A Perspective from the U.S.A.

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Mechanical Engineering Education
– A Perspective from the U.S.A.

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Engineering Faculty / Professors
(Assistant / Associate / Full)

- **Industry Experience** – not very common.
- **Promotion / Tenure** – requires publications and funded research projects.
- **Position / Support** – usually no Institute, sometimes endowed chair.
Engineering Students (Undergraduate)

- **High School Graduates** – only a small group (10-12%) have the background to study engineering.
- **Financing Education** – tuition and fees (up to $25k/year) / in graduate school (M.S. and Ph.D.), usually assistantship.
- **Practical Training** – in undergraduate school, some universities have co-op programs (similar to Praktikum). Most foreign graduate students lack industry experience.
- **University employment** – usually not related to engineering. No incentive for faculty to hire undergraduates for research.
Engineering Students (International)

- In undergraduate school, usually 10-15%.
- In graduate school, more than 50% / 75% of engineering and science Ph.D.’s are granted to international students.
- Over 30% of U.S. professors are first generation immigrants.
- Foreign nationals graduating from U.S. universities receive an 18 month training visa that may lead to “green card” or immigration to the U.S.
Educational Structure

- **The University System** – BS/MS/PhD degrees / engineering technology programs / community (2 year) colleges.
- **Engineering within university** – most engineering schools are part of a large university / exceptions are MIT, Caltech, RPI, IIT, etc.
- **Ranking of universities** – very important in U.S. private universities (MIT, Stanford, Princeton, Yale, etc.) have more resources (endowments) but some public universities are also good (Berkeley, Michigan, etc.)
- **Science vs. engineering** – in general U.S. engineering schools emphasize science of engineering (faculty interest, limited laboratory equipment).
- **Design and manufacturing** – in U.S. often with Industrial Engineering, some project related learning, some faculty with industry experience.
Educational Structure / Graduate School

- Entrance requires examination and good grades (less consideration of other factors, as in undergraduate school).
- Foreign students have an advantage since they are better prepared for the entrance examination.
- MS takes two years, some programs do not require a thesis but only course work (not desirable).
- PhD takes two to four years after the MS, requires courses and dissertation, mostly theoretical topics.
- Graduate schools attract the best students from all over the world.
University Administration

- **Public and Private Universities** – State funding and tuition / tuition and endowment income.
- **Federal and State Support** – Both public and private universities try hard to attract federal and state fund via projects.
- **Major Funding Agencies** – National Science Foundation, Departments of Defense, Transportation, Energy and Education. Popular areas “now” are nanotechnology, biotechnology, information technology, advanced materials and environmental sciences.