



## **Collaboration of Afghan and American Universities in a New Architectural Engineering Program at Herat University, Afghanistan**

**Miss Homaira Fayez, Herat Engineering University**

My name is Homaira Fayez. I am currently instructor at Herat University Engineering Faculty in Architecture Department. I have received my masters degree from University of Hartford.

**Dr. M. S. Keshawarz, University of Hartford**

Dr. Keshawarz is Professor and Chair of the Civil, Environmental, and Biomedical Engineering at the University. He has led the collaboration efforts between Herat University and the University of Hartford assisted by his colleges at both universities.

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### ABSTRACT

Herat architecture in Western Afghanistan has seen better days through its history than what is being practiced now. Its civil infrastructure during the Timurid Dynasty 500 years ago was structurally sound and aesthetically more pleasing as we see them in the splendid remnants of that era. The war of occupation by the Russians and the ensued civil war damaged or destroyed whatever was left of an architectural style peculiar to Herat. Migration to the neighboring countries during the war years has brought a hodgepodge of architectural styles from the neighboring countries which do not flow with its environment. One can see examples of Roman Architecture, Iranian Architecture, Pakistani Style building, and there are some which is hard to tell what architectural style has been followed.

Through a concerted effort, Herat University in collaboration with the University of Hartford and funding from the World Bank, USAID, and US Army Corps of Engineers, established the Department of Architecture that would be offering an architectural engineering program at Herat University in 2010. One of the goals was to educate architectural engineering professionals who would reintroduce unique aspects of Herat architecture into the modern styles of building design, not only in Herat, but throughout Afghanistan. As a result of this collaboration, an architectural engineering program has been established at Herat University, its curriculum has been designed, faculty has been trained, equipment has been furnished, and the first batch of graduates from this program graduated in January 2014.

Unlike other programs in the Faculty of Engineering at Herat University where students are absorbed based on the capacity of that program, almost all architectural engineering students are admitted based on their own choices. The program is very popular with female students with an overall female student population of 30 percent distributed throughout the three years as 24 percent sophomore, 67 percent juniors, and 33 percent senior. The Department Head and one of the professors are women who received their master's degree from the University of Hartford. It is believed that having female professors who would be looked at as role models will have a strong effect in attracting such a large percentage of females to the program.

This paper will outline in more detail the collaboration between the Herat University and the University of Hartford in establishing the architectural engineering program, its curriculum, student body, equipment, and lessons learned from the collaboration.

## INTRODUCTION

Herat, a city in western Afghanistan, represents one of the world's most spectacular medieval Islamic Architecture. It is situated just north of and in the fertile valley of Hari Rud (River).

Five hundred years ago, though there were no civil infrastructure such as electricity, water supply system, and highways in this ancient city, yet Heratis (people of Herat) were living in a much better condition and were more satisfied with their lives than they are now. We are referring to the era of the Timurids Dynasty in Herat. That part of Herat's history can be summed



Figure 1: Gohar Shad Begum's Mausoleum

as the best period in Herat's history. In fact, whatever is left as the magnificence and glory of Herat is the inheritance of that period. An example of Timurid era architecture is reflected in Figure 1.

The war of occupation by the Russians and the ensued civil war damaged and/or destroyed whatever was left of an architectural style peculiar to Herat. Migrations to the neighboring countries during the war years have brought a hodgepodge of architectural styles from the neighboring countries which do not flow with its environment. One can see examples of Roman Architecture, Iranian Architecture, Pakistani Style building, and there are some which is hard to tell what architectural style has been followed.

It is obvious that the main reason for the unregulated architectural style influence from the neighboring countries is the lack of trained indigenous architects in Afghanistan, especially in Herat, and thus the Architecture Department was created in Herat University through joint efforts between the University of Hartford and

Herat University in 2010. The current program that is being offered in the Architecture Department is an architectural engineering program, rather than a pure architecture program.

## BACKGROUND OF THE HERAT/HARTFORD COLLABORATION

Engineering education as a formal pursuit began in Afghanistan with the establishment of the Faculty of Engineering at Kabul University in 1956. That program flourished for over two decades in partnership with various foreign universities and government agencies. In 1984, five years after the Soviet invasion, professors were dispersed. Many were killed, some left the country and a number of these faculty members established an engineering program in Peshawar,

Pakistan, which was later in 1995 transferred to Herat in Western Afghanistan. The program was officially incorporated as part of HU in 2002.

Since its transplant in Herat in 1995, the Faculty of Engineering at Herat University has offered civil engineering as its only engineering program until the establishment of Architecture and Mechatronics Departments in 2010.

### **STRENGTHENING ENGINEERING EDUCATION AT HERAT UNIVERSITY**

Collaboration with foreign universities, under the framework of the Strengthening Higher Education Program (SHEP), was formed by the Ministry of Higher Education, Islamic Republic of Afghanistan, and was funded by the World Bank. As a result, the partnership between the University of Hartford (UH) in West Hartford, Connecticut, USA, and Herat University (HU) in Herat City, Afghanistan was initiated in August 2007 to develop and implement a modern program to strengthen and modernize engineering education at HU.

The goal of modernizing engineering education at Herat was achieved through a two-phase effort.

- Phase I, focused on developing the professional capacity of junior and senior faculty and upgrading the existing program and curriculum.
- Phase II, concentrated on establishing two new bachelor's degree programs: Architectural Engineering and Mechatronics.

These activities, not mutually exclusive, were pursued concurrently.

Under the partnership, junior HU faculty members, who had only a bachelor's degree, applied to enroll in the master's degree program at the UH and worked toward obtaining their master's degrees. Earning this graduate degree will enable Herat faculty to be better teachers as well as be better prepared to implement curriculum revisions. More qualified faculty will also attract better students and will provide the groundwork to expand curriculum to other engineering majors. Two of these junior HU faculty members were trained in the field of Architectural Engineering.

### **ARCHITECTURAL EDUCATION AT HERAT UNIVERSITY**

The architectural engineering program was established in 2010 with the return of two faculty members from Hartford with a ready to implement curriculum, and a brand new studio with equipment. With the admission of 35 new students at the beginning of 2011 the Architecture Department commenced its well organized architectural engineering program. Another 32 students were admitted in 2012, followed by 30 students in 2013. The first batch graduated in January 2014. A picture of graduates is shown in Figure 2.

## **Curriculum**

The curriculum for the Architectural Engineering major is presented Table 1. The first year is common for all majors and they will branch out at the end of the first year. They will take a typical architectural engineering course series consisting of science, engineering, studio design, and history. Efforts have been made to incorporate indigenous architecture style in the design studio course and the history course.



Figure 2: First Batch of Graduates

The curriculum of contains 147 credits spread over eight semesters, including:

- Seventy nine credits in architecture,
- Fifty nine credits common with civil engineering and
- Nine credits university wide general education requirements.

Using the University of Hartford syllabi as a guide, the faculty prepared their own syllabi in accordance with the Academic Regulations and Requirements of the Ministry of Higher Education, Government of Islamic Republic of Afghanistan.

## **Faculty**

Initially, faculty consisted of the two faculty members from Herat University who received their masters' degrees from Hartford and took the responsibility of running the program. As time went by, more faculty resources were added and currently strength of the faculty is five instructors, all with masters' degree.

Table 1: Architectural Engineering Program at Herat University

**FIRST SEMESTER**

IS 101	Islamic Studies	1
M 144	Calculus I	4
ES 220	Technical Drawing I	3
ES 141	Intro to Engineering	4
ENG 110	English I	4
HIS 110	History of Afghanistan	1
	Total:	17

**THIRD SEMESTER**

IS 201	Islamic Studies	1
	History Of Architecture I	4
M 240	Calculus III (Calculus of several Variables)	4
PHY 113	Physics II	4
ENG 112	English III	3
ES 110	Engineering Mech. I (Statics)	3
	Total:	19

**FIFTH SEMESTER**

IS 301	Islamic Studies	1
	Architectural Design II	4
CE 310	Structural Analysis	4
	Mechanical, Electrical Plumb System	4
	Technical Elective	3
CE 350	Surveying I	3
	Total:	19

**SEVENTH SEMESTER**

IS 401	Islamic Studies	1
CE 410	Concrete II	4
	Technical Electives	3
	Architectural Design IV	4
	Technical Elective	3
	Urban Planning II	3
	Total:	18

**SEECOND SEMESTER**

IS 102	Islamic Studies	1
M 145	Calculus II	4
ES 115	Computer Programming	3
PHY 112	Physics I	4
ENG 111	English II	3
ES 222	Technical Drawing II	3
	Total:	18

**FOURTH SEMESTER**

IS 202	Islamic Studies	1
	Architectural Design I	4
M 242	Differential Equations	3
	History of Architecture II	3
	Arch. Rendering/Models/Sketching	4
ES 212	Strength of Materials	4
	Total:	19

**SIXTH SEMESTER**

IS 302	Islamic Studies	1
	Architectural Design III	4
CE 310	Concrete I	4
	Urban Planning I	3
CE 312	Steel Design	3
	Landscape	3
	Total:	18

**EIGHTH SEMESTER**

IS 402	Islamic Studies	1
	Architectural Design V	4
	Non Technical Elective	3
	Construction Documents	4
	Technical Elective	3
	Arch. Design Project	4
	Total:	19

## **Materials and Equipment**

Architectural engineering program of Herat Engineering Faculty received assistance from many different organizations including:

- Scholarships funded by the World Bank and USAID through the University of Hartford.
- Drafting equipment for 120 students were funded by USAID through the University of Hartford and shipped with assistance from the US Army Corps of Engineers.
- A PC Lab funded by USAID with 28 desktops and tables.
- Studio drafting tables by USAID for 120 students.
- Textbooks and reference books (200), two plotter, projectors, A3-printers, 54-in flat screen TV, and drafting boards.

Assistance provided by different organizations were the main drivinfg force and motivation in the successful establishment of the program.

## **Teaching Style**

Instructors in the in the Department try to deliver lecture those most professional way possible. Lectures, laboratories, studios, and site visits follows strict guidelines and everyone from instructors to students all act responsibly according to the criteria set by the Department.

Lectures are supplemented by power point presentation and PC Lab with sufficient software to help student and faculty to carry out their assignments.

Teaching styles learned in different countries are emulated at Heart. As an example participatory teaching where there is two way interactions between faculty and students, as opposed to a one way lecture type, has improved communication between faculty and student and proved to be more conducive to the learning process.

## **Student Body**

The program is very popular with female students with an overall female student population of 30 percent distributed throughout the three years as 24 percent sophomore, 67 percent juniors, and 33 percent senior. The Department Head and one of the professors are women who received their masters' degrees from the University of Hartford. It is believed that having female professors who would be looked at as role models will have a strong effect in attracting such a large percentage of females to the program. Table 2 reflects the spread men and women student from sophomore to senior levels.

Table 2. Spread of female and male students through different levels

Year	No. of students	Female	Male
Senior	35	8	27
Junior	32	14	20
Sophomore	30	8	22

## **Graduations**

The architectural engineering program has had its first graduation ceremony in January 2014, a first in Herat. The society will welcome the fresh and young architectural engineers and counts toward their contributions to the architect of Herat. As the time passes they will observe the effects of a re-born architecture in the environment. These are child steps towards the rebuilding of the infrastructure and architecture style of the area, preventing the authentic style of architecture from being plundered more than what the city has experienced so far. Architecture style of the city during the Timorid Dynasty was outstanding in the country and in the region and there is hope that these graduates will introduce a semblance of the architecture in Herat City and to the entire Afghanistan..

## **Future**

Three years ago, this department was none, but a few lines on a sheet of paper. Decisions were made, assistance were delivered by our friends which undoubtedly had a big role in the formation and growth of this department .

If the department moves forward with the same pace as it has moved so far, it will respond to the need of the city and help push the City of Herat to its deserved position. Of course we will continue to be needing support from our friends at home and abroad. Our work will continue in acquiring books for the library, review curriculum and increase its coverage of traditional Islamic Architecture, and seek opportunities for our instructors to pursue higher education at Ph.D. level.

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