Summer Project

• Q&A/General Discussion
NCTU Introduction – Location

Taipei
- Taipei Campus

Hsinchu
- Kuang-Fu Campus
- Bo-Ai Campus
- Ju-Bei Campus

Tainan
- Tainan Campus

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NCTU Introduction – 5 campuses

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NCTU Introduction — Taiwan Silicon Valley

2 top universities

NCTU (Kuang-Fu)

NTHU

Hsinchu Science Park

487 companies
150653 employees
NT$10,395 billions

Industrial Technology Research Institute

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NCTU Introduction – Cradle of High-tech Industry Leaders

65% of CEOs and top level managers in the Hsinchu Science Park are NCTU Alumni

Stan Shih
Founder of Acer

Jonney Shih
Chairman of ASUS

Ecans Tu
President of Synnex

F.C. Tseng
Vice Chairman of TSMC

Ming-Zhi Xuan
Founder of UMC

Robert Tsao
Founder of UMC

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Nanyang College

Institute of Electronics

1958
Reestablished in Hsinchu (Taiwan)

College of Engineering

1959-1978

Comprehensive University

1979-Present

NCTU Introduction – History

1896
Shanghai (China)

Students: 12,620
• 5,478 undergraduates, 7,142 graduates

Faculty: 728 (adjunct excluded)
• (largest number of IEEE fellows in Taiwan)

Accreditation by AACSB*
• College of Management

*AACSB (Association to Advance Collegiate Schools of Business)
NCTU Introduction – 11 Colleges

- Electrical & Computer Engineering
- Engineering
- International Semiconductor Technology
- Computer Science
- Science
- Management
- Biological Science & Technology
- Humanities & Social Sciences
- Technology Law
- Photonics
- Hakka Studies

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More Information about National Chiao Tung University

→ Booth #11
Key educational issues

NCTU used to be an engineering-oriented university

Students focus only on their professional knowledge!

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科學人, P. 55, 193 (2018)
Active and Cross-disciplinary Learning

Develop NCTU students' inter-disciplinary skills

CS@NCTU

NCTUx

ICT Co-working space

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CS@NCTU

Integration of NCTU core competence:

• Electronics Engineering x Computer Science

Offering basics to non-engineering major students:

• Scratch, Python, Graphical Scripting Programming skills

Empower future-ready graduates

• Stronger ability for logic thinking
• Willingness to adopt new technologies

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Complementary is the key
- Science x Liberal Arts, Applied Mathematics x DITP (Design and Innovation Technology Program)

Credit design: 70% core competence plus 30% cross-disciplinary knowledge, without additional credits for graduation

Theory and Practice in balance
ICT co-working space

➢ ICT: Innovative Creative Technology

➢ Identify forefront & innovative topics
  • 3D-printing, Robot, Precision Machining...etc

➢ Software-wise
  • Consolidate expertise from different disciplines to address above topics and put theory into practice (HCI: Communication Technology x Computer Science)

➢ Hardware-wise
  • Sharing workshop space for fast prototype production
  • Encourage maker spirit
NCTU study abroad experience

GNN Joint Workshop & lab stay *(Chaired by students)*

- G : Gwangju Institute of Science and Technology (GIST, Korea)
- N: Nara institute of Science and Technology (NAIST, Japan)
- N: National Chiao-Tung University (NCTU, Taiwan)

*Held alternatively by each university every year.*!
ACT TOGETHER, WE GO FAR!
CU Introduction - Location

1. Tokyo station
2. Narita airport
3. Chiba University (Main campus)
Number of Students

Total 14,114 Students

- Undergraduate 10,670
- Masters Degree 2,160
- Doctoral Degree 1,188
- Professional Degree 96

1,681 International Students

877 Students Going Abroad

APAIE 2018 Conference & Exhibition | The Impact of the Fourth Industrial Revolution on Higher Education in the Asia Pacific | 25 to 29 March 2018

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Number of Staff

Total 3,456 Personnel
9 Executives
1,369 Academic Staff
2,078 Technical / Administrative Staff

553 International Researchers

1,519 Staff Going Abroad

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# 10 Undergraduate Faculties

<table>
<thead>
<tr>
<th>Letters</th>
<th>Science</th>
<th>Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Law, Politics &amp; Economics</td>
<td>Liberal Arts and Sciences</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Pharmaceutical Sciences</td>
<td></td>
</tr>
<tr>
<td>Medicine</td>
<td>Nursing</td>
<td>Horticulture</td>
</tr>
</tbody>
</table>

[www.apaie2018.org](http://www.apaie2018.org)
# 13 Graduate Schools

<table>
<thead>
<tr>
<th>Humanities &amp; Studies on Public Affairs</th>
<th>Science &amp; Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>Nursing</td>
</tr>
<tr>
<td>Law Schools</td>
<td>Graduate School of Humanities</td>
</tr>
<tr>
<td>Medical &amp; Pharmaceutical Science</td>
<td>Graduate School of Social Sciences</td>
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<tr>
<td>Horticulture</td>
<td>Graduate School of science</td>
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<tr>
<td></td>
<td>Graduate School of Engineering</td>
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<td>Graduate School of Medicine</td>
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<td>Graduate School of Pharmaceutical Sciences</td>
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Top Global University Project

4 Original Goals

- 700 Classes Offered in English
- 50% of Students Study Abroad
- Accept 3000 Overseas Students
- Select 10% Students by Unique Exams

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Overseas Campus and Office

Seinäjoki University of Applied Sciences
Russian State University for the Humanities
Beijing
Shanghai Jiao Tong
Ho Chi Minh City
Universidad de Monterrey
University of Cincinnati
Charité Berlin
Mahidol
Universitas Indonesia
Zhejiang
UCSD
Overseas Campus
International Cooperative Research Center
International Exchange Center
Overseas Office

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Double Degree Programs

◆ China : 11 programs
  • Shanghai Jiao Tong University - Design MS, Bioengineering PhD, Horticulture MS/PhD
  • Tsinghua University - Horticulture MS,
  • Zhejiang University - Design MS

◆ Indonesia : 7 programs
  • University of Indonesia - Medical Engineering, Environmental Remote Sensing MS/PhD
  • Institut Teknologi Bandung – Design, Environmental Remote Sensing MS/PhD
  • Bogor Agricultural University - Horticulture MS

◆ Thailand : 6 programs
  • Mahidol University - Horticulture, Pharmaceutical Sciences PhD
  • Silpakorn University - Pharmaceutical Sciences PhD
  • King Mongkut’s Institute of Technology - Horticulture PhD

◆ Italy : 1 program
  • Università degli Studi di Firenze - History of Italian art PhD

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More Information about CHIBA University

Booth #44
LAS help students to become individuals who have skills to make connections across disciplines and between current and new knowledge through a unique perspective of Japanese culture and technology, and applying that knowledge in professional and community life.

◆ Five Features

1. Solution oriented education combining the arts and sciences
2. “Tailor-made” education and learning support with SULA
3. “Active” learning
4. “Social” learning
5. Overseas study

Students are required to study overseas at least once prior to graduating.

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Study path of LAS

Year 1
- Acquire multi-perspectives and identify problems of particular
  Bird Eye Courses
- General Education Courses

Year 2
- Acquire the foundation skills to solve problem
  Skill Building Courses

Year 3
- Acquire experiences of overseas study, fieldwork, internship and volunteering
  Fieldwork Courses / Studying Abroad Courses

Year 4
- Select and learn the appropriate knowledge to solve issues
  Major Courses of Global Studies / Contemporary
  Japanese Studies / Integrated Sciences

- Solve chosen problem and communicate one’s discovery to a world audience
  Major Project Work Course

To develop students’ cross-disciplinary skills
**Study path of LAS**

<table>
<thead>
<tr>
<th>Year1</th>
<th>Year2</th>
<th>Year3</th>
<th>Year4</th>
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</table>

**“learning about practice in practice”**
Students increase the abilities to identify and find solutions for problems through hands-on learning experiences in the local communities, the nation, and the world.

Acquire experiences of overseas study, fieldwork, internship and volunteering

- Fieldwork Courses
- Studying Abroad Courses

**“learning about the world in the world”**
Students cultivate their skills to identify and find solutions for problems through the study abroad programs with overseas partner universities.

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2. “Tailor-made” education and learning support with SULA (Super University Learning Administrator)

- Guidance from teaching staff and SULA allows a learning path that is tailored for each student.

- Students’ individual needs and goals
  - curriculum
  - activities
  - study abroad programs

LAS, CHIBA University

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National Chao Tung University (NCTU) & Chiba University (CU)

2017 Summer Project

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2017 Summer Project

◆ 3-week customized courses (23 days, 3 weekends)
  ✓ English Class
    12 days (2 hours / day)
  ✓ Programming Class
    12 days (3 hours / day)
  ✓ Visiting 4 Company/Lab

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Summer Project with NCTU

This course aims to advance students' listening and speaking skills.

Contents
• Reading
• Writing
• Speaking/Pronunciation
• Grammar
• Topic Discussion
• Presentation class

English conversation

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Summer Project with NCTU

English conversation

- Before the class
  Students reported:
  - their Weak Points and Strong Points
  - their Goal

- After the class
  Students reported:
  - their Weak Points and Strong Points
  - "What I need is:"

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English conversation

**Student1**
Before the course  I have no courage to speak in English
After the course  I realize that I am good at speaking English, and also at listening
What I need is: To have courage to speak in English

**Student2**
After the course  I could understand what an English teacher said but not in the case of visiting lab or companies.
What I need is: Communication skill

**Student3**
After the course: I feel that my listening skill is improved.
What I need is: To try hard to have some opportunities to speak English

**Student4**
After the course  I do not feel shy to speak in English any longer
What I need is: To increase output opportunities

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Summer Project with NCTU

Programming

Contents

• Introduction to Python
• Basic programming skills
• Text and document processing
• Web-based User Interface (WUI) programming
• Data visualization
• Image processing

Not only talking or reading about Python, let’s code together!

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I needed to have prior knowledge.
I wanted to have more exercises.
I wanted to have more time for class.
Taking the programming course in English was;
- an important experience.
- an good way to learn something in English.
Take time to get used to the programming words in English.
The programming course became a motivation to start learning the programming.

I had fun to study the python!
I made my household accounts by myself!!
Summer Project NCTU & CU

- Company Visiting
- Culture trips
- Cross-culture Activity

Empower future-ready graduates

- Stronger ability for logic thinking
- Willingness to adopt new technologies

Stronger ability for logic thinking

Willingness to adopt new technologies

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Summer Project NCTU & CU

- Company Visiting
- Culture trips
- Cross-culture Activity

The talk from staffs attracted students very much.
- by the game demonstration to know new technology
- by their presentation about company and about their social contributions

Japanese Debate Team “TAKENO KO”

- Short trip to Taipei, Tainan

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National Chao Tung University (NCTU) & Chiba University (CU)

2018 Summer Project

Thank you very much!

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• Q&A/General Discussion