

Developing New Technology-Related Bachelor Programs in The Middle East

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Abstract – The purpose of this paper is to summarize the development of five recently launched bachelor programs at the University College of Applied Sciences in Gaza, Palestine. These programs are Technology Education, Business with Technology, Geographic Information Systems, Development Planning, and Building Technology. These programs are non-traditional academic programs where traditional curricula are hybrid with a varying degree of engineering and IT-related technology courses. These programs have been accredited by the local accreditation board and a few hundred students are currently enrolled in these programs, with the first batch of these students have already graduated in the summer of 2010-2011. The paper sheds some details on the curriculum of these programs. Though these engineering and technology-related academic programs were developed with both local and regional interests, universities worldwide could benefit from this experience.

Keywords: New Technology Program, Engineering Bachelor Programs; Engineering Education in Middle East; Geographic Information System Bachelor Degree

BACKGROUND

The University College of Applied Sciences-Gaza (UCAS) is a public college established in Gaza City, Palestine in 1998. When established, the main mission of the College is to provide applied science and technology related associate degrees. Ten years later, the College has grown to become the largest community college in Palestine; both in terms of enrolled students (about 6,000 students) as well as the number of academic programs it offers (36 programs) [1]. In 2007, the Palestinian Ministry of Education and Higher Education (PMoE&HE) accredited the College to convert from a community college to a university college, thus offering bachelor (4-year academic programs) degrees in addition to its existing associate-degree programs.

Following elaborate rounds of discussions between the PMoE&HE and the various constituencies within the College (e.g., Board of Trustees, Dean and higher administration, faculty, students and their families), a strategic decision was made that UCAS should continue its mission to offering bachelor programs focusing on applied sciences and technology rather than on traditional college education [2]. That is, UCAS's new academic bachelor programs should be different from what other universities and university colleges traditionally offer. The implication of this decision is that the accreditation process may go smoother because of less competition with other traditional and related programs; however, two main challenges remained: First, finding new technology-related programs beneficial to the local and regional markets; and second—which became a major issue only later—recruiting students to these new programs because students and their families preferred to join traditional programs with well-established job titles.

As a result, a strategic plan was developed listing a number of bachelor programs, all technology related [2]. Though new to the local community, it was believed that these programs will attract the attention of perspective students and their families, as it opens the door for new type of jobs in the local or regional job markets.

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The main purpose of this paper is to summarize the development of five engineering and technology related programs at UCAS. Details of each one of these programs are also presented.

PROCESS OF DEVELOPMENT AND ACCREDITATION OF PROGRAMS AT UCAS

As one would expect, the accreditation of a new academic programs is a time and resource consuming process. Though the accreditation process itself may vary from one country to another, the main requirements are mostly the same. In Palestine, the academic accreditation board (Accreditation and Quality Assurance Commission, AQAC), which is an entity of the PMoE&HE, requires the following determinants to be satisfactorily achieved prior to awarding the accreditation of a new bachelor program in Palestinian institutions of higher education [3;4]:

1. The graduates of the proposed academic program must have a good potential to find relevant jobs in the local and regional job markets; whether it is in the private or public sectors. It is worth mentioning that these jobs need to be sustainable even if the number of these jobs is limited.
2. The academic institution applying for the accreditation must prove to the accreditation board that it has the resources to support and maintain the offering of this program. Therefore, minimum number of faculty, floor space, library material, and laboratories and their equipment must be secured.
3. The program must be cost effective in the long run; i.e. benefits generated from tuition fees and other income resources should cover the various costs (mostly faculty salary) to run the program.
4. The program must have acceptable justification, objectives, curriculum and study plan as determined appropriate by a pool of reviewers both from within as well as outside Palestine.
5. It usually takes over a year from the time an institution initiates the process by sending their application for accreditation of a new program and until the accreditation board sends their decision of granting or rejecting the accreditation of the proposed program.

At UCAS, the process is typically initiated by forming a committee to prepare the application document for the proposed program, which is sent along with supporting documents to the accreditation board, AQAC. Each new program's committee typically includes the following:

1. Faculty members from within UCAS who are interested and related to the proposed area of study,
2. Potential faculty members from outside UCAS who showed interest to joining faculty of proposed program,
3. Government officials representing relevant governmental offices,
4. Private industry representatives as potential employers for proposed program graduates, and if needed
5. Representatives of potential governing professional bodies, such as local society of engineers.

Once the committee is formed, a steering meeting is organized to discuss the need for the proposed program and its potentials to succeed and support the local and regional job markets. If the proposed program is received positively, a formal survey of the job market need for the program is then conducted. Several workshops are held to develop the curriculum and study plan for the program with the need to introduce many technology courses is emphasized. When developing the program's curriculum, the curricula of similar and related programs from local, regional, and international universities are usually consulted. After a few iterations, a final draft of the curriculum is adopted and the final application document is prepared. After approved by the various governing bodies of the College, the application is send to the accreditation board. It is worth mentioning that this process to propose a new program typically takes one to two semesters.

EXAMPLES OF TECHNOLOGY-RELATED PROGRAMS

The following sections describe the details of five technology-related programs that have been already or about to be accredited.

Technology Education Bachelor Program

The main goal of the Technology Education Bachelor Degree Program is to prepare well-qualified school teachers capable of teaching technology, which a school subject that Palestinian students must now study from 5th until 12th

grades. Since the technology subject was added to the Palestinian school curriculum just recently, there is a great shortage of qualified teachers to cover the various topics in this school subject, starting from basic engineering knowledge in the early grades up to IT technology in the later grades. The Program curriculum requires students to successfully complete a total of 142 credit hours (one credit hour is equivalent to one hour of lecturing every week for a total of 16 weeks in each semester, with typical load of 16 credit hours a semester). Figure 1 shows the distribution of the courses among the different areas of studies, based on the relative weight of their credit hours. As one can see, about 44 percent of the credit hours in this program are in engineering and IT technology.

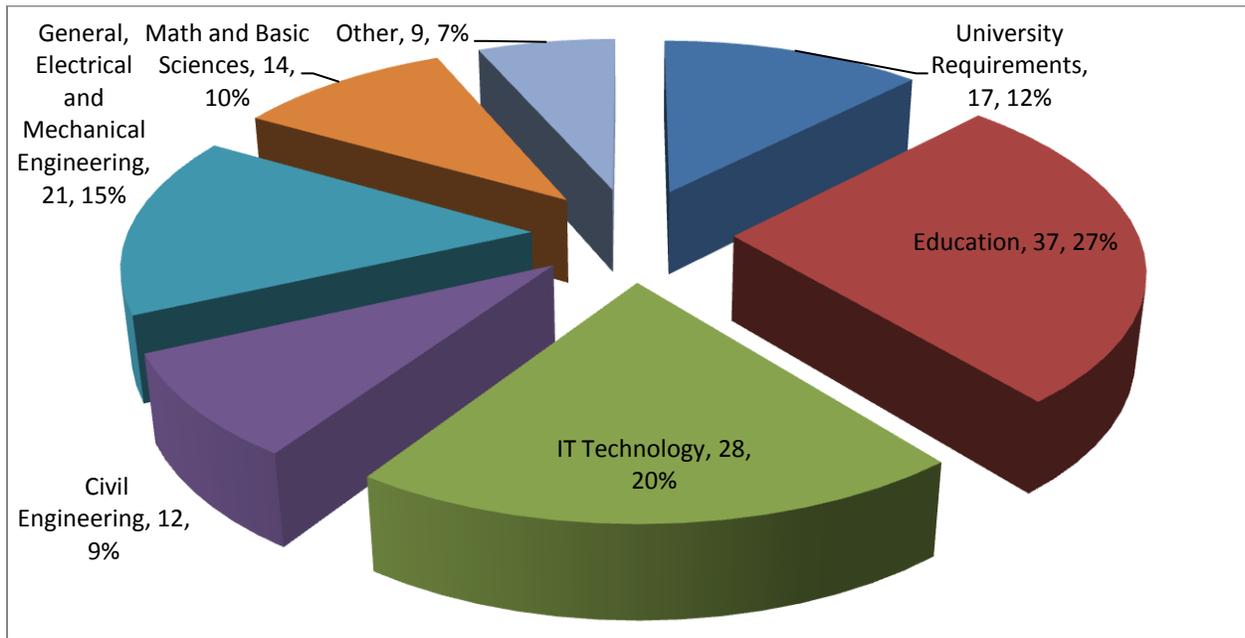


Figure 1. Distribution of Courses in Technology Education Bachelor Program (Data source: <http://www.ucas.edu.ps/departments/ETEC/>)

Business Administration with Technology Bachelor Program

The Business Administration with Technology Bachelor Degree Program curriculum requires students to successfully complete a total of 140 credit hours. Figure 2 shows the distribution of the courses among the different areas of studies, based on the relative weight of their credit hours. The main difference between this Program and a traditional Business Administration program is the additional number of IT-related courses to be completed by students in this program. As one can see, about 20 percent of the credit hours in this program are IT technology related.

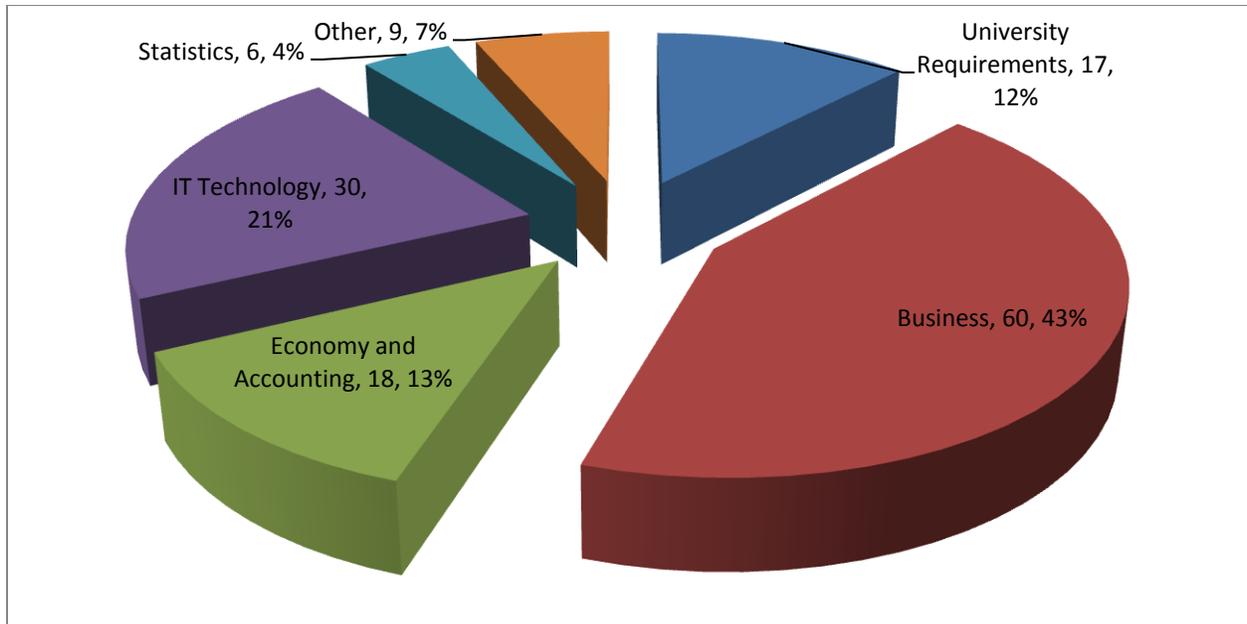


Figure 2. Distribution of Courses in Business Administration with Technology Bachelor Program (Data source: <http://www.ucas.edu.ps/departments/TecMang/>)

Geographic Information Systems Bachelor Program

Geographic Information System (GIS) is a newly developed field that is closely linked to the engineering and IT sectors and is considered to be one of the most rapidly growing IT sub-sectors. Employment opportunities for GIS specialists/technicians exist in all fields currently utilizing GIS. Examples include natural resource and environmental agencies, urban and regional planning agencies, transportation agencies, and many other disciplines where skills in GIS are now increasingly in demand. There are opportunities in the government and private sectors in social and urban planning, environmental science, geology, archaeology, transportation, and asset/infrastructure management, to name a few. Job demand for GIS specialists is also expected to continue to grow worldwide in the near future. Furthermore, new emerging GIS technologies and methods will also augment the current demand for GIS technicians.

The GIS Bachelor Program at UCAS is the first of its kind in the Middle East and one of just a few worldwide [5]. The program curriculum requires students to successfully complete a total of 132 credit hours. Figure 3 shows the distribution of the courses among the different areas of studies, based on the relative weight of their credit hours. As one can see, about 72 percent of the credit hours in this program are in GIS technology, engineering, and basic IT technology.

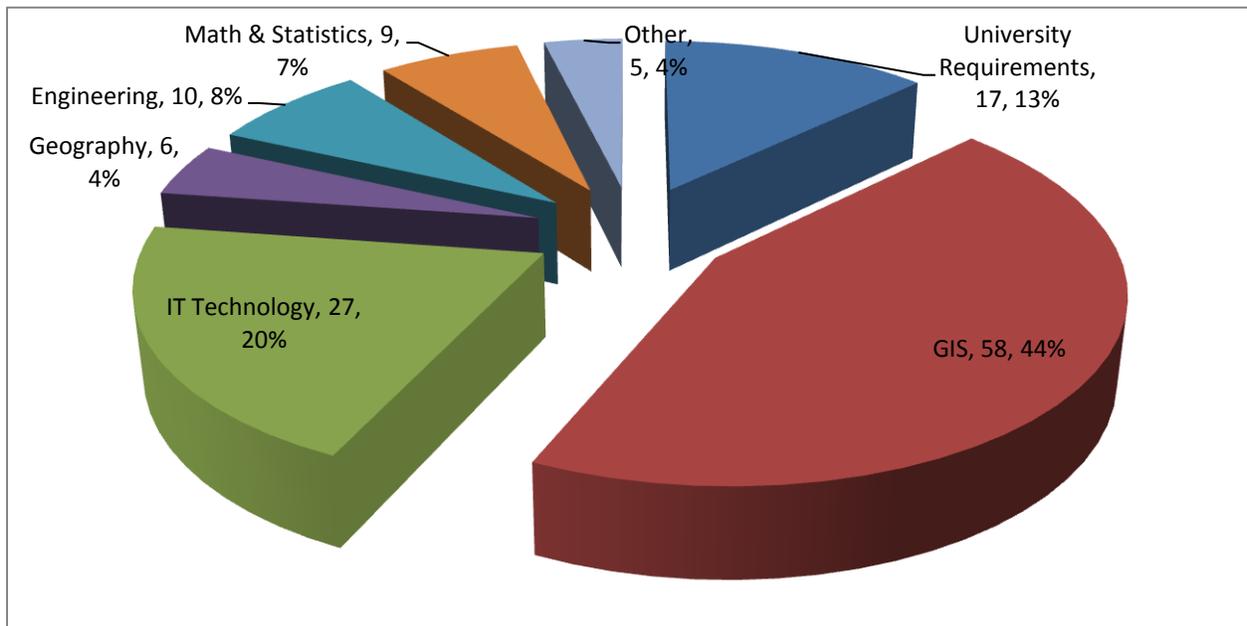


Figure 3. Distribution of Courses in Geographic Information Systems Bachelor Program (Data source: <http://www.ucas.edu.ps/departments/GIS/>)

Development Planning Program

The main goal of the Development Planning Bachelor Program at UCAS is to graduate highly skilled and employable planners able to enter one of the badly needed fields in Palestine and the region. The Program's graduates will find work as planners, development coordinators, analysts, and project managers in positions with public, private and nonprofit organizations.

The Development Planning Bachelor Program at UCAS is again the first of its kind in Palestine and the Middle East [6]. The program curriculum requires students to successfully complete a total of 135 credit hours. Figure 4 shows the distribution of the courses among the different areas of studies, based on the relative weight of their credit hours. The majority of (61 percent) of the credit hours in the program are planning courses with the rest of hours distributed among related disciplines, such as 10 percent engineering, 9 percent economy and business, and only 4 percent in engineering, which makes this Program as the least program with IT technology of all proposed programs.

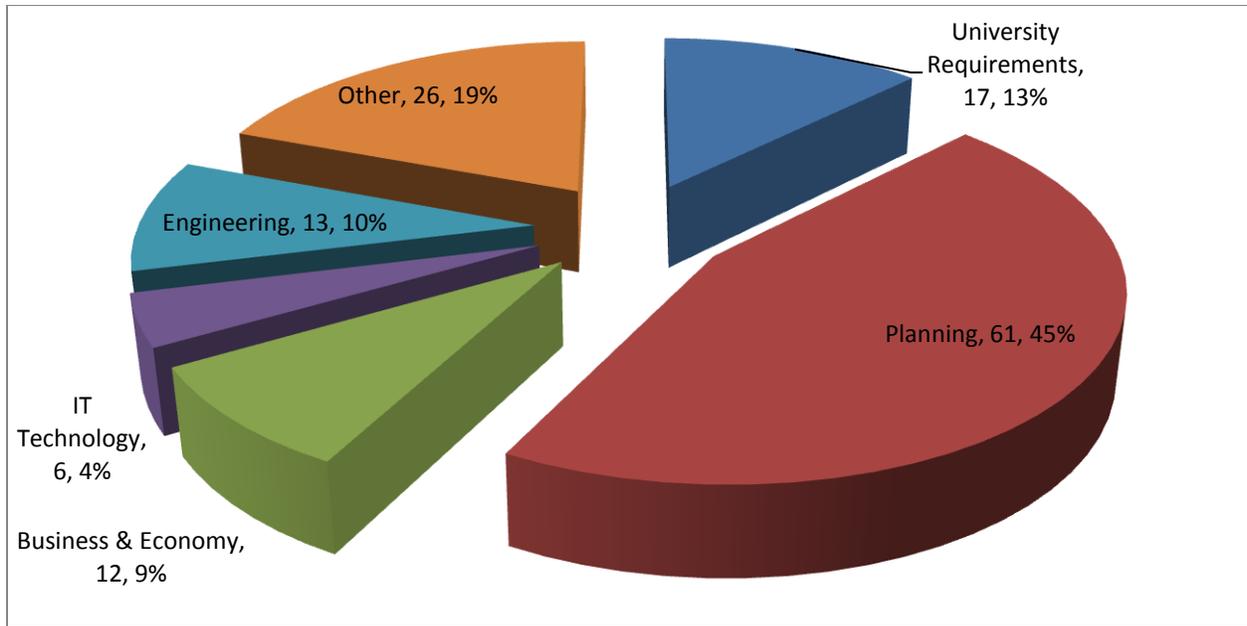


Figure 4. Distribution of Courses in Development Planning Bachelor Program (Data source: <http://www.ucas.edu.ps/departments/DevPlan/>)

Building Technology Engineering Program

With the ever-increasing complexities of modern building technology, the need for innovative and specialized building engineering programs has also expanded. Furthermore, the need for work-ready engineers, i.e. from classroom to construction sites, has also promoted development of highly-specialized building engineering programs. As such, many academic institutions worldwide have introduced building engineering at the undergraduate level to address challenging demands and market professional needs, particularly in the rapidly changing building construction world.

UCAS's Building Technology Engineering Program is an interdisciplinary program that integrates pertinent knowledge from different disciplines [7] as follows:

- Structural, architecture, electrical, and mechanical design principles of building, and general engineering knowledge and skills,
- Building technology including construction technology and methods, materials, and building details, and
- Management and economics for project planning and scheduling.

Building Technology Engineering is a hybrid academic program in which building-related knowledge from civil engineering, architecture, electrical engineering, and mechanical engineering are integrated into this emerging field of study. The program will focus on teaching and training students how to design most of the aspects (architectural, civil, electrical, and mechanical) of residential and commercial buildings with minimal coverage of designing other structures and infrastructure systems. Graduates of the program will possess a highly desirable skill set that make them employable in one of the largest industrial sector in Palestine, i.e. building construction. Employment opportunities for graduates of the program encompass wide-ranging involvement in the building and construction industry, including consulting engineer, site engineer, project manager, construction manager, cost engineer, facility manager, and operation manager, among other careers.

UCAS Building Technology Engineering Bachelor Program curriculum requires students to successfully complete a total of 170 credit hours. Figure 5 shows the distribution of the courses among the different areas of studies, based on the relative weight of their credit hours. As one can see, more than 75 percent of the credit hours in this program are engineering. It is worth mentioning that UCAS has recently received the final accreditation of this program and student admission to this will start in the 2012-2013 academic year.

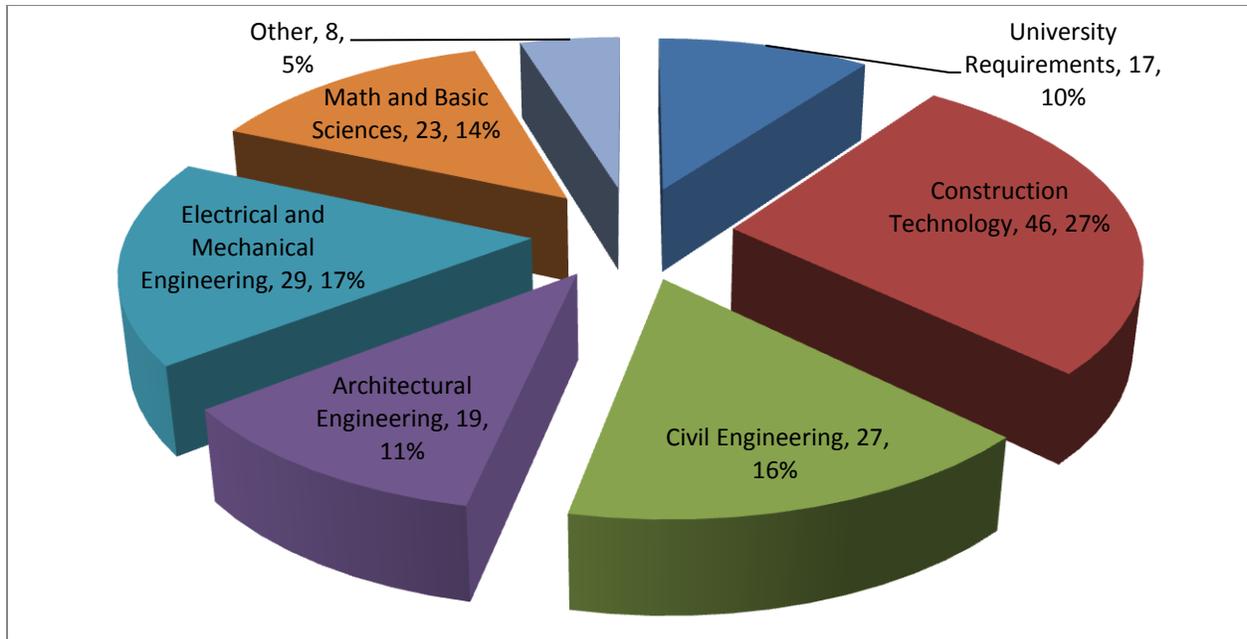


Figure 5. Distribution of Courses in Building Technology Engineering Bachelor Program (Data source: [7])

CONCLUSION

The paper presented details on the curriculum of five newly-developed and accredited bachelor-degree programs at a local university college in Gaza, Palestine in the Middle East. They are: Technology Education, Business with Technology, Geographic Information Systems, Development Planning, and Building Technology. These programs are non-traditional academic programs in the sense that traditional curricula are hybrid with a varying degree of engineering and IT related technology courses. Some of these programs could be viewed as innovative programs (e.g. GIS and Technology Education) while others could be viewed as integrating more IT courses in traditional programs (e.g. Business with Technology). As of Fall semester of 2011-2012, student enrollment in these programs are as follows: 70 students in the Geographic Information Systems Program, 101 students in the Development Planning Program, 107 students in the Technology Education Program, and 300 students in the Business with Technology Program. The Building Technology Program will start to admit students in the 2012-2013 academic year. The first twenty students have already graduated from these programs in 2010-2012. Though these new technology-related academic programs were developed with both local and regional interests, universities worldwide could benefit from this experience.

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