Way forward: a recent educational practice

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AeRospace College Alliance of Sino-Universities (ARCAS)

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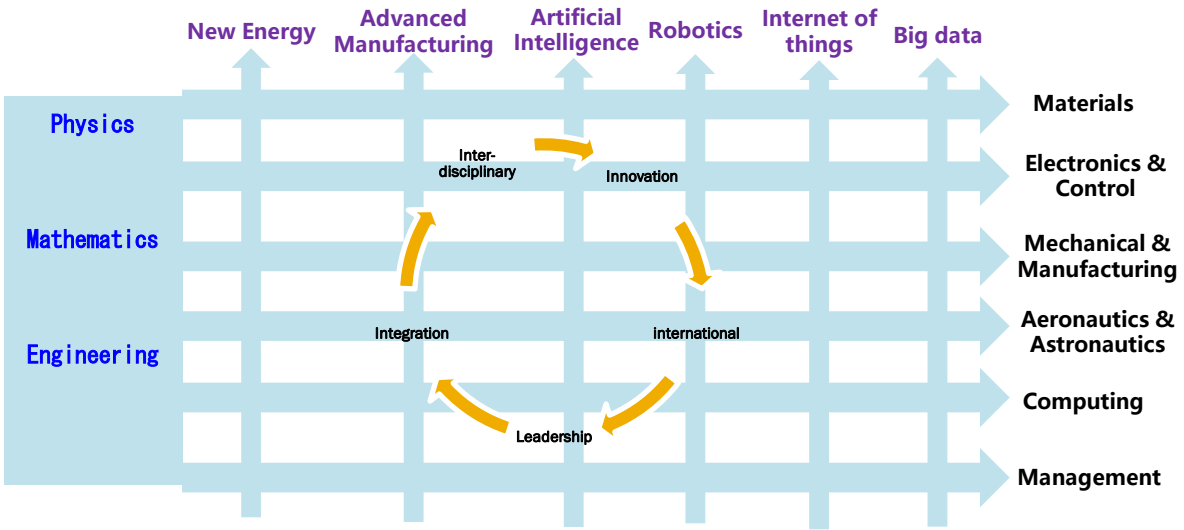
ARCAS

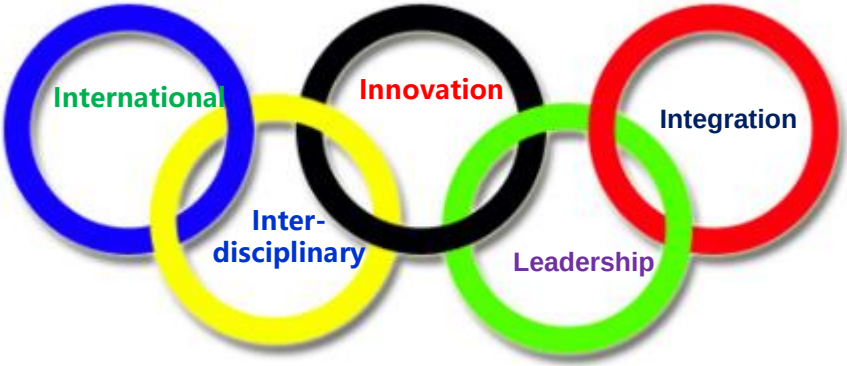
- ARCAS: AeRospace College Alliance of Sino-universities
- Launched in 2015, including 18 universities, now 35 members, including all major aerospace/aviation educational institutes in China
- To promote aerospace education, research and innovation in China
  - Cultivate next generation of aerospace /aviation talents

New perspectives of Engineering



Future talents characteristics?

I4L



School of General Engineering (SGE)

State Administration of Foreign Experts Affairs
中华人民共和国国家外国专家局

Responsible for certifying foreign experts to work in the China and organizing overseas training for Chinese technical and managerial professionals.

08/2018: Second 50 students

08/2017: First 50 students

05/2017: Opening ceremony

10/2016: SGE approved by BUAA

06/2015: Approved by SAFEA

03/2015: Application to SAFEA

School Vision

To establish a leading school in China to develop the I4L capabilities of students needed to tacking complex problems facing fast-changing world.

Benchmarking:

- MIT-Gorden Engineering Leadership

Curriculum System:

- Refer to MIT、Princeton University、Toronto University、Purdue University、University of Leeds

Leading Talents:
Build international talents training system

Leading Faculty:
Build first-class teaching /research faculty

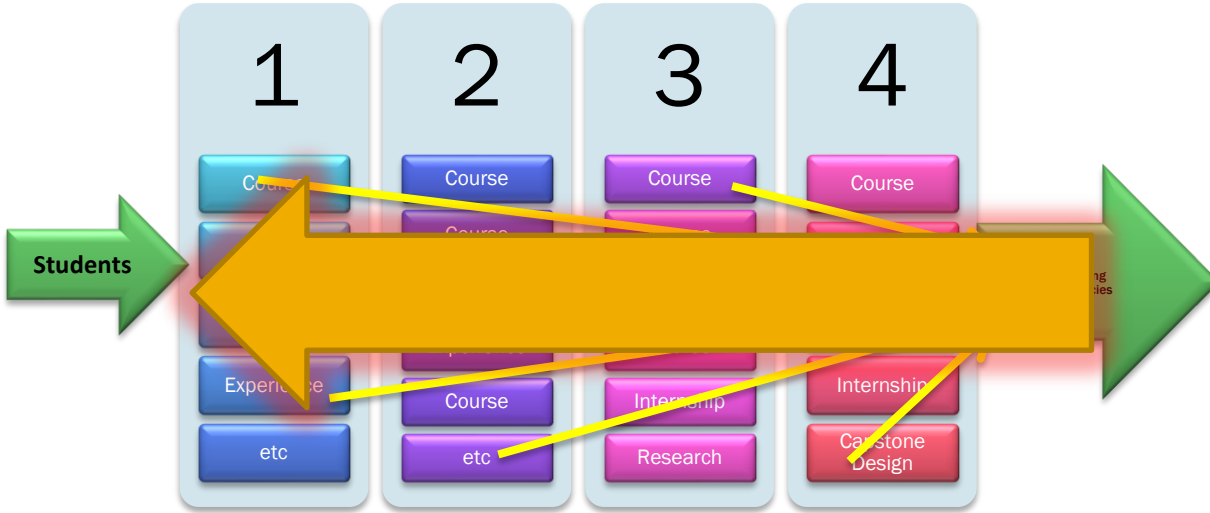
Leading Research:
Create international R&D Innovation cooperation center

Demonstration:
Success / experience extend to a large scale

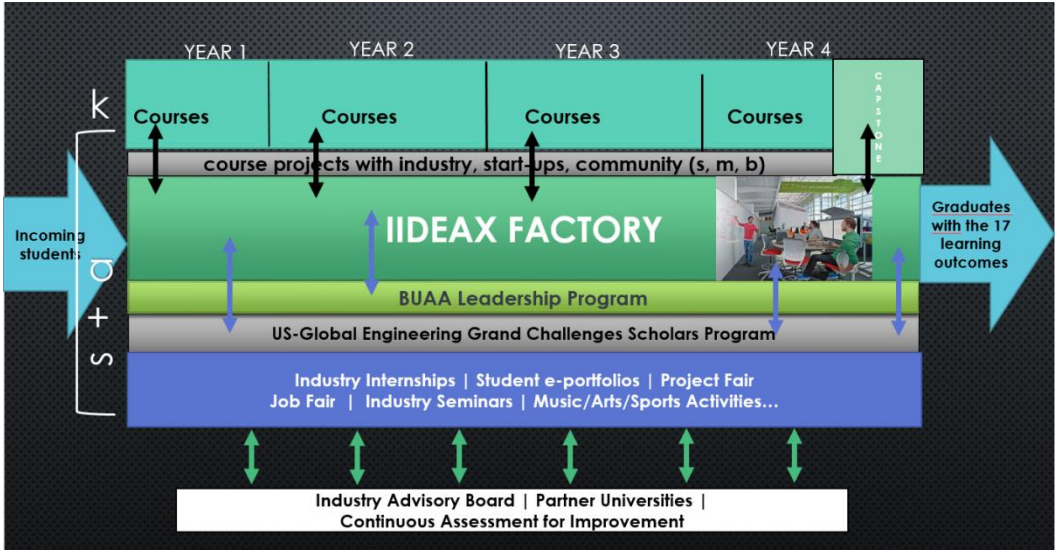
Pros & Cons of China / International teaching

	China	EU & USA
Teaching style	Focusing on knowledge dissemination --Solid technical knowledge More time on formative teaching, less time in self-exploration Exam-based learning Weak problem solving capability	Focusing on capability development: flexible teaching arrangement – hands on; group projects More time and flexibility in self-exploration Less scope / depth of knowledge
Outcome	Technician-type worker Averaging performance	Creative talents Two –extremes (either too good or too bad)

Backward Design



Backward design



Course structure

Year 1	Year 2	Year 3	Year 4
Math	ME basics	ME core	ME advanced
Physics	AE basics	ME core	Capstone
English	ICT basics	AE core	AE advanced
Engineering basics	Interdisciplinary	AE core	Capstone
University Fundamental	**General Engineering Fundamental**	**Core subjects of Mech /Aero. Eng**	**Advanced topics + Capstone projects**

Leadership Program

Top 5 Key Leadership Competencies

- **Vision**
- **Initiative**
- **System Thinking**
- **Strategic Focus**
- **Resourcefulness**

Other Key Leadership Competencies

- **Communication**
- **Interpersonal Skills**
- **Ethical Actions and Integrity**
- **Having the resolve and courage to act ethically and with integrity**
- **Decision Making**
- **Responsibility and Determination**
- **Self-Awareness and Self-Improvement**
- **Engage and Connect**
- **Negotiate and Compromise**

Program Schedule

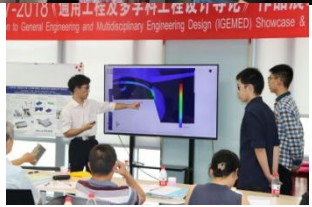
Semester Content Goal	Year 1 70% passive/30% active	Year 2 50% passive/50% active	Year 3 30% passive/70% active	Year 4 Over 80% active
1	**Leadership Fundamentals I** ▪ Lectures (70%) ▪ Workshop (30%)	**Assessments:** ▪ 360° Leadership Feedback ▪ Emotional Intelligence (EI) Assessment ▪ PLDP ("Journal") Launch ▪ Leadership Development Course ▪ Project Management I ▪ (Concepts & Definitions)	**Leadership Development Workshops** ▪ Innovation and Design Thinking	**Assessments:** ▪ 360° Leadership Feedback Follow-up ▪ Emotional Intelligence (EI) Assessment Follow-up ▪ PLDP ("Journal") Closure ▪ Leadership Development Course ▪ People and Organization ▪ Engineering Professional Ethics
2	**Leadership Fundamentals II** ▪ Leadership Capabilities ▪ Define current Leadership Capabilities Profile (LCP)	**Leadership Development Course** ▪ Project Management II (Tools)	**Leadership Development Workshops** ▪ Entrepreneurship	**Leadership Development Lab** ▪ The Art and Science of Negotiation
Summer	**Preparation for NAE-GCSP Project** ▪ Intro to GCSP ▪ Technical writing ▪ Poster development ▪ Oral presentation	**Engineering Leader Interview** **Mentoring and Preparation for Internship(s)**	**Leadership Internship ("Job Shadowing")**	
←		**NAE-GCSP***	**Project**	→
NAE-GCSP Project Stage	**Introductory** ▪ GCSP basics ▪ Form teams of five (5) students each ▪ Select Grand Challenge Topic ▪ Launch project	▪ Team Progress Report, Showcase (Poster) and Oral Presentation ▪ Proposal and plans for next year	**May** ▪ Team Progress Report, Showcase (Poster) and Oral Presentation ▪ Proposal and plans for next year ▪ Selection of team to participate in GCSP International Forum	**Decision point:** Continue Project as GCSP or move it to Capstone Course Project

Example Module: Introduction to General Engineering

- This course introduces students to the concept of general engineering, with an emphasis on building the capacity of group work and problem solving via general engineering projects.
- It is supported by both analytical studies and group design projects.
- Learning outcome
  - Comprehension of basic general engineering concepts
  - Comprehension of emerging engineering topics
  - Understanding of the concept of engineering design
  - Get insights into the inter-disciplinary nature of general engineering
  - Ability to communicate efficiently in a group
  - Ability to apply their learning in small group to solve practical engineering problems.
  - First experience of applying the learning in small group to solve practical engineering problems







Example Projects

Thanks for your attention