Education of Young Engineers in Electromagnetic, Antennas and Propagation in Japan

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1. Introduction

EM related education is not easy task for both universities and companies world-wide. This talk presents two programs, one is classical while the other is relatively new.

2. Training courses for young EM engineers

In 1994, Technical committee of Antennas and Propagation in Communication Society of IEICE Japan (TC-AP) opened a series of the training courses specially designed for younger engineers as well as seniors who newly join in this heavy topic area. It covers basic EM theory, Numerical method, Antenna design, Propagation and algorithms for wireless communications. It has been working more than 10 years and about 40 courses with total number of about 3000 engineers have been held. There are several unique features which contribute to the high quality and long-lived programs.

- Two one-day Preparatory staff meeting:
- Advance homework using a self-study textbook of more than 100 pages.
- Fees about 100-120 USD and 30 USD for the regular and the student respectively as an activity of TC-AP for membership-raising.
- Copyright kept by the lecturer; the text book is available only for the attendees.

The talk will include the latest information after the first report presented B08 in 2005 URSI GA.
3. Integrated Doctorial Education Course

The PhD program in general has not been so popular in Japan in comparison to MS program. In 2002, the ministry of Education and Ministry of Education, Culture, Sports, Science and Technology started the 21th century Center of Excellence programs. One of the main objectives has been to enhance the PhD course and to encourage the PhD students, in the number of students, in the quality of degree holders. As for the EM-related education, we proposed the 21st Century COE Program “Phontonics Nanodevice Integrated Engineering” (FY2002-2006, Project Leader: Prof. Shigehisa Arai), which were conducted by Dept. of Electrical & Electronic Engineering, Dept. of Physical Electronics, Dept. of Communications & Integrated Systems, Graduate School of Science & Engineering and Dept. of Electronics & Applied Physics, Dept. of Information Processing, Interdisciplinary Graduate School of Science & Engineering, Tokyo Institute of Technology. It has just successfully completed and around 700 PhD students have been graduated in the program. Based upon these successes, Tokyo Institute of Technology initiated a new program “Integrated Doctorial Education Program” from 2006. In these programs, there are several new trials for the PhD course students, such as

- 3 to 6 months study experience at University in other country or domestic company.
- External Examiners
- PhD student Forum
- Research Assistant Program.

These may not be new but are not popular in Japan.

4. Conclusions

In view of explosion of wave technology in the coming information society in contrast with the world tendency of descent of EM colleagues, “how to feed the next generation in electromagnetic” seems one of the urgent task for URSI. IEICE TG-AP is also sharing this feeling and is finding the way to extend this activity. Some examples are; collaboration with Asia Pacific countries as well as IEEE AP education committee, harmonization with IEEE AP distinguished lecturer program, and also workshops in the EM related symposium ISAP. As for the PhD program, Social and cultural background in Japan is different from that in USA and EUROPE. But fostering young leaders through PhD program is highly demanded not only from academia but also from industries.
Table 1  History and statistics of the workshop for young EM engineers.
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Figure 1  Integrated Doctorial Education Program at Tokyo Tech