Towards Achieving ABET's "Substantial Equivalency" Recognition in Department of Chemical Engineering at a non-US institution

Majeed S. Jassim (speaker)
Department of Chemical Engineering
University of Bahrain
P.O. Box: 32038
Bahrain
drmajeed@gmail.com

Babatunde A Oyenekan
University of Texas
Department of Chemical Engineering,
1 University Station C0400
Austin, TX 78712
Phone: 512-471-4851
Fax: 512-475-7824
babatund@che.utexas.edu

Abstract

The engineering college in University of Bahrain (UOB) is currently pursuing ABETS's Substantial Equivalency recognition for its departments. As a non-US institution the goal of the university management is to ensure a high quality assurance of its education system and gets global recognition of its undergraduate educational programs.

Resources have been allocated to improve the quality and teaching methodologies with refurbishments of new experimental and computing facilities. Every faculty member has been asked to satisfy all ABET criteria within the syllabi framework through standardized quality measurement tools. The department has established a very good link with the industry in a joint task-force to promote the chemical engineering education and assist the graduates with their expertise during process plant design phase.

Previous surveys have identified shortcomings in the learning process but new plans are underway to enhance the quality of educational facilities. The university has invested a lot of resources and efforts to achieve all of the ABET criteria and it is an exciting time for the graduates and faculty alike to streamline the education programs and take it to another level.

Key Words: ABET, engineering, education, accreditation, substantial equivalency

Need for International ABET Evaluation

There are few engineering colleges in the Gulf Universities that had managed to get "Substantial Equivalency" recognition from ABET: Kuwait University, King Fahad University of Petroleum and Minerals and King Abdul Aziz University from Saudi Arabia, Qatar University, and United Arab Emirates University.

The Bahrain University management has decided to pursue similar target for its engineering college and has allocated resources to accomplish a successful outcome. However, it should be clear that this type of recognition is not an accreditation inference by ABET. In fact, it only

shows that the ABET consultants have reviewed the departmental programs and have established trust in curriculum and the skill level of the graduates.

The success of the accreditation exercise would: (1) enhance the image of the university in the community, (2) ensure higher teaching quality levels, (3) get the trust of the governmental and business organizations regarding the quality of graduates, (4) ensure successful integration of the graduates in postgraduate studies abroad, and (5) compete with universities in the region and hence determine the position of university on a global benchmark.

Strategic Plan of the Department

The strategic plan of the department constitutes of 3 components: mission, vision and educational objectives. These were defined as shown below:

Mission: The mission of the department is to provide high quality teaching, conduct research, and disseminates chemical engineering knowledge through internationally distinguished programs; henceforth in collaboration with its undergraduates students, seeks to standardize an education pattern in the principles as well as practice of chemical engineering that will benefit the society by means of serving a broad and dynamic range of career paths in addition to providing a foundation for everlasting professional growth.

Vision: To be the quality leader region wise as a higher learning/educational institution, reflected through the university of Bahrain, which offer chemical engineering undergraduates programs that will be recognized by its students, alumni, their employers, colleague department, and others, for excellence, attention to individual student, involvement of undergraduate student in the department's research programs, and efforts towards continual improvement.

Educational Objectives

- To provide our student with top quality teaching that enables them to excel in their careers.
- To transfer skills to the students in order to enable them to meet the modern engineering challenges.
- To provide our students with diverse engineering knowledge that allows them to pursue different career opportunities.
- To expose the students to industrial atmosphere by spending two mandatory months in an industrial institution.
- To enrich the academic and industrial research activities in Bahrain.
- To arrange specialized courses for industrial and governmental institutions.

Curriculum

The curriculum for BSc. program is shown in Figure I. The program is taught by 3 entities. The department of Chemical Engineering is responsible about 50% of curriculum, the college

of Science is responsible about 30% and the remaining 20% is fulfilled by Education, IT, Business, English, and Engineering courses.

The curriculum is designed to equip students with an edge in communication, practical engineering, computer, environmental and safety skills and knowledge. Our students need special treatment because they are mostly graduated from Arabic-speaking high schools. Thus, their level has to be improved with tailor-made English courses in the early stage of the program.

By the graduation time, the students should be equipped with various skills that enable them to find recruitment opportunities in the country or the neighboring states. Most of the students are absorbed in the local industries: aluminium, refinery, oil and petrochemicals, environment, health and safety, insurance and banking sectors. The wide scope of positions emphasizes the need for broad required fundamental knowledge and the ability of graduates to adapt to a life-long learning habit.

Improvements to Facilities

ABET evaluation was based on “input approach” for many decades. However, this philosophy has left little opportunities for educational innovations. Thus, “outcomes approach” environment has been in effect since 1998.

Active methodologies are necessary to fulfill this life-long learning philosophy. Therefore, the ratio of computers per student has increased with the opening of new laboratory facilities. New and licensed educational software were encouraged to use as support material in classrooms. Multimedia laboratories were equipped with comprehensive teaching aids. The department has plans to purchase new experimental apparatus and increase the number of professional technicians. A new building was constructed to increase the number of classrooms in the engineering campus.

The professors in the department are either UK or US educated and have good research and teaching experience. It is the policy of the university that the new recruited professors should have a minimum of 5 years experience prior to appointment.

Link with Industry

The chemical engineering department has established strong links with different industrial partners to strengthen the outcome of the educational process. A joint committee with Bahrain Petroleum Company (Bapco) is an on-going exercise that aims to promote the discipline of chemical engineering in the local community and hence provide fresh bloodline of engineers that supports both the established and new industries.

A list of action items was proposed by the committee to attract high school graduates into the engineering profession. The plan was broadly divided into 4 categories: arranging of publicity campaign, establishing strong link with ministry of education, arranging seminars by high-profile chemical engineers, and providing attractive scholarships.

Another successful link was the involvement of experienced engineers into the process design classes. This course is a key indicator of the graduates understanding of core chemical engineering subjects and other important issues such as the environment and safety. The graduates had presentations, round-table discussions and suggestions by sound technical engineers. These were then invited at the end of the course to evaluate the outcome of the design projects. This process of interaction provided few recruitment opportunities for our graduates and ensured an immediate feedback and constructive criticisms from industry against outcome of the BSc. program.

To fulfill the BSc. requirements, the graduates are obliged to join a 2-months industrial experience in one of the local industries. The university conducts surveys for both the employers and the students to quantify and assess the quality of the outcome. The students are asked to submit a written report.

Conclusions

Substantial Equivalency recognition is an important achievement step for the college of engineering at the University of Bahrain. The mission, vision, and educational objectives statements were defined in detail. Plans are underway to document evidence of the link between program outcome and program objectives. The computer and laboratory facilities were improved and the link with industry had been strengthened.

References

1- www.abet.org

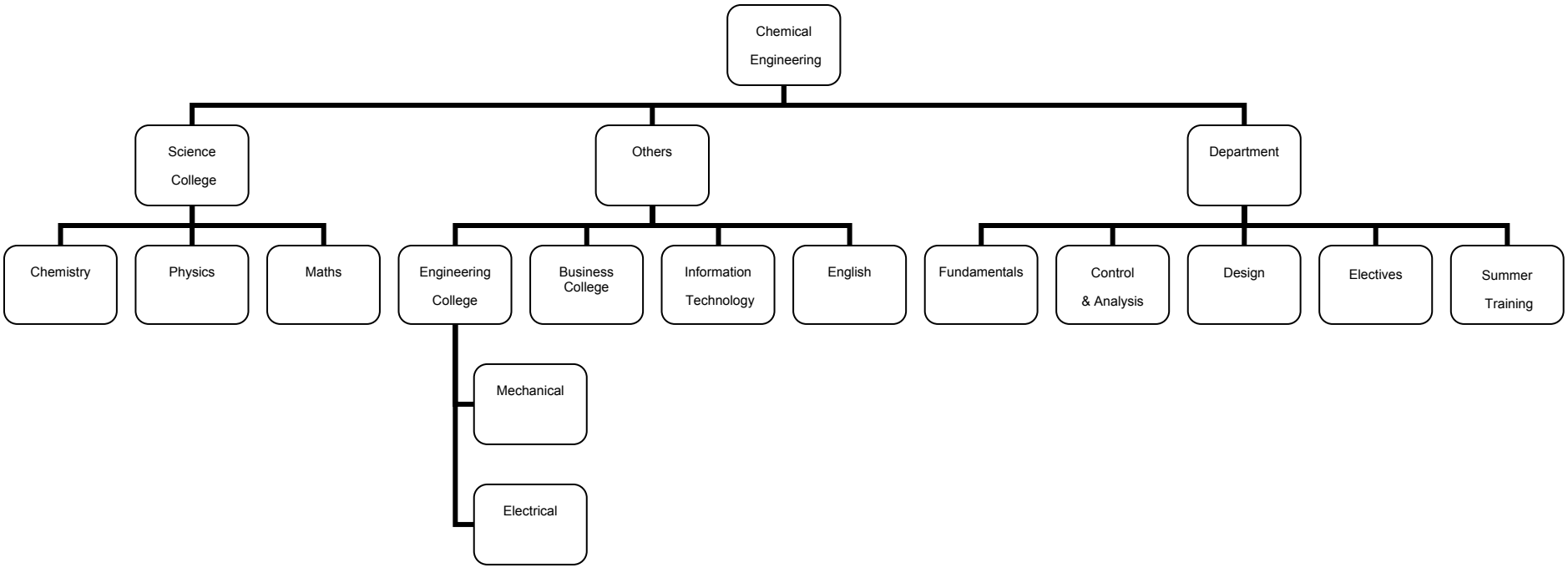

Figure 1: Structure of BSc Program for Chemical Engineering Course