Submitted to ICEE 2004, Florida, USA, October 16-21, 2004

A picosat design course with synchronous internet teaching

J. J. Miau[1], J. N. Juang[1], D. Chu[2], Y. Y. Lin[1], R. C. Hsu[3], J. Fan[4], D. M. Ma[5], and K. M. Chung[1], D. Y. Chiang[1],

[1]National Cheng Kung University, Tainan, Taiwan, ROC
[2] National Space Program Office, Hsin-Chu, Taiwan, ROC
[3] National Huwei University of Science and Technology, Huwei, Taiwan, ROC
[4]Feng-Chia University, Taichung, Taiwan, ROC
[5] Tamkang University, Taipei, Taiwan, ROC

ABSTRACT

This paper reports on the recent development of a picosat design course with synchronous internet teaching. Realizing the emerging need of system engineering education in the country, three years ago the authors of this paper formed a team to initiate a course entitled "picosat system engineering and design". In viewing that this multi-discipline course requires extensive expertise and experience from different organization, this course is taught via internet, which is convenient for a lecturer, from one of the universities or industry, to give lecture at a location of convenience. In other words, this course would not have been possible without the integrated resources of industry and universities via internet. Moreover, it should be mentioned that the course has been financially shared by the Ministry of Education.

The scope of this course is to provide students fundamental knowledge of system engineering process and guide students to design their own pico-satellites in teams. This course is designed for two consecutive semesters, for the students at the third-year level of undergraduate study and/or above. In the first semester, lectures are emphasized on fundamentals of mission requirements and analysis, satellite subsystems including attitude determination and control, space power, communication, structure, thermal control, command and data handling, and payload. By the end of the semester, a contest is held to evaluate the performance of the students by teams based on their presentations and design reports on their pico-satellites. In the second semester, lectures are emphasized on the technical aspects of the system and subsystems of a satellite, in order to help the student teams to have a better grasp on various aspects of the design process. By the end of the semester, a contest is also held to evaluate the final results of their design projects. Both contests mentioned above are held with all the students and the lecturers, who serve as the evaluators, gathered in an auditorium. Therefore, the contests actually provide good opportunities for students and lectures to share their ideas and experiences with others.

This course has been conducted for the past two consecutive years. A questionnaire-based survey was made on a yearly basis to collect the comments of the students who took the course. Notable comments were on the quality of the internet in campus, the interaction between lecturers and students in and after class, the clarity of the guidelines concerning the design projects, and the breadth and depth of the

lecture contents. These comments were well taken and discussed extensively in the organization meetings of the lecturers. Therefore, actions were taken to improve the quality of the course in a timely manner. The survey results obtained in the two years will be compared and discussed in this paper.