International Partnerships in Engineering Education: American and African Perspectives

J. Antonio and S. Moaveni

Department of Mechanical Engineering
Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
jerome.antonio@mnsu.edu

Department of Mechanical and Civil Engineering
Minnesota State University
saeed.moaveni@mnsu.edu

Abstract

Universities the world over are increasingly moving to establish international partnerships in their education and research programs. This growing trend is fuelled by many factors including the need to give their students the education they require to function in an increasingly globalized world. In this paper, the two authors share their experiences gained in serving as key participants in activities carried out under a collaboration project between Minnesota State University in the United States of America and Kwame Nkrumah University of Science and Technology in Ghana, West Africa. The first author was educated both in Ghana and in the United Kingdom, while the second author was educated in the American system. Both are mechanical engineering professors and have spent time in each other's university. The purpose of this paper is to present the experiences of the two professors from their two different perspectives in the belief that this would help their colleagues in the academic community in their efforts to establish viable international collaboration programs. The perspectives will focus on the difference and commonality of issues such as student admission, advising and assessment of students' work, faculty load, student-faculty interaction, curriculum content, resources and facilities.

Introduction

Universities and institutions of higher learning, by the very nature of their work, maintain a certain level of interaction with their counterparts in various parts of the world. These interactions have traditionally taken a variety of forms such as attendance at international conferences and meetings, visits to institutions abroad to serve as external examiners, and spending sabbatical leave in institutions abroad. With increasing globalization of the world, many institutions have come to realize the need to take more deliberate steps to promote international collaboration with their counterparts beyond the levels that they are traditionally used to. Over the last decade, many universities in the United States have set up mechanisms to support this increased level of interaction. It is now very common for universities to conclude written agreements and memoranda of understanding with institutions abroad and

to set up offices for international programs to facilitate their international cooperation activities.

The increased premium on international cooperation has led to the establishment of programs to promote activities such as international collaborative research, exchange of students and hosting of faculty members and guest lecturers from abroad. However, because of the novelty of some of the new partnership arrangements, there is a dearth of experiences to guide the actual execution of the activities envisaged under the cooperation programs. This is especially so in the case of partnerships between universities in the United States and their counterparts in sub-Saharan Africa. In this paper, two professors share their experiences in participating in activities under a cooperation agreement concluded in 2006 between their respective universities, namely Kwame Nkrumah University of Science and Technology in Ghana, West Africa, and Minnesota State University, Mankato, USA.

The two institutions and the nature of their collaboration

Kwame Nkrumah University of Science and Technology is the successor to the Kumasi College of Technology which was established by ordinance of the British colonial government in 1951. In 1961, four years after independence, the college was transformed into a fully-fledged university by an Act of Parliament. The university is situated on a seven-square mile campus about four miles from the center of the city of Kumasi, which is some 160 miles by road from Accra, Ghana's capital city. The city of Kumasi is Ghana's second city and the capital of the culturally rich Ashanti heartland and location of what is reputed to be the largest and liveliest open-air market in West Africa.

Ghana's legal system is based on English common law. Business hours are from 8 a.m. – noon, and 1 p.m. – 5 p.m. The currency of the Ghana is called the Cedi. The exchange rate is approximately 1 U.S. dollar to 1 Cedi. The local time is the same as Greenwich Mean Time (GMT). Ghana is located between the 4 and 11.5 north latitude and 1.11 east and 3.11 west longitudes. The land size is 238,537 km^2 (92,100 square miles). Ghana's climate is considered tropical, and typically with temperatures ranging between 21-32 ºC. Its rainy seasons are March through July, and September through October [1, 2].

The University currently has an enrollment of about 24,000 students distributed among 6 colleges, one of which is the College of Engineering with over 3,500 students pursuing programs in Aerospace, Agricultural, Chemical, Civil, Computer, Electrical and Electronic, Geological, Geomatic, Materials, Mechanical, Petroleum, Telecommunications Engineering. The University was set up primarily as an institution dedicated to engineering and the physical sciences; however, over the years programs have developed in the social sciences, business and law. It is one of six state universities, all modeled on the British system. There are also more than ten private universities, but few run any programs in engineering. KNUST remains by far the most important institution for training engineers in Ghana.

The state universities in Ghana rely on two main sources of funds: subvention from Government and the fees paid by students. Government subvention mainly covers staff salaries and little else. Furthermore, because the universities are owned by the state, the fees

that the universities are allowed to charge are kept extremely low for fear of political protest and unrest by students and parents. The result of this situation is a chronic shortage of funds to run the universities, with the attendant quality assurance problems especially for programs in engineering and the sciences that depend heavily on physical resources and facilities. The problem is made worse by the fact that the universities are under pressure to increase their intake to accommodate the increasing number of graduates from the secondary schools.

Minnesota State University, Mankato (MSU) is a comprehensive, public university home to nearly 14,000 students, 500 international students from 62 countries, and 1700 faculty and staff. It offers 160 undergraduate and more than 80 graduate programs of study through six colleges. Each year, MSU hosts the International Pan-African conference and the world's third-largest Science Fair. The campus sits atop 303 acres hill overlooking the Minnesota River Valley. Founded in 1868 as a teachers' school, MSU has grown into a comprehensive university today with an annual budget of over $200 million and 105,000 alumni worldwide. The current annual tuition and fees for undergraduate in-state student is $6,050. The Department of Mechanical and Civil Engineering offers B.S. in Mechanical Engineering, B.S. in Civil Engineering, and M.S. in Engineering. The department has 12 full-time faculty, a number of adjunct faculty, and an enrollment of over 320 students. Minnesota State University is located in the city of Mankato about 80 miles (130 km) south of Minneapolis, in south central Minnesota. The Greater Mankato has a population of nearly 50,000. The name "Minnesota" comes from Dakota Indian words meaning "sky-blue waters." Because of the existence of large number of lakes in Minnesota, the state is known as the "Land of 10,000 Lakes." Minnesota is also the starting point of the Mississippi, one of the world's largest rivers. The Dakota and Ojibwe Native Americans tribes (Indians) lived in Minnesota when the first Europeans arrived. In the late seventeen century, French explorers led an expedition into Minnesota, and were soon followed by fur traders who had come for beaver fur to make hats in Europe. The early settlers in the region were people from the east coast of the United States. By the late nineteen century large numbers of immigrants, particularly Germans and Scandinavians settled in Minnesota [2, 3]. The state of Minnesota is located in upper Midwest section of the United States bordering with Canada. It is located between approximately 43 and 49 degrees latitudes and between approximately 90 and 97 degrees west longitude. The Minnesota time zone offset is -5 hours UTC/GMT. It has a population of approximately 5 million and is extremely cold during winter.

The agreement between the two universities is aimed at promoting long-term collaboration in fields which are compatible with the orientation of each institution and relevant to the interests and needs of their respective countries. The agreement is mainly focused on student exchange, but there are also provisions for faculty and staff visits and exchange. The agreement identifies a number of areas with potential for developing joint initiatives with an international dimension: joint research projects; collaboration for developing projects within specific areas; cultural/commercial missions; internships.

One of the first activities under the collaboration agreement was the visit by the second author to KNUST where he worked with faculty and staff to restore an old subsonic wind tunnel for use by the Aerospace Engineering Program [4]. This was followed by further visits to Ghana by faculty of the Department of Nursing, and visits by faculty and students of the

Department of Urban Planning. Visiting professors from MSU have been assisting with teaching on the Nursing program at KNUST. Medical equipment together with books on nursing have been donated by MSU to KNUST. This paper was written at a time when the first author had just completed a one-semester sabbatical leave at MSU, and a joint project involving the design of solar water heaters by mechanical engineering students at MSU and KNUST was about to begin. This paper is based largely on the collaboration between the Mechanical Engineering programs at the two institutions from the perspectives of the two authors.

Institutional resources for supporting international collaboration

Many institutions in Africa are as enthusiastic about international collaboration as their counterparts in the U.S. However, unlike the U.S., few have established adequate institutional structures to support such collaboration. In Minnesota State University, there is a well-resourced International Centre which provides a wide range of services to exchange students, visiting scholars and others. There is also the office of the Director of International Programs which manages the growing number of programs that the university has with institutions all around the world. By contrast, at KNUST there is only an office of the Dean of International Programs which is not very well resourced. Consequently, most issues relating to arrangements for exchange students and visiting professors are dealt with directly on an *ad hoc* basis by the academic departments concerned. It is important for American Universities in collaboration relationships with institutions in Africa to be aware of the fact that the institutional structures that they take for granted may not exist in their counterpart institutions. Awareness of this may help to avoid unnecessary frustration arising from unrealistic expectations that cannot be met.

Background preparation of students

In Ghana students enter the university at the age of 18 or 19 years after spending one or two years in nursery school or kindergarten, six years in primary school, three years in junior secondary school, and three years (recently increased to four) in senior secondary school. Candidates for admission to programs in engineering must pass courses in elective math, physics and chemistry among other requirements. Invariably, only a small fraction of the candidates who qualify for admission can be admitted. There is very keen competition for places on programs in Engineering.

At MSU, most students enter the university at the age of 18 years. Unlike KNUST, admission to Mechanical or Civil Engineering program at MSU has three layers. First, students must seek admission to the university, which is decided solely by MSU's Admissions Office. Second any MSU student with a minimum GPA of 2.0, who has completed 32 semester hours, including transfer hours, may gain admission to the College of Science, Engineering and Technology and may declare his/her major, including mechanical or civil engineering, by submitting an Application Form. Third, admission to major is necessary before enrolling in 300- and 400-level engineering courses. Admission to the program is granted by the department not the university. Students submit an application for admission to the Mechanical Engineering Program near the end of the sophomore year. Admission to the

program is based on GPA and performance in selected courses. Only students admitted to the program are permitted to enroll in upper-division engineering courses (300 level and above). Before being admitted to the mechanical engineering program, a student must complete a minimum of 51 semester credits in English composition, calculus based physics, chemistry, mathematics up to differential equations, basic engineering courses including computer graphics communication, geometric dimensioning and tolerancing, electrical circuits and lab, and engineering mechanics. For transfer students the distribution of credits specified in the previous statement may vary, but the total credits must satisfy departmental transfer requirements. To be considered for admission, the student must have a cumulative GPA of 2.5 for all science, math, civil, electrical, and mechanical engineering courses. A grade of "C" or better must be achieved in each course. The letter grade system at MSU is A, B, C, D, F, NC, and P. Students' performance while attending MSU is evaluated primary through the courses they take. All courses required for the program, including general education electives and mechanical engineering electives, must be taken for grades except for any internship credits where only P/NC grade is assigned. The course instructor has the sole responsibility in grade assignments. The mechanical, civil, and electrical engineering programs at MSU are ABET accredited and require 128 credit-hours for graduations. During their senior years, students have the option of taking electives in thermal-fluid areas or solid/mechanical systems.

Structure of academic programs

The mechanical engineering program at MSU includes science, mathematics, engineering science, and a sufficient amount of traditional mechanical engineering coursework. The graduates are provided with good foundation upon which to build a professional or a graduate specialization. Professional ethics and professionalism are emphasized during the student's academic career.

The course content of the Mechanical Engineering program at MSU is very similar to that at KNUST. The differences in the programs lie in the way in which each program is packaged. For example, at MSU freshmen and sophomores take courses in Statics and Dynamics, whereas at KNUST students take Basic Mechanics (which is an introductory course comprising of topics in both statics and dynamics) followed by courses in Theory of Machines. The philosophy of the program at KNUST is that, as much as possible, most of essential courses must be completed by the end of the third year. Therefore, only non-technical electives are allowed in the first three years. Technical electives are available mostly in the final years of the program. In Ghana because very few courses run more than once a year and there are no summer courses, students have very little choice as to when to take various courses. Students at MSU have much more choice as to what courses they take and when they take them. To further compare the two programs, one must compare the quality of students, faculty, educational objectives, outcomes and assessment, facilities, institutional support and financial resources and professional components. The students and faculty at both programs are highly motivated and hard-working. The major difference between the two universities arises from institutional support and financial resources and the quality of facilities.

Teaching and learning facilities and resources

Because of inadequate funding, as mentioned earlier in this paper, KNUST, like the other state universities in Ghana, is faced with a myriad of resource problems. Many years of inadequate investment in physical infrastructure has resulted in classrooms and laboratories that are far too small to accommodate the ever-increasing student population. The number of laboratory workstations is often inadequate, requiring that students work in groups that are too large for effective teaching and learning. These problems are further compounded by the difficulty of attracting professors to teach in the universities because of poor salaries and conditions of service. Consequently, class sizes are very large, with classes of 150-200 students being regarded as normal. The student/professor ratios on many programs are very high, placing a limitation on the amount of contact that students can have with their professors both inside and outside the classroom.

In Ghana, as in many sub-Saharan African countries, access to textbooks is a big problem. Most students are too poor to purchase recommended texts. Therefore, the practice of designating specific textbooks for particular courses is uncommon. Very often, the instructor has to compile materials from several different sources for his/her students. The material may have to be given to students in the forms of 'notes' given in class since the resources for reproducing handouts for students are often absent. The need to prepare notes, tutorial sheets and other course materials can lead to a richer presentation than is possible with reliance on a single course text. However, it can be extremely time-consuming.

Teaching from a course text places different types of demand on an instructor. For example it is very important for the instructor to be thoroughly familiar with the text. From the point of view of a visiting professor from a different educational culture this means that he/she must have access to the course text and associated instructors' manuals several months ahead of time.

In comparison, the strength of the mechanical engineering program at MSU lies in the quality of instruction provided by relatively small class sizes, good engineering laboratory facilities, and the close interaction among faculty, practitioners, and students. The existence of modern laboratory equipment and the continued availability of funds to acquire additional equipment are also positive attributes of the program. The Department of Mechanical and Civil Engineering receives substantial annual funds for new equipment acquisitions, supplies, software, and repair. The mechanical engineering program emphasizes classical, basic engineering education with significant laboratory and design components. The physical quality of a learning environment such as classrooms, laboratory facilities, and equipment are an integral part of any good engineering program. At MSU, all of the classrooms are equipped with state-of-the-art audio/visual projection equipment including video/data projector, digital document camera, VCR, wall mounted speakers, projection screen, and Ethernet connection. The seating arrangements are generally comfortable and ample desktop space is available for writing and having reference materials displayed. All classrooms have either white or black boards. Moreover, the mechanical engineering program at MSU provides a strong hands-on laboratory experience for students to conduct experiments for

classes and other activities such as ASME designs and undergraduate research. The undergraduate labs include an All-Purpose Computing and Advanced Computing Labs, Geometric Dimensioning and Tolerncing Lab, Mechanisms and Mechatronics Lab, Vibration and Control Lab, Wind Tunnel Lab, Thermal-Fluid Lab, and the Structural Testing Lab. In addition the students have access to Senior Design Project Labs to work on their capstone senior design projects. Additional Engineering Projects Laboratory offers students the space and the machines such as CNC Horizontal Milling and Turning Centers, welding equipment, and inspection tools to fabricate parts for their projects. The mechanical engineering students maintain a resource room (~700 sq. ft) which provides mechanical engineering reference materials and study spaces. It also has computers and a scanner.

Students' other commitments

In Ghana full-time students, with the exception of those on programs specifically designed for working people, are expected to devote their full attention to their academic work. In the US it is not unusual to find students combining work with full-time studies. The flexibility of the American system makes this possible. However, it is important that visiting professors who are not familiar with the American system are made aware of this. Without an understanding of this it would sometimes be difficult to understand student behavior, especially with regard to rescheduling of classes, turning in assignments, scheduling quizzes and tests, etc. It is very important for students to know right at the beginning of a course what demands would be made on them and how they will be assessed.

A related issue is the great importance attached to extra curricular activities and sports in American universities. A nice recreational facility has become a common tool in attracting students to a university. Unfortunately, this attraction encourages many students to spend a lot of time on sporting activities, sometimes to the detriment of their academic work. Visiting professors from outside the US need to be made aware of the role of extra curricular activities and sports in American universities. It is important that they are prepared to be flexible enough to accommodate the special needs of the students is their classes. Moreover, in US, student organizations such as ASME and ASHRAE Student Sections exist to assist student development in engineering practice. At MSU, the ASME activities are supported financially by the Minnesota Section of ASME, the Mechanical Engineering Advisory Board, private mechanical engineering firms, the College of Science, Engineering, and Technology and the Department of Mechanical and Civil Engineering. Another noteworthy difference is the progressive introduction of engineering design content as the student proceeds through the curriculum at MSU, beginning with design in small doses in the Introduction to Engineering class and leading to the senior design projects. Written work and oral presentation are required of the student in presenting the engineering solution to a design problem in design courses. There exists a good atmosphere for student learning, with easy access by students to the faculty, staff, equipment, computers, library, study space, and advising.

Lack of knowledge of the American educational system and the academic background of students can be a handicap for a visiting professor who is assigned to teach freshman or

sophomore classes. It is often difficult for the professor to link new knowledge to what the students have already been taught prior to entering the university.

Procedures for assessing achievement of students

The area of assessment of student achievement is one in which there are marked differences in practices and procedures between the American system and the Ghanaian system. In both systems, a student's overall assessment on a course is generally made up of two components: continuous assessment (consisting of scores from assignments, quizzes, tests, etc during the semester) and scores from a final examination at the end of the semester. The main differences lie in the autonomy that the professor enjoys and the heavier weighting that is given to continuous assessment under the American system.

The professor in America enjoys considerable autonomy is deciding how students on his/her course will be assessed. The professor is free to decide what weighting will be given to continuous assessment as opposed to the final semester examination. In Ghana, as in many systems modeled on British practices, the weighting is specified by university regulations and cannot be altered by professors. In America assessment is heavily weighted in favor of continuous assessment. Typically, final semester examinations could carry only 30% or less of the total mark for a subject. The reverse is true in Ghanaian universities where final semester examinations could contribute as much as 70% of the marks on a course. Also, in Ghana the final examinations are very formal. The examinations papers would normally be subjected to review by peers or external examiners, and the papers and marked scripts kept for possible inspection by program moderators and accreditation committees.

The practice of giving assignments from course texts and grading the assignments as part of the overall assessment of students is one that the first author found difficult to accept. This was because there were very strong indications that some students had access to the instructor' solutions manuals, calling into question the validity of any marks from these assignments. The first author found that some professors, in reaction to this problem, had reduced significantly the weighting given to marks obtained from textbook assignments. In some cases, the marks had been downgraded to as low as 0-5% of the overall mark for a course.

Course Evaluation Procedures

At KNUST, students evaluate each course at the end of the semester through the completion of a questionnaire designed for the purpose. The completed questionnaires are analyzed by the Quality Assurance Unit and the results are made available to instructors. Where very adverse comments have been made by students, the instructor involved is called by the department chair or dean for a discussion. A similar evaluation system is used at MSU, but some aspects of it are voluntary. The instructor has the right to decide not to have a course evaluation, and when a course evaluation has been conducted and the results are available, it is at the discretion of the MSU faculty to share his/her class evaluation results with the

department chair or the dean. However, at least some sample class evaluations are required as a means by which teaching performance is evaluated for tenure and promotion.

Ghana Visit and Experience

This may be a good place to say a few words about the second author's experience in Ghana. In the United States of America, over 300 colleges and universities offer bachelor's-degree programs in engineering that are accredited by the Accreditation Board for Engineering and Technology (ABET). As the reader may be well aware, ABET examines the credentials of the engineering program's faculty, curricular content, facilities, and admissions standards before granting accreditation. Although institutions could use different terminology to describe what students are expected to know and be able to do by the time of graduation, accredited programs must demonstrate that their graduates, by the time of graduation, have certain abilities and *the broad education necessary to understand the impact of engineering solutions in a global and societal context.*

How does an American engineering program provide its graduates with "*the broad education necessary to understand the impact of engineering solutions in a global and societal context*?" How does one teach topics such as global citizenship, global collaboration, and diversity to engineering students? How does one teach concepts that emphasize commonality of human purpose and gives a greater meaning to life beyond the walls of our homes and the boundaries of our cities and countries? The collaboration between the engineering programs at Kwame Nkrumah University of Science and Technology (KNUST) and Minnesota State University (MSU) is an attempt to better educate students at both universities – through direct interaction with faculty from a different culture – to understand the importance and the responsibility of a global citizen and the impact of engineering solutions in a global context.

The second author's visit in 2007 coincided with a year-long activities marking the Golden Jubilee (50 years of independence celebration). Ghana's first President, Dr. Kwame Nkrumah, envisioned Ghana as the guiding light of African independence and solidarity – the BLACK STAR. The second author found Ghanaians to be extremely friendly, warm, hospitable, and dignified people. His first interaction with students was during a field trip to the city of Obuasi with the first author's vibration class. The purpose of the field trip was for students to learn how mechanical vibrations of relatively large machines, in a gold processing plant, are monitored. The city of Obuasi is a part of the Ashanti heartland. In the Kingdom of Ashanti gold played ornamental, symbolic, and political roles and the people of the Gold Coast (former name for Ghana) used gold dust in exchange for goods and services. Portuguese eventually learn about the gold and had a trade monopoly with the Gold Coast for two centuries. Seeing the AngloGold Ashanti gold processing plant was indeed a unique experience for the second author. He also travelled to the city of Cape Coast and ELMINA, where he visited a private secondary school and the ELMINA Castle. The secondary school had the same feel as that of similar private schools in the United States. However, the ELMINA Castle was a very sad place—a place from which, many African slaves were shipped to the new world. Here is a brief history—The Portuguese founded the Castle in 1482 to protect the gold-rich lands they had discovered. During the 15th and 16th centuries Portuguese enjoyed a trade boom despite the French and the English attempts to break the

trade monopoly. In the 16th century the price of gold slumped due to massive importation of gold from Mexico. The Portuguese were dislodged from ELMINA by the Dutch. In 1872 the ELMINA Castle was ceded by the Dutch to Britain. During the 18th century—the Atlantic peak period for slavery—nearly 677,000 slaves were traded to the new world. The second author had read about the slavery, but experiencing the place is something that he would never forget. It is still mind bugling that as humans, we are capable of such horrible acts.

One of the major goals of this collaboration was to restore and modify an old subsonic wind tunnel that was donated to KNUST by a British university in the 1950s when engineering programs were first started in the College. At the time of the second author's visit the wind tunnel had not been used for over 30 years. Initial tests showed that the wind tunnel's structure, motor, fan, and control mechanism were sound and only in need of minor repair and slight modification. The wind tunnel also needed a downstream extension chamber. Moreover, we needed to design and fabricate prototypes and a drag and lift force measuring apparatus. A challenging feature of this project was that we had to use locally, readily available materials, to design and fabricate these items. The wind tunnel is now restored to service using inexpensive materials [4]. The facility is now available to students and huge expenditure that would have been made in buying a new one has been saved. Moreover, the second author gave several seminars during his visit and interacted freely with students at every opportunity including the day-long visit of the gold processing plant. Such interactions help to reassure students that their educational experiences are not very different from those of their counterparts in more resource-rich parts of the world. This raises their self confidence. The second author also was able to see at first hand the many needs that his university could assist in satisfying. These include the lack of appropriate textbooks and other teaching and learning materials. Since his return to Minnesota he has been working to address these needs. For example, a large consignment of donated textbooks is ready to be shipped to Kumasi. He has also been sharing his experience with his students and has obtained funding from EPA to get students involved in the design and fabrication of inexpensive solar hot water heaters for Ghana.

Social, cultural and other issues

There are a number of socio-cultural issues which all exchange students and other visitors have to be made aware of if their visits are to be successful. One of these is the peculiarities of American English. It is important for the visitor to know that some common English words are pronounced very differently in American English. Equally important is the fact that certain English words have completely different meanings in American English. Apart from language there are several practical things about which visitors need an orientation: transportation (including use of buses and taxis); food (including, for example, how to request exactly what one wants in a restaurant); shopping; renting of apartments (with emphasis on the responsibilities of tenants); dress code for various situations. In the experience of the first author, some knowledge of American history is helpful in understanding contemporary issues and being able to make good conversation whenever the situation demands.

During the first author's stay at MSU he was given several opportunities to speak to various audiences on a wide range of topics relating to his country and his university. The audiences included students, professors and administrative staff of the university and, in one case, retired professionals from the local community. In all cases the audiences showed very keen interest in learning about other societies and cultures. The second author had similar experiences during his Ghana visit. Both authors are firmly convinced about the immense benefits of such speaking engagements and other social interactions.

Conclusion and recommendations

In this paper, two professors from an African and an American university share their experiences from their participation in activities under a collaboration agreement between their institutions. Their experiences relate to issues arising mainly from visits that each professor paid to the other's institution. It is clear that international collaboration is very beneficial but poses some challenges. The following recommendations are made for addressing some of these challenges:

- Visiting professors and exchange students should be put through an orientation program which will cover topics such as American, African, Indigenous history, language and culture, as well as practical issues such as transportation, health, food, dress code, etc. The university's International Center is probably best placed to run this orientation program.
- For visiting professors who are to be engaged in teaching, an additional orientation program should be organized to cover topics such as the American (or the African) educational system, teaching methods and the use of teaching technologies provided by the university, assessment practices and procedures. This orientation would be better done in the visiting professor's department.
- It is very important that visiting professors are given their teaching assignments and copies of course texts and instructors' manuals well in advance of their arrival to take up their appointments.
- The presence of visiting professors provides a good opportunity for staff and students to learn about foreign cultures and engineering practices in other parts of the world. Therefore, speaking engagements and other activities should be arranged for visiting professors in a deliberate effort to promote interaction with the host staff and students.

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Biography

JEROME ANTONIO was educated in Ghana and at Imperial College of Science, Technology and Medicine in London where he obtained his MSc and PhD degrees in Mechanical Engineering. He has taught courses in Applied Mechanics at the Kwame Nkrumah University of Science and Technology in Ghana for over 20 years.

SAEED MOAVENI was educated in the United States and is currently Professor of Mechanical Engineering at Minnesota State University. Dr. Moaveni has over 20 years of professional experience and is a registered P.E. in New York.