

Education Reforms at Tokyo Institute of Technology

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Outline of Talk

- 1. About Tokyo Tech's Current Education System**
- 2. Mission of Tokyo Tech: Necessity for Education Reform**
- 3. New Education System**
- 4. Expected Results after the Reforms**

Overview of Tokyo Institute of Technology

1881 Founded as the Tokyo Vocational School

1929 Elevated to a degree-conferring university -
Tokyo Institute of Technology

As of May 1, 2013	Number
Undergraduate Students (International Students)	4,790 180 (3.8%)
Graduate Students (International Students)	5,123 [M 3,611 + D 1,512] 943 (18.4%)
Research Students	90
Academic Staff	1,148
Administrative Staff	472

Tokyo Tech's World University Rankings

- **QS World University Ranking 2013/2014:**

Overall: 66th (4th in Japan)

Engineering & Technology: 42nd (2nd in Japan)

- **THE Ranking 2013:**

Overall: 125th (3rd in Japan)

Engineering: 58th (3rd in Japan)



Structure of Undergraduate Schools and Graduate Schools (Number of Departments/School)

Undergraduate Schools

School of Science: 5

School of Engineering: 16

School of Bioscience and
Biotechnology: 2

Graduate Schools

School of Science and
Engineering: 20

School of Bioscience and
Biotechnology: 5

School of Interdisciplinary
Science and Engineering: 11

School of Information
Science and Engineering: 3

School of Decision Science
and Technology: 4

School of Innovation
Management: 2

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Mission of Tokyo Institute of Technology

Contribute to the Development of a New and Vibrant Society

- Produce graduates with a broad understanding of science and technology who have the ability and determination to take on leading roles in society.
- Create and support innovative science and technology that will lead to sustainable social development.



Aiming to become “One of the World’s Top Ten Research Universities” by 2030

Education

- Produce master’s degree graduates who will thrive in a global society
- Produce doctoral degree graduates who will become the world’s top-level researchers and leaders

Contributions to Society

- Contribute to society through education and research

International Activities

- Develop an international education and research environment

Research

- Produce globally recognized research findings and innovations
- Enhance research through system and infrastructure development

The Current Tokyo Tech Education System and the Necessity of Reform

Problem: A quality education has not been the main goal or focus

- Students primarily focus on earning credits for graduation
- Students lack a sense of mission to develop professional skills, to set goals that contribute to society, and to cooperate in a diverse global society



To educate students with a passion for life-long learning, we need:

- to create systematic and well-defined curricula with quality syllabi
- to provide students diverse and flexible learning processes
- to employ effective teaching methods for students' active participation in classes and labs

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Three Pillars of Education Reform

(by the Board of Directors – September 6, 2013)

1) Build a New Education System for a World-class Technological University

- Create a new system in which undergraduate and graduate schools are joined.
- Revitalize the curricula and lectures and make them globally accessible.
- Tune the curricula and lectures to those of other top universities in the world so that students can easily transfer credits.

2) Innovate “Learning”

- Create extensive and systematically structured curricula to support students in pursuing their goals and interests.
- Change the fundamental definition of “learning” from “what year a student is in” to “what and how much knowledge a student gains.”
- Increase the depth of course content and make the evaluation of learning more rigorous.

3) Promote Ambitious Internationalization

- Make Tokyo Institute of Technology a center of interaction for talented individuals from around the world by implementing a globally accessible, top-class education system.
- Utilize the Institute’s strengths as a science and technology university to recruit larger numbers of students from overseas and foster greater student participation in opportunities abroad.

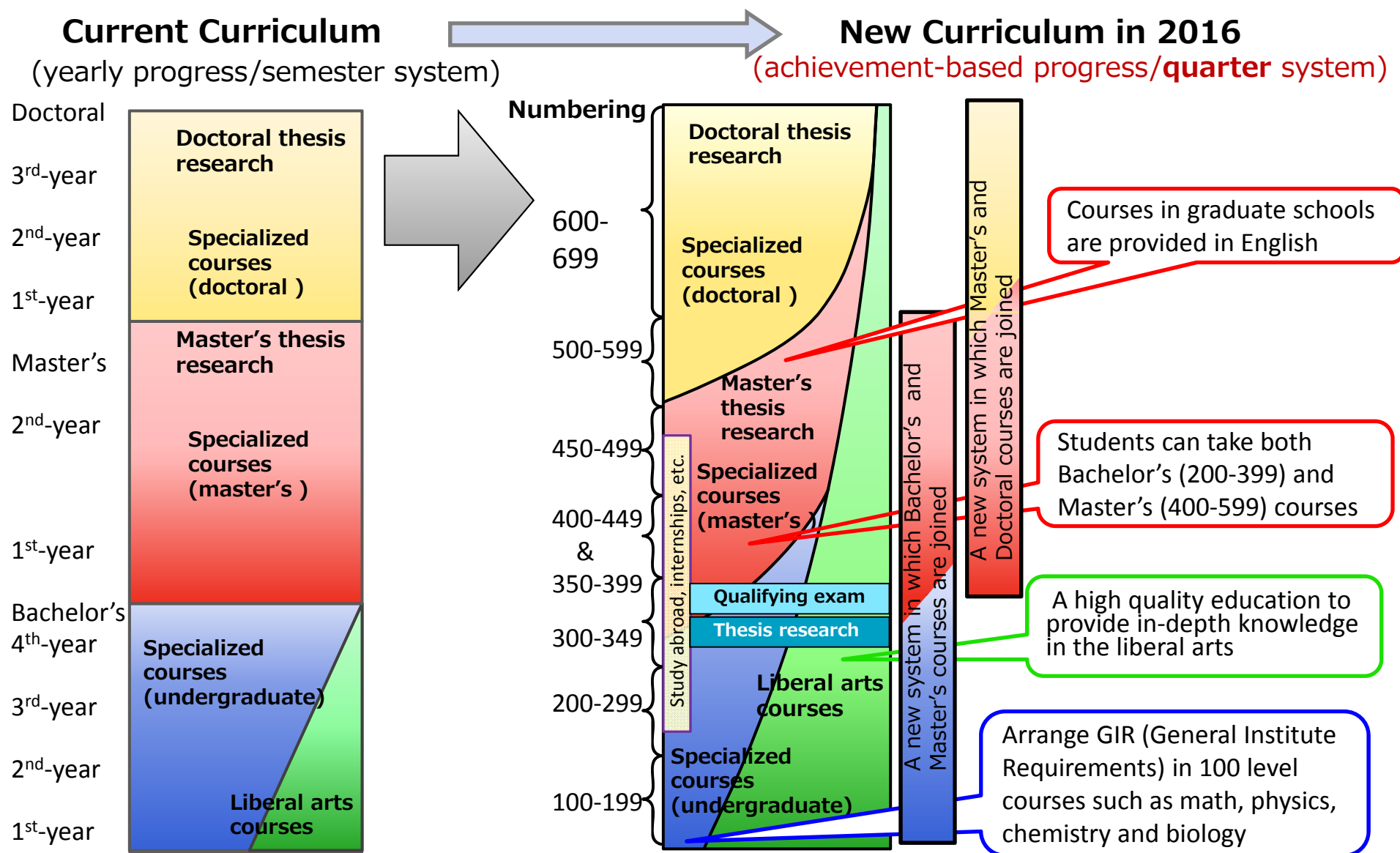
Education Reform Plan of Action

- **Sept. 2013:** established the “Education Reform Committee”
- **March 2014:** new curricula proposals from 9 separate discipline-based faculty committees due
- **April 2014 - March 2015:** revitalize curricula based upon reviews
- **April 2016,** university-wide implementation of new curricula at start of spring semester

Additionally

- **2014~:** design a “lecture theater” course to motivate freshmen as a first step in education reform
- **2013-2014:** groups of faculty members and administrative staff will visit 20 world-class universities to learn about education systems, methods of active learning and classroom design
- **2013~:** enhance student-exchange programs with world-class universities to increase mobility of students

A New System in Which Undergraduate and Graduate Schools are Blended



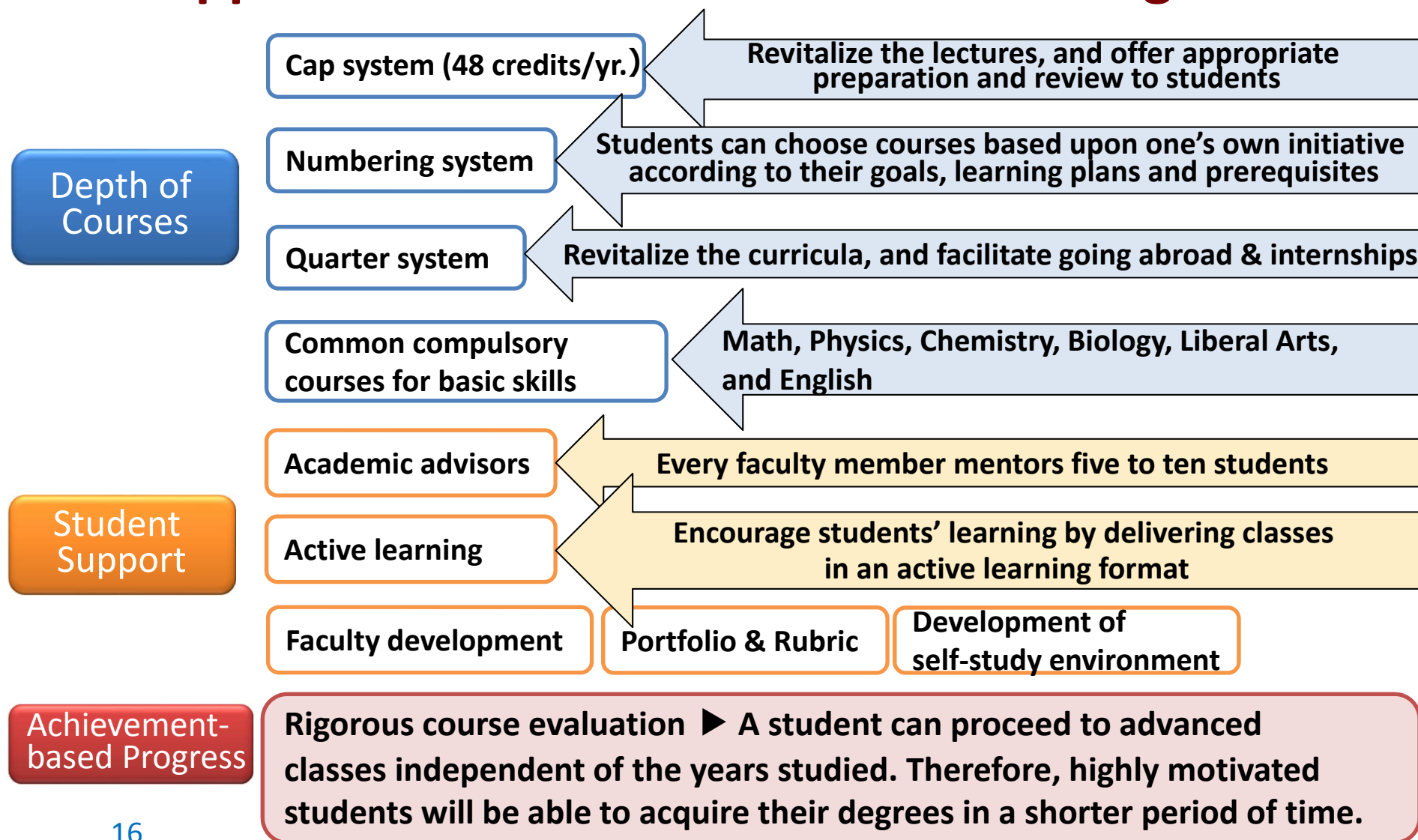
Learning Outcomes, Assessment Criteria, and Competences

Tokyo Tech Course Numbering	Learning Outcomes and Assessment Criteria in Study Programs	Competences in Study Programs	
		Instrumental and Professional Competences	Systematic and Interpersonal Competences
300 Discipline-based Courses	<ul style="list-style-type: none"> - Gain knowledge in the main discipline, knowledge in the liberal arts and communication skills in one's native language and in second and third languages. - Gain knowledge in another discipline. (+) Systematically gain knowledge in a second discipline (in addition to the first discipline). 	B9: Fundamental knowledge gain in main and minor disciplines	B4: Liberal arts: understanding of humanities, arts and social sciences B5: Communication in second and third languages B8: Capacity for generating new practical ideas and teamwork B10: Presentation skills B11: Communication in one's native language
200 Fundamental Courses	<ul style="list-style-type: none"> - Gain fundamental knowledge in main discipline, knowledge in the liberal arts and communication skills in a second language. - Gain capacity for generating new ideas based on the knowledge in one's discipline. (+) Understand relations between knowledge gained in each each subject, and basic knowledge in the profession in English. 	B6: Fundamental knowledge in main discipline	B4: Liberal arts: appreciation of diversity B5: Communication in a second foreign language B7: Capacity for analysis and synthesis B8: Capacity for generating new ideas
100 Introductory Courses	<ul style="list-style-type: none"> - Gain basic knowledge and spirit as a student of Tokyo Institute of Technology independent of the groups (I to VII) and the schools. 	B1: Grounding in basic knowledge in main discipline.	B2: Capacity to learn and think B3: Will to succeed B4: Liberal arts: ethical commitment B5: Knowledge of second and third languages

Bachelor Competences in New Curriculum

- B1:** Grounding in basic knowledge in main discipline
- B2:** Capacity to learn and think
- B3:** Will to succeed
- B4:** Understanding of humanities, arts and social sciences
- B5:** Communication in second and third languages
- B6 :** Fundamental knowledge in main discipline
- B7:** Capacity for analysis and synthesis
- B8:** Capacity for generating new practical ideas and teamwork
- B9:** Fundamental knowledge gain in main and minor disciplines
- B10:** Presentation skills
- B11:** Communication in one's native language

Increase in the Depth of Course Content and Application of Achievement-based Progress



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Impact of New Curriculum 2016 (1)

1) A variety of courses and educational opportunities will be offered to students to ensure an enriching academic life

- With a world-class curriculum and in-depth course content, highly motivated students **will be able to acquire their degrees in a shorter period of time.**
- With a shortened period of study, students **will be able to study abroad and pursue internships or dual degrees.** It will also be possible to get involved in a wider range of social activities and get hands-on experience in line with Tokyo Tech's spirit of *Monotsukuri (Making Things)*.
- Students **will be able to attain linguistic proficiency and communication skills** for adapting successfully in the global arena.

Impact of New Curriculum 2016 (2)

2) Tokyo Tech will maintain its high level of excellence in basic and specialized education, tuned to international standards

- As a top ranking science and technology university, Tokyo Tech implements a high quality education for all students in order to nurture human resources with in-depth knowledge in the sciences and liberal arts.
- With the new curriculum, students can transfer credits with top universities in the world

3) These reforms will contribute to the development of graduates with a sense of pride and the will to influence society

Make Tokyo Institute of Technology a Central Point of Interaction for Talented Individuals

Broaden academic cooperation agreements



Increase number of classes in English



Increase bilateral student mobility for courses and workshops



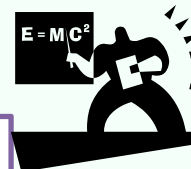
Tune the curricula and lectures to those of other top universities so that students can easily transfer credits.

Other top universities in the world

 Tokyo Tech



Accreditation of credits & degrees



Adjustment of lecture content

Open curricula & syllabi to the public

Adjustment of curricula, etc.

Open curricula & syllabi to the public

Dynamics of Machinery
• 2.670-----

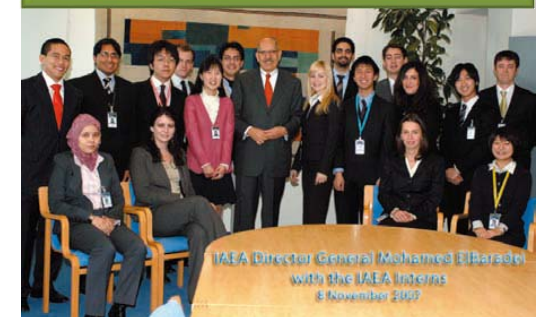
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8.01-----

機械の動力学
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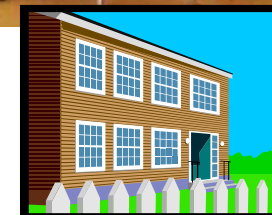
物理学 I
101-----

Adjustment of credits

Invite top researchers in the world



Provide facilities and services for International researchers



Main Building at
Tokyo Institute of Technology
in Spring

Thank you for your
kind attention

