

Remote Course and Degree Delivery in China

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Abstract

The Department of Electrical & Computer Engineering (ECE) at Portland State University (PSU) has begun to deliver ECE courses to students in Shanghai, China at the International Institute for Information, Science, & Technology (IIIST) in an innovative experiment in international collaborative education. The courses consist of current lectures recorded in PSU classrooms, delivered with full support materials by both CD-ROM and Internet streaming, to students at the IIIST in Shanghai. The students are fully admitted to PSU, and will graduate with PSU degrees. All courses are in English, and the IIIST provides support in English as a Second Language, and by providing most of the lower-division program. Classroom assistance with the courses is provided in the Shanghai classroom by local faculty drawn from Fudan and JiaoTong Universities. Graduate programs are due to begin in Fall 2002. The paper will provide full details of the program's organization, and industrial support. One outcome of the program will be that "local" Portland engineering students will have the opportunity to visit China for summer courses and travel, in conjunction with the IIIST. Another is that essentially all of PSU's ECE Department's courses will be available on-line (or on CD) to other potential collaborators worldwide.

1. INTRODUCTION

The program's genesis lies in a chance conversation on the topic of international education, carried on over a period of days at two conferences in Sweden and Germany in 2001. On the IIIST's side, the purpose of the BSCS program running at the time in cooperation with the University of Nebraska at Omaha (UNO) was to provide a U.S. university degree, taught entirely in English, to prepare for employment opportunities in the rapidly growing Pudong/Shanghai high-tech field fuelled by international companies. The IIIST was also interested in adding educational programs focused on VLSI design, which coincidentally matches PSU's forte in the Department of Electrical and Computer Engineering (ECE.) On the other hand, the difficulty in establishing international experiential programs for engineering students inevitably reduces to funding. The proposition established in these first discussions was for PSU to deliver courses to IIIST students, with the income generated by this activity going to support PSU student travel to Shanghai and China. The relationship thereby established between the two institutions would enhance the experience of both groups, bringing the student groups into close contact, to enhance the language skills of the IIIST group, and to

provide a cultural experience for the PSU students unobtainable by any tourist activity. It is worth noting that the initial plan was to deliver graduate PSU courses to the IIIST, both institutions being participants in a proposal to establish an international electronics packaging research consortium, to be supported by the degree program.

2. IIIST

The IIIST was constituted as a private university by Shanghai City, which charged Fudan University with oversight responsibility for academic standards and programs. Most of the IIIST faculty are current or emeritus Fudan faculty, with recent appointments from Jiaotong University ranks. Originally named the Fudan IIIST, the Institute has since separated itself from the parent institution. It is currently planning construction on its own 150 acre campus in Pudong, having occupied temporary quarters in Pudong and in Shanghai near Fudan for the past three years. The Institute currently enrolls about 250 freshmen, sophomores, and juniors in Computer Science (CS) and about 25 ECE freshmen. The IIIST undergraduates are primarily full-time students, recruited directly from high school.

3. PSU

The University has its roots in the G.I. Bill, and has developed into a full-scale urban campus with a mission of service to the city. The average age of its students is a full six years older than the national average, 28 versus 22, reflecting a high proportion of part-timers and other non-traditional students. It is one of the few U.S. universities which can claim a demographic representative of its State's population. The work experience of its students is one benefit of the high concentration of local hi-tech industry, which includes Intel's primary fab location, Biotronik, Cadence, Credence, ESI, IDT, InFocus, Lattice, LSI Logic, Maxim, Mentor Graphics, Microtech, Planar, PMC-Sierra, Sharp Labs, STMicroelectronics, Synopsys, Tektronix, Teradyne, Triquint, Vitesse, Wafertech, Welch-Allen-Protocol, etc., and a host of others in "Silicon Forest," most with strong ties to PSU's College of Engineering and Computer Science (CECS.) The city lies between the recreational areas of the Pacific Ocean beaches and the Cascade Mountains snow-fields, at the confluence of the Willamette and Columbia Rivers. The region is known equally for its wines and beers, and the city for its restaurants, arts, and music. President Bernstine has identified internationalization of the campus and curriculum as one of PSU's priorities.

4. DEGREES

The programs currently operating are the BSCS (which has transferred from UNO) with students up to the junior level, and the BSEE and BSCpE, both just beginning with freshmen. All operate as transfer programs, with students in the first two years taking predominantly Jiaotong University classes at IIIST to add to lower division PSU CECS courses. Students who meet the standard PSU on-campus grade point average (GPA) requirement can then qualify for formal admission to the CECS if they have also met the campus threshold in the Test of English as a Foreign Language (TOEFL). The remaining upper division courses are all provided by PSU, with completion to normal standards qualifying the students for graduation with the PSU degree. Student admission into the lower division IIIST program is made on the basis of the Chinese university entrance exams.

The MSECE degree is scheduled to begin in fall 2003, with the MSCS following one year later (in time for the first BSCS graduates.) It is expected that both thesis and non-thesis options will be offered, with full-time students taking the former, and the latter aimed at part-time students

employed in U.S. companies operating in Pudong. There is also a plan to open a graduate branch campus in Suzhou one year later.

5. DELIVERY

The courses are regular PSU courses, delivered completely in English, including tutorials, laboratories, examinations, etc, to regular academic standards, which remain wholly within PSU control. The courses are exactly the same courses as in the regular program, because they are video-recorded in the classroom, and delivered with all ancillary materials both on-line by streaming and on CD-ROM. There is no attempt to link the classrooms in real time. Instead the lecture is played in the IIIST classroom in the presence of the IIIST instructor, who acts as a mentor to respond to questions, and who can pause the lecture to add an explanation, etc. The mentors are all current or emeritus faculty from reputable universities, currently predominantly Fudan. The link to PSU faculty is through the IIIST mentor. The PSU faculty travel to Shanghai each year to meet with mentors and students, and to conduct tutorials. The IIIST keeps detailed records of all students and courses for accreditation purposes, and operates the same consumer surveys as PSU.

The challenge will be to replicate one of the features of the PSU BSEE/BSCpE experience: the senior capstone design project, which is totally integrated into local industry. The goal is to transfer this educational experience through the Shanghai subsidiaries of Portland based companies.

6. MOTIVATION

There are four main reasons for developing this relationship:

- The opportunity to provide an international educational experience for our own Portland-based PSU students is the primary driver. The intent is to plough income from the program back into travel support and expenses for engineering students to spend a summer in Shanghai and China. The Portland summer traverses the end of the IIIST spring and start of fall, so there is an opportunity for direct personal interaction with PSU students at IIIST, with extended travel through China during their break. They will take courses on Chinese language, culture, history, and technology while at the IIIST.
- Recruitment of PSU's BSEE/BSCpE/BSCS and MSECE/MSCS Shanghai graduates into the Portland

campus MSECE/MSCS and Ph.D. programs, respectively. These would be our own graduates, of known abilities and academic backgrounds.

<http://www.ece.pdx.edu>, <http://www.cs.pdx.edu>, and <http://www.iiist.com.cn>.

- Research opportunity enhancement by faculty collaborations between PSU and IIIST/Fudan/Jiaotong.
- Service to Portland's microelectronics (and other) industries. Many of these have already located manufacturing and/or sales facilities in the Shanghai area, most commonly in Pudong. Looking much further ahead, successful Chinese companies establishing facilities in the U.S.A. might be influenced by their PSU graduate employees into choosing Oregon!

7. FINANCES

PSU's program fees are set at the published Oregon Resident rates, but with the important additional provision that IIIST is authorized to grant substantial scholarships (i.e. fee remissions) according to need and/or academic qualifications. The net effect is that the typical fees IIIST can charge its students are very competitive, in recognition of the disparity in family incomes between the two countries. As China's GNP grows, the actual fees will rise to match PSU's full in-state fees.

8. THE OPPORTUNITY

As a side benefit of the program, the ECE and CS courses recorded for the program are available as streaming video on the web, and eventually these will include essentially all courses at both BS and MS levels. Portland students already make extensive use of their availability at home or outside of scheduled hours. And if PSU can deliver courses in Shanghai, it can also deliver them in Bucharest or even in Texas! The opportunity exists, for example, for creative cooperative arrangements for exchange of courses on the web.

Another alternative is to expand upon the model provided by other PSU agreements with colleges in Korea and India. In one of these, for example, students complete three years at their home institution, and 1.5 years at PSU, to complete degrees in both programs. The PSU time could be cut to simply one year if some of the course requirements could be completed on line. The featured advantage of the PSU senior year in ECE is the group capstone project course in local industry mentioned earlier.

Further information on the PSU courses can be found on the Department websites at