

**A Comparison of the Curriculum of Civil Engineering at the
University of Florida and The University of Engineering &
Technology Lahore, Pakistan**

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Abstract

The objective of this paper is to compare the curriculums and the methodology of teaching of the Civil Engineering (CE) departments of the University of Florida (UF) and the University of Engineering & Technology, Lahore (UET). An overview of the CE courses at both institutions has been presented and reviewed. Each school is among the national leaders in engineering education. The civil engineering department at UET Lahore is one of the oldest departments at the university, and the first in Pakistan. It is not a semester-based system and follows an annual system of education. The University of Florida is among the oldest universities of the United States, and follows a semester system. Despite the different systems of education in the two institutions, both are providing exceptional education in producing top quality engineers. The CE education at UF is focused on providing a broad general education that enhances communication skills, teamwork, and leadership skills. The CE education at UET Lahore emphasizes on the fundamental concepts and principles, which constitutes the basis of civil engineering practice. To foster their creative abilities, the students are assigned projects on design or laboratory investigations for self-directed execution. The classroom and laboratory work is supplemented

with field trips to acquaint students with the civil engineering projects of national importance. The difference in offering courses within the curriculum at both institutions is based on the regional needs of each country. However, the general aim at both institutions is to provide a well-rounded, excellent CE education.

University Of Engineering & Technology Lahore

The University of Engineering & Technology, Lahore (UET), is one of the few pre-partition Institutions in Pakistan which offers Graduate and post graduate degrees in the largest number of Technologies in Pakistan. It started in 1921 as the Mughalpura Technical College, deriving its name from the famous suburb of the old city of Lahore, richly dotted with architectural heritage of the great Mughals including the magnificent Shalimar Gardens. Its more familiar name of the pre-University era, the Maclagan Engineering College, was given to it in 1923 when Sir Edward Maclagan , the then Governor of the Punjab, laid the foundation stone of the building, now called the main block. At that stage the institution offered courses of study in two disciplines, namely, Electrical and Mechanical Engineering. The Year 1932 is a major milestone in the evolution of this institution when it was affiliated with the University of the Punjab for award of a Bachelor's Degree in Engineering. In 1947, at the time of independence of Pakistan, it has a well-established B.Sc. Degree course in Civil, Electrical & Mechanical Engineering, and the quality of its scholastic standards won it a place of prestige throughout the British India. In 1954 it started the first ever Mining Engineering course in Pakistan. Its massive expansion and development commenced in 1961 on its transformation into a University. In sixties according to the needs and requirements of the country, Bachelors degree courses were started in Chemical, Petroleum & Gas, Metallurgical Engineering, Architecture & City and Regional Planning. By 1970's it had established over a score of Master's Degree courses and Ph.D. Degree programs. Due to the increasing number of students in 1970's Engineering College Taxila and Peshawar were formed to accommodate them. Later they were given status of Universities, thus establishing a total of three Engineering Universities, with UET Lahore as the parent University¹.

In 1961 the University had 36 teachers out of whom only 4 had doctoral degrees. Now it has over

300 teachers out of whom more than 100 have doctoral degrees from some of the most reputable Universities of the world. Since the inception of the University, there has been a massive rise in enrollment. From a total enrollment of 447 in 1961, the figure has now gone up to about 5500¹.

Department Of Civil Engineering

The Department of Civil Engineering was established in 1939 as part of the Maclagan Engineering College, Lahore. Currently it has a total enrollment of about more than 1000 students. The Department of Civil Engineering is the oldest in the country and offers a high level of quality courses. The Department of Civil Engineering offers a total of 200 seats every year for Bachelors Degree course¹.

The Department of civil Engineering, one of the best in the region, offers the following courses of studies¹:

- a) Bachelor's Degree in Civil Engineering.
- b) Master's Degree in Civil Engineering with specialization in:
 - 1. Soil Mechanics & Foundation Engineering
 - 2. Structural Engineering and
 - 3. Hydraulics and Irrigation Engineering
- c) Ph.D. Degree in Civil Engineering

The Bachelor's Degree constitutes a total period of 4 Years & Master's Degree is of 2 Years part time study.

CE Curriculum and Teaching Methodology

To foster students' creative abilities, they are assigned independent projects on design construction or laboratory investigations. Many courses include field trips to expose students to practical fieldwork.

The department is equipped with laboratories that meet the course requirements. These

laboratories are: computer, concrete, highway engineering, hydraulics and irrigation engineering, soil mechanics and foundation engineering, strength of materials, surveying and a test floor laboratory.

UET follows an annual based educational system. In other words, a year's program is not divided into semesters but is considered as a whole. The courses taught during one year are comprehensive and enable students to get acquainted to and learn the particular subject.

All courses are compulsory. Students do not have any option to choose, add or drop any course. Although this may seem to be an unreasonable approach, but the courses are divided among the four years such that all aspects of civil engineering are covered. Students have the option to specialize in a particular field of interest in his/her master's degree program.

Depending upon the course length, each subject is awarded a total of 100 or 150 marks. The maximum marks that a student can obtain in one year are 1250. Average of the percentage of the marks obtained by a student in the four years is calculated and a grade on the degree is awarded accordingly.

University Of Florida

The University of Florida (UF) began its roots in 1853 as a private institutional entitled Kingsbury Academy located in Ocala. It was a state-funded Florida Seminary until the Civil War; the seminary was moved to Gainesville. It was originally consolidated with the state's land grant Florida Agricultural College, then in Lake City, to become the University of Florida in 1906. In 1947, the student body numbered 8,177 men and 601 women. Today UF is the ninth largest university in the nation².

The University of Florida is a public, land-grant research university, one of the most all-inclusive in the Southeastern United States. It includes virtually all-academic and professional disciplines. It is the oldest and largest of Florida's ten universities and is a member of the Association of

American Universities (AAU). Its faculty and staff are dedicated to the common pursuit of the university's threefold mission: education, research and service².

Currently the University of Florida has approximately 4,000 distinguished faculty members with outstanding reputations for teaching, research and service. The faculty attracted \$339.4 million in research and training grants in 1999-2000. UF has 54 eminent scholar chairs, positions funded at more than \$1 million each to attract nationally and internationally recognized scholars. A variety of other endowed professorships help attract prominent faculty. More than two-dozen faculties are members of the National Academies of Science and/or Engineering, the Institute of Medicine or a counterpart in another nation. Also, in a national ranking of total Fulbright Awards for 1999-2000, UF ranks 10th among AAU public universities, with eight visiting scholars and six American scholars².

CE Curriculum and Methodology of Teaching

The primary objective of the Civil Engineering Department is to provide students with a curriculum designed to accomplish three primary purposes³:

- To provide a broad general education that enhances communication skills and encourages all-around development of students, both individually and as productive members of society,
- To ensure a thorough preparation in the fundamentals of science and engineering, and
- To provide a foundation to the planning, design, construction, and operation of civil engineering projects.

The department is changing its Civil Engineering curriculum to increase flexibility for undergraduate students so they may specialize in a specific area of their choice. This change was in response to student complaints and the results of a comparative study of curricula at nationally top ranked CE departments⁴.

Students have often complained of uneven exposure to the various areas of CE, with too much emphasis in some areas and not enough in others. Also, in comparison to other top ranked CE departments, it was found that our CE curriculum was the most rigid since it only allowed two

elective courses⁴.

The current curriculum consists of 131 credits made up of 51 credits of math, science and general education courses; 11 credits of engineering fundamentals (statics, dynamics, thermo, and strength); 63 credits of required CE courses; and 6 credits of electives⁴.

The primary change in the new curriculum is the reduction in the number of required CE credits from 63 to 54. This allows an increase in elective credits, from 6 to 15, while maintaining the overall degree requirements at 131 credits⁴.

In making this reduction, the curriculum committee believes it has maintained the body of core material necessary for all CE graduates. The final program was based on the experiences of the committee members and on a study of the material covered in the CE fundamentals examination, which was presumed to be the material deemed essential by the profession⁴.

The curriculum committee felt that specific “track” or “emphasis” areas should be developed giving students with an interest in a particular area of CE and opportunity to study that specialty in greater depth, while avoiding the situation of students picking random, unrelated courses. For those students with no particular area of interest, a broad track, essentially equivalent to the current curriculum, would be available⁴.

Six tracks have been proposed: Construction, Geotech, Hydrology/Water Resources, Structures, Transportation and the broad CE track. More tracks may be added later, perhaps in Geomatics, Geo-sensing, Materials, and Coastal Engineering⁴.

The new curriculum officially comes into effect with the 2003-2004 UF undergraduate catalogue- i.e., starting fall semester 2003. If a student is graduating Fall 2002, Spring 2003 or Summer 2003, he/she will essentially be unaffected⁴.

A student entering the CE department as a freshman or transfer in Fall 2003 will automatically be

on the new curriculum. Everyone else will have the option of either remaining on the old curriculum or switching to the new⁴.

The new curriculum change received overwhelming approval by the department faculty, and by students at a recent Student Chapter meeting of ASCE. The department looks forward to producing diverse undergraduate professional equipped with a more focus and rich educational experience⁴.

Conclusions

Both universities are ranked among the top in their respective countries. Courses are designed to cater to the specific needs of the respective country and region.

The methodology of teaching differs, as UET follows an annual system of education whereas UF follows a semester system. The semester-based system is being effectively employed in top ranked universities around the world. UET is also committed to change to the semester-based system. This change will result in graduating better quality engineers. UET should also change its curriculum to enable students to choose courses of their interest.

UF offers courses on campus as well as through distance learning. Whereas, UET currently does not offer any online or TV based courses. UET must develop distance learning technology to offer off-campus courses to remote areas of Pakistan. The facilities and resources available to the two institutions differ immensely. Pakistan is still a developing country and is far behind in technological advancement than the United States.

References

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Biographical Information

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