

**EFFECTIVE AND EFFICIENT MEANS TO PREPARE INTERNATIONAL STUDENTS  
FOR U.S. ENGINEERING/TECHNICAL EDUCATION**

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**INTRODUCTION**

Approaching a new century, increasing world-wide industrial and technological competitiveness demands excellence in engineering and technical education. The U.S. is privileged to enjoy the economic and technological advances required to excel in global competition. Therefore, young people from around the world come to this country for studying and training at universities and other educational institutes to prepare themselves for future leadership roles in science and engineering. Their educational and cultural experiences gained in the U.S. will assist them in enabling their native countries to compete in global enterprises.

During the mid-1990's, a significant portion of the engineering student population in the U.S. was due to international students[1]. In 1993/94 international students in the field of engineering totaled 76,055 or about 17 percent of the international student population. The number of international students at the University of Nevada, Las Vegas was 427 in 1992/93 and 503 in 1993/94; at the University of Toledo, it was 1440 in 1992/93 and 1349 in 1993/94. Accordingly, efficient methods must be implemented to guide these students through U.S. institutions of higher learning.

**UNIVERSITY PROGRAMS**

To guide international students, as well as native born students, through their educational experiences, universities must develop and execute a number of programs/policies. These programs include

Orientation  
Advising

## **ORIENTATION**

The admission policies for international students must be clearly stated and uniformly implemented. International students should be informed of their chosen program requirements and minimum standards, such as threshold knowledge in the basic sciences and mathematics, and verbal and written proficiency in the English language. These students must be informed and provided with a brief description of the local community, with emphasis on living expenses, housing accommodations, health insurance, banking systems, food facilities, cultural activities and sensitivities, department of motor vehicles, and local transportation systems (including campus bus service). Also, all requirements for legal entry into the U.S. as a student, as specified by the Immigration and Naturalization Service, should be provided.

Orientation programs should comprise two phases; a personalized orientation program focusing on cultural activities and student services provided by the university should be conducted, followed by an academic orientation program. These programs should be completed before classes begin. The personalized orientation will assist international students in making a successful transition from their home countries to U.S. engineering institutions by familiarizing them with university services such as the library, computer center, student recreation center, student union, major laboratories, cultural center and legal office. In addition to touring these locations, supplemental written details should be provided. For example, the student union may not only provide different varieties of food services and recreational areas, but may also provide offices for student affairs, multi-cultural student development, career services and the International Student Association (ISA). The ISA is composed of many organizations, each representing one nationality. The student union provides a sample of university community life, offers the total development of students through a diversity of experiences outside of the classroom and promotes multi-cultural awareness through special programs, workshops, exhibits and research projects. It will purvey opportunities for the international students to meet and socialize with American students, creating multi-cultural and multi-lingual experiences, and to interact and exchange ideas.

During the academic orientation, the college should make available to students booklets describing a bird's eye view of past contributions, current missions and up-to-date information - especially in scholarship, financial aid and possible employment inside and outside the university. Each engineering department should present an overview of its programs including the basic core program and technical electives, honors program, co-op program, graduation requirements, career opportunities and activities of the student chapters of professional societies. Each department may publish undergraduate student handbooks[2] and graduate student handbooks[3] which include course registration and scheduling procedures, rules, regulations, critical deadlines, tips from upper classmates, study techniques and other useful information. This same information can be continuously updated on a webpage for easy access by the students.

## **ADVISING**

Advising should also comprise two phases. Academic advising[4] consists of providing information and guidelines enabling students to select their appropriate areas of academic concentration through proper choices of required courses, technical electives and related capstone/synthesis projects. Thus, the international student will have knowledgeable information regarding the particular courses which may be prerequisites for advanced courses. The student handbooks mentioned above may also help. In order to determine academic advancement, the faculty should monitor and evaluate the performance of their advisees in areas such as problem solving techniques, decision making and progress in the basic engineering courses. Perhaps some deficiencies can be made up through tutoring provided by volunteer upper class members of Tau Beta Pi or other engineering honor societies. A writing center may provide assistance to an individual with writing assignments or projects. Most international students taking English as a second language can benefit from a writing center by improving their grammar when writing and organizing reports or theses.

Personalized advising[5] pertains to student development (including emotional and personal). The academic advisor must get to know the student on a one to one basis and be helpful in developing interpersonal interactions. The faculty should possess an attitude of acceptance, respect and tolerance of cultural differences and linguistic handicaps. To alleviate loneliness and a feeling of despair for international students away from their families, friends and homeland, they should be encouraged to participate in various activities on campus, such as sports, arts, lectures, cultural events and theatrical performances (as time permits). It is also important to socialize with American students to overcome language hindrances by practicing the use of idioms[6] with the aim of improving their usage in a social context. These activities may improve academic performance and develop an understanding of the American culture.

In both types of advising, the faculty serve as strong communicators and coordinators of learning experiences to encourage international students to successfully complete their engineering/technical education. Faculty should be more involved in the students' decision processes by providing general guidance at all stages of the students' college years. They should assist students in selecting basic and advanced courses as well as identifying possible career paths. Faculty should remind students of the continuous changes in job cycles and the variability in future engineering job market demands. What seemed a good career choice at the onset may turn out to be the wrong career choice for a particular student. Therefore, advising and encouraging students to continue their career objectives must be available at all times - not only during the normal registration periods.

## **INSTRUCTION**

Globalization of curricula and instruction can enhance the international students in comprehending the American culture and understanding the latest technology. International students can assist their American counterparts to be more open and sensitive to different cultures and civilizations. This is especially true in the humanities and social science electives. For example, Principles of Political Science, dealing with an overview of problems common to western and non-western political

societies and the role of ideologies in the process of political changes, may be followed by American National Government, presenting a survey of politics in the U.S. government. In the technical electives, for example, when discussing the environment, structures, construction, hydraulics, power generation, etc., examples outside the U.S. could be cited and briefly discussed as well as projects within the U.S. As an example, in addition to the Hoover Dam, the Egyptian Aswan High Dam and/or the Chinese Three-Gorge Dam could be cited. Since science and engineering have no boundaries, it is a good illustration for technological transfer from a developed country to the rest of the world.

Currently, universities maintain numerous centralized instructional computer laboratories. Extensive use of the Internet is stressed for all students. Some faculty put course syllabi, reference literature, assignments, and other information on their web site. Communication between students and faculty through e-mail extends office hours to 24 hours daily. For international students, communication by e-mail to friends and relatives in their homelands could enhance moral support for their academic works. Also, they can use the worldwide web to read news of their native lands and to keep up to date on current events.

## **INSTITUTIONAL SUPPORT**

Institutional services and support can be effective in leading to the desired results. For example, the University of Toledo has established the Office of International Services which consists of

1. International Admissions Services - provides all necessary academic information for admission to the university

2. Immigration Services - informs international students of all requirements and proper papers necessary to obtain entry student visas to the U.S. and to extend them until graduation

3. American Language Institute - provides intensive English instruction and cultural orientation for students not meeting language proficiency requirements

This office also serves as an information clearing house for such topics as such questions as health insurance, on-campus residence for graduate students, cost of living expenses in Toledo, cultural activities in the city, transportation around Toledo, amount of cash to be carried, etc.

Additionally, an International House, known as I-House, was constructed on campus; this is a residence hall serving both international and American students. Currently, approximately one-third international students and two-thirds domestic students occupy this residence hall; this cultural diversity exposes residents to the customs and behaviors of other nations. Dining facilities, a computer laboratory and meeting rooms provide excellent opportunities for students to interact and exchange ideas while preserving the dignity of the individuals and enjoying the diversity of the community.

The International Student Association (ISA) is composed of approximately seventeen organizations representing different countries whose main objective is to improve relations and create mutual

respect between international and domestic students. It is responsible for such programs as a welcome party, the ISA annual dinner, and other cultural and social events planned to make such activities integral and valuable components of the university experience.

## **CONCLUSION**

International students educated in the U.S., upon returning to their home countries, will carry with them both engineering knowledge and cultural sensitivities. Accordingly, they will have a better understanding of American culture; they will be able to promote technological transfer which will enhance prosperity and wealth individually, nationally and globally.

Furthermore, the American students will have a better understanding and appreciation of other cultures. This will also serve to improve the world-wide competitiveness of their corporations.

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## BIOGRAPHICAL SKETCHES OF AUTHORS

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