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**Ancient Egypt: A blend of engineering/architecture and history/culture****Dr. Ashraf Ghaly P.E., Union College**

Ashraf Ghaly is Director of Engineering and Carl B. Jansen Professor of Engineering at Union College, Schenectady, NY. Published over 250 papers, technical notes, and reports. Supervised over 50 research studies. Registered PE in NYS. ASCE Fellow and Member of the Chi-Epsilon Civil Engineering Honor Society.

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## **1. Introduction**

Union College, Schenectady, New York was founded in 1795 and the first of its engineering department was established in 1845. In its mission statement, Union College “considers its commitment to study abroad to be a central part of its identity. In addition to broadening perspective and deepening knowledge, study abroad often energizes and challenges students so that they are motivated to a higher level of commitment to the enterprise of learning”. The college also emphasizes the importance of the international experience for engineering students since engineering has become a global profession. Graduates will likely work as part of an international team in a global company, an organization with international clients, or they may be dispatched to international locations to negotiate or oversee work. Thus it is critically important that students “understand the nuances of other cultures, and the proper way to communicate.” Students are “expected to meet the linguistic and cultural competency requirements of the core components curriculum by participating in some type of international experience.” Union College proudly advertises that over sixty percent of its students participate in at least one of its many international programs. A miniterm abroad, such as the Egypt miniterm presented in this paper, is one of the possible venues for engineering and non-engineering students to fulfill their curricular requirements.

## **2. Development**

The country where a full term or a miniterm abroad is held is chosen carefully. Faculty involved in the development of a term or miniterm abroad always searches for destinations rich with history and culture. A few of these courses are concerned with engineering and architectural subjects. Fewer, if any, are interested in exploring the intersection between engineering and the humanities. The present three weeks miniterm was developed specifically to introduce the students to the close relationship between the engineering and humanistic aspects as manifested by ancient and modern Egyptian civilization. Egypt was selected as a destination for this miniterm because it has one of the oldest civilizations of the world. Its history is rich with events and its land still hides a lot of mystery. With the Mediterranean Sea to the north and the Red Sea to the east, Egypt enjoys a strategic location on the map of the world. This made it always desired by empires looking to widen their reach. In its entire history, Egypt has been under occupation by many foreign powers but this had little or no effect on its identity or culture, and had, on the contrary, impacted the foreign forces by Egyptian culture.

Many of the monuments and temples constructed thousands of years ago are still standing in good shape. A survey of archeological sites reveals an impressive inventory of Pharaonic, Greek, Roman, Jewish, Christian, and Islamic monuments with magnificent features reflecting the traces of these cultures. Furthermore, the Great Pyramid of Giza, the only remaining wonder of the seven wonders of the ancient world is still standing in Egypt in good shape after thousands of years of being exposed to the elements. Egypt has also a remarkable array of modern wonders including the largest earth dam in the world, the Suez Canal that connects the Mediterranean and Red Seas, subways, roads, bridges, tunnels, and huge energy generation facilities, water storage, massive irrigation, and giant land reclamation projects. Faced with an explosion of population increase, the effort of upgrading existing infrastructure and constructing a new one for the many new cities presently under construction is unparalleled. Furthermore, for its beautiful nature, mild



weather, endless sand beaches, and rich history, Egypt is a major tourist attraction with countless hotels and resorts that cater to every taste and budget.

The goals of this miniterm were to introduce the students to as many as time allows of the major features of ancient and modern Egyptian civilization and to personalize this experience. The program that was developed emphasized visits to places of significant historical importance, in addition to their extraordinary engineering and architectural features. There is no shortage of such places in Egypt. The banks of the River Nile, for instance, are dotted with numerous temples and monuments. Each of these structures is a masterpiece of architecture and a marvel of engineering. No one to this day knows for sure how these tremendous feats of engineering were accomplished in such perfection and without the benefits of modern machinery and surveying instruments. The mystery surrounding how these structures were built adds to the fascination that visitors display when they see these monuments.

### **3. Implementation**

The Egypt miniterm was designed for students from any background or major. It required no pre-requisite and had no restrictions on those who wish to apply. One of the major goals of this miniterm was to illustrate the closely-knit relationship between engineering/architecture and history/culture. The exploration of this relationship helps both engineering and non-engineering students appreciate the contribution various disciplines make in building societies. The variety of the visited monuments and places made it possible for students to have a wide spectrum of possibilities to select a project of interest for their term paper which was one of the requirements of the students taking this course. Since the topics selected by students were required to have cultural as well as engineering features, many of the visited ancient and modern places incorporated the stated criteria. The following are examples of some of the subjects selected by students. From Ancient Egypt, the Pyramids, for example, qualified as a topic for a term paper since they were built based on the cultural belief in the re-incarnation, and the structures themselves, physically, constitute an engineering miracle at the time they were constructed. As a modern Egypt project, the High Aswan Dam, for instance, would meet the required criteria because of its giant engineering scope and its many other positive impacts including flood prevention, power generation, availability of water for year-round irrigation, safe navigation, preservation of communities near the Nile banks, and creation of new industries that rely on hydropower, which impacted the standard of living and changed the fabric of the Egyptian society. In addition to its many positive impacts, the High Aswan Dam had its negative side effects. These side effects, in and of themselves, qualify as a possible subject for a term paper a student can write on the environmental effects of the dam and its impact on the eco system in the area where it is constructed in addition to the displacement and resettlement of people caused by the formation of Lake Nasser in the upstream side of the dam.

### **4. History of Ancient Egypt**

The following are the major eras in ancient Egyptian history [1]. These periods are significant because all visited monuments, temples, and note-worthy attractions are associated with one or more of the periods shown below [2].

- Pre-Dynastic History.
- The Early Dynastic or Archaic Period (3100-2686 BC).
- The Old Kingdom (2686-2181 BC).
- The First Intermediate Period (2181-2050 BC).
- The Middle Kingdom (2050-1786 BC).

- The New Kingdom (1567-1085 BC).
- The Nineteenth Dynasty (1320-1200 BC).
- The Late Period (1085-322 BC).
- Greek Rule (332-30 BC).
- Roman and Byzantine Rule (30 BC-638 AD).

Students participating in this course were required to keep a journal of the daily visits to places and the history associated with them as explained by the group's Egyptologist. In addition to the journal, students were required to write a term paper on a subject of their interest that has direct relationship with one or more of the visited places. In selecting the subject of their term paper, students needed to develop a comprehension of the history and background associated with various structures and events.

### **5. Orientation**

Before departure to Egypt, orientation sessions were held to familiarize the students with Egypt as a country and the places to be visited during the miniterm. These orientation sessions were designed to introduce the history and culture of Egypt and their resilience in the face of invading foreign forces that occupied the country for lengthy periods throughout its history. Maps, illustrations, and videos of The National Geographic Society and the History Channel were used as aids to make orientation sessions enjoyable and informative. Students were often overwhelmed by the amount of information due to Egypt's long history and the abundance of places of historical significance. Students were also fascinated by Egypt's modern history and its culture today. They asked many questions about Egyptian people, social customs, political inclination, religion, popular sports, economic situation, relationship with its neighbors, relationship with the United States, etc. Students were given answers to their questions but were also encouraged to read more and get information from other sources, such as the Internet, to ensure that the information they attained came from a variety of sources and is not tainted by bias. Orientation sessions also heightened the already high interest of students in the country and made them even more eager to visit the places that they always dreamed of visiting. It was evident that the students that participated in this miniterm developed an early interest in visiting Egypt when they studied history at grade school. Many of the aspects of ancient Egyptian rituals, such as mummification for example, fascinated and intrigued them and added to their interest in learning more about the country and its history. Another aspect that sparked these students' interest in Egypt was the religious aspect as Egypt is mentioned in the three holy books of the Abrahamic religions. This interest reached its peak as students physically visited and saw several of the places mentioned in religious holy books. Students felt as if they became part of history.

### **6. Site visits**

The Egypt miniterm was designed to be three weeks long during which all major temples, monuments, historic places, and note-worthy attractions were visited. This was possible with good pre-visit planning and dedicated transportation means. Although the program was packed with activities, the geography of Egypt and the concentration of almost all major attractions in the vicinity of and within the valley of the River Nile (Figure 1) allowed the miniterm participants to achieve their goal. Egypt covers an area of approximately one million square kilometers in northeastern Africa, with the Mediterranean Sea forming its northern coastline and the Red Sea forming its eastern coastline. Libya shares its western border and Sudan its southern border.

Egypt is overwhelmingly a desert country bisected by the River Nile (Figure 1). Over 90% of the land area is formed by a convergence of deserts -- the Libyan Desert to the west, the Sahara and Nubian Deserts to the south and the Arabian Desert to the east. There are oases scattered across this wasteland and a swathe of land along the Suez Canal which is cultivated, but it is mainly the land fed by the River Nile -- the Nile valley and the Nile Delta -- that is both habitable and arable. The Sinai Peninsula is formed of sand desert and spectacular mountains rising as high as 2637 meters above Red Sea level. The beaches, marine life, and coral reefs in this area are beyond imagination.

More than any other feature, the River Nile characterizes Egypt. It emanates from Ethiopia and Sudan in the south, flowing north through the country for 1545 km, emptying into the Mediterranean Sea and all along its course provides Egypt and its people with life and sustenance. Throughout history the Nile Valley has been defined as two distinct regions -- Upper Egypt which extends south of Cairo to the Sudanese border, and Lower Egypt, which encompasses the Nile Delta, which begins north of Cairo. The major places visited in each city are listed below and selected photos are shown in Figure 2.

- Giza: Giza Pyramids (Figure 2A), Valley Temple and The Great Sphinx.
- Memphis/Sakkara: Alabaster Sphinx, Step Pyramid (Figure 2B).
- Cairo: The Citadel (Figure 2C), Alabaster Mosque, Hanging Church (Figure 2D), Ben Ezra Synagogue, Egyptian Museum (Figure 2E), Cairo: Khan El-Khalili Bazaar.
- Aswan: High Dam, Temple of Isis/Philae Island (Figure 2F), Unfinished Obelisk, Elephantine Island, Botanical Gardens, Kitchener Island.
- Abu Simbel: Temple of Ramses (Figure 2G), Queen Nefertari Temple, Nubia.

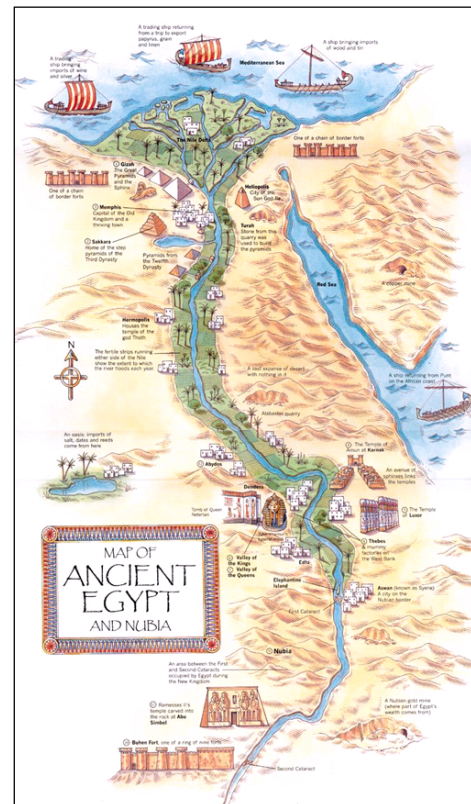


Figure 1: Ancient Egypt, River Nile Valley, Mediterranean Sea, and the Red Sea.

- Kom Ombo: Kom Ombo Temple (Figure 2H).
- Edfu: Temple of Sobek and Haroeris, Edfu Temple (Figure 2I), Esna Lock.
- Luxor: Valley of the Kings, Temple of Hatshepsut (Figure 2J), Colossi of Memnon, Luxor Temple (Figure 2K), Karnak Temple (Figure 2L), Temple of Amon.
- Dendara - Abydos: Temple of Abydos (Figure 2M), Temple of Dendara (Figure 2N), Temple of Hathor.
- Red Sea: Hurghada, Sharm El-Sheikh.
- St. Catherine: Mount Sinai, Monastery of Saint Catherine (Figure 2O), Burning Bush, Moses Springs, Open Air Military Museum.
- Alexandria: Montazah Gardens/Palace (Figure 2P), Roman Amphitheater (Figure 2Q), Greek and Roman Catacombs, Pompeii's Pillar, Library of Alexandria (Figure 2R), Seaside Citadel.





Figure 2A: Giza Pyramids.



Figure 2B: Step Pyramid



Figure 2C: The Citadel.



Figure 2D: Hanging Church.



Figure 2E: Egyptian Museum.



Figure 2F: Temple of Isis/Philae Island.



Figure 2G: Temple of Ramses.



Figure 2H: Kom Ombo Temple.





Figure 2I: Edfu Temple.



Figure 2J: Temple of Hatshipsut.



Figure 2K: Luxor Temple.



Figure 2L: Karnak Temple.



Figure 2M: Temple of Abydos.



Figure 2N: Temple of Dendara.



Figure 2O: Monastery of Saint Catherine.



Figure 2P: Montazah Gardens/Palace.



Figure 2Q: Roman Amphitheater.



Figure 2R: Library of Alexandria.

## 7. Student Term Paper

The subjects selected for term paper revealed students' fascination with ancient Egyptian monuments. Almost 60% of the papers were on Pharaonic temples and monuments [3], 20% on contemporary religious monuments, and 20% on modern engineering marvels and their environmental impact on their surroundings. Each paper addressed both engineering and historical aspects of the studied structure. In addition to reliance on electronic sources and textbooks, the papers also reported students' observations as witnessed on site at the time of the visit. They also documented many of the observations through photos. The presentations made during the visit by a specialized Egyptologist tour guide served the students well and provided an on-the-spot opportunity to ask questions and get answers about places and events.

## 8. Course Assessment

Several components were used in the assessment of this miniterm. These were class participation in the pre-departure and post-return sessions, participation and involvement during the trip itself, written term paper and journal, and oral presentation of the paper. The grading of the paper placed equal emphasis on the accuracy of historical and engineering information, correctness of writing including grammar and spelling, presentation of data, and supplementing materials such as photos, graphs, charts, tables, etc.

Students that wanted to go on this miniterm abroad were naturally excited. This excitement was even heightened with everyday spent in touring various places. The variety of activities, coupled with mild and sunny weather, added to the experience. With all these positive factors, the majority of the students were able to achieve excellent grades.

## 9. Student Evaluation

The final requirement in this miniterm was for the students to fill out a course evaluation administered by the college. The following multiple answer questions were asked and the results were compiled and shared with the course instructor.

- What was the overall quality of the program?
- How well was the program run?
- What was the overall quality of the living arrangements?
- What was the overall quality of the group excursions (if any)?
- To what extent did orientation sessions help prepare you for the program?
- To what extent did the program contribute to your understanding of the host culture/s, of your own culture/s, and of cultural differences in a global world?
- To what extent did the program contribute to your language proficiency (if applicable)?
- How did the academic rigor of the program compare to the academic rigor of a term of study at Union College?

In addition to the above multiple answer questions, the evaluation form included two open ended questions where students were asked to share any thoughts or add any comments about their international experience. It was extremely gratifying to read students' positive comments and see how their international experience impacted their views of the world. Some of these students went as far as saying they felt they would never be the same person again as they gained a new perspective on many new things in life. Several students expressed their wish to visit Egypt again. It is worth noting that some of the students that participated in this miniterm many years ago are still in touch with the instructor where they usually refer to their experience in Egypt as eye opening and helpful in dealing with people from other backgrounds and cultures. This feedback affirms the importance of stressing such an international experience as a component in the education that students receive.

### **10. Logistics**

With a tight schedule packed with activities, the decision was made to arrange and plan everything prior to the group's departure. This guaranteed that all proper reservations and necessary permits would be on hand when needed. With the tremendous popularity of the places visited, to avoid long waits and possible disappointments, it is believed that proper pre-planning was behind the enjoyment and smooth sailing the group encountered in Egypt. It is also worth noting that group reservations for flights, hotels, transportation, and entry fees can save a considerable amount of money.

### **11. General Remarks**

An important aspect of this trip was giving students free time to interact and deal with the Egyptian people through conversations, buying of souvenirs, choosing a type of food for a meal, planning for an excursion, and many of the daily activity that one routinely does. Language was not a barrier as many Egyptians know enough English to communicate and do simple business transactions. This was not a problem at all and there was always someone who was willing to help with communication if needed. Another important aspect of this three-week miniterm is to give students some time off to relax from an exhausting daily routine of extensive visits to temples and monuments. Of the three-week long miniterm, students were given six days of relaxation time at two Red Sea resorts where they enjoyed beautiful beach activities and bright sun. The relaxation time was actually about 5 days due to the time it takes in transportation.

### **12. Bibliography**

- [1] Malek, Jaromir, "EGYPT: Ancient Culture, Modern Land", *Cradles of Civilization*, University of Oklahoma Press, 1993, pp. 1-192.
- [2] Reeves, Nicholas, "The Great Discoveries: a Year-by-Year Chronicle", *Ancient Egypt*, Thames & Hudson, NY, 2000, pp. 1-255.
- [3] Schulz, Regine and Seidel, Matthias, "Egypt: The World of Pharaohs", Konemann, 1998, pp. 1-532.