Department of Systems Engineering and Engineering Management
PROPOSAL FOR GRADUATE CERTIFICATES

To: Dr. Ed Morse (Engineering Graduate Committee Chair)

From: Dr. Ertunga Ozelkan (SEEM Interim Chair and Graduate Director)

Date: 11/15/13

Re: Establishment of Graduate Certificates

I. Graduate Certificate in Energy Systems Analytics
II. Graduate Certificate in Lean Six Sigma
III. Graduate Certificate in Logistics and Supply Chains

The following documentation is provided for the proposal of three graduate certificates following the published procedure: http://provost.uncc.edu/sites/provost.uncc.edu/files/media/Graduate-Certificate-Proposal-Procedures.pdf

Procedure for Certificate Program Approval:
Approval by the appropriate college committees and deans and the Graduate Council are forwarded to the Dean of the Graduate School (DGS). The DGS, having determined that all appropriate consultations have been conducted and that the home college has approved the proposal in wording consistent with that approved by the Graduate Council, forwards the recommendation to the Provost.

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UNC CHARLOTTE
Department of Systems Engineering and Engineering Management
PROPOSAL FOR GRADUATE CERTIFICATES

Proposal Format (No New Courses Required or Proposed)

I. TITLE: Graduate Certificate in Energy Systems Analytics

A. Summary/Catalog Copy
The Graduate Certificate in Energy Systems Analytics provides graduate students and professionals with the opportunity to reach a demonstrated level of competence in energy systems planning and deployment. Students will be introduced to topics directly related to the energy industry, energy markets and energy value chain dynamics along with planning techniques and case studies from the energy industry. The graduate certificate may act as a standalone graduate option for post-baccalaureate and post-masters students, or may be pursued concurrently with a related graduate degree program at UNC Charlotte. The twelve credit hours in the certificate may be applied to the graduate programs in the Systems Engineering and Engineering Management (SEEM) department per approval of the department Program Director.

B. Program Requirements
The certificate will be awarded upon completion of four graduate level courses (12 credit hours) in the area of energy systems analytics. The cumulative GPA must be at least 3.0 and at most one course with a grade of C may be allowed toward the certificate. Requests for other energy-related course substitutions may be approved at the discretion of the department graduate director. Three credit hours of transfer course work may also be approved at the discretion of the department graduate director.

Required courses:
- EMGT 5961 Introduction to Energy Systems (3)
- EMGT 5962 Energy Markets (3)
- EMGT 5963 Energy Systems Planning (3)
- EMGT 5964 Case Studies in the Energy Industry (3)

C. Admission Requirements
In addition to the general requirements for admission to the Graduate School, the Systems Engineering and Engineering Management department seeks the following:

- Either a bachelor's degree in engineering or a closely related technical or scientific field, or a bachelor's degree in business, provided relevant technical course requirements have been met
- Undergraduate coursework in engineering economics, calculus, or statistics
- An average GPA of 3.0 (out of 4.0)
- Applicants should submit written description of any relevant and significant work experience
- Applicants whose native language is not English, will need to satisfy the UNC Charlotte Graduate School’s English proficiency requirements.
- Early-Entry Program - Undergraduate students with a GPA of 3.2 or above and with at least 75 semester hours completed toward a baccalaureate degree in Civil, Electrical, Mechanical, or Systems Engineering, or Engineering Technology at UNC Charlotte may be admitted as an early-entry student provided they meet all other requirements of admission except the earned bachelor’s degree.

D. Justification
1. Need for program
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William States Lee College of Engineering and UNC Charlotte have made significant investments in the area of energy systems engineering by building the Energy Production and Infrastructure Center (EPIC). This graduate certificate is well aligned with the college and university strategy of making UNC Charlotte a leading institution in energy related research and education. As indicated in the attached support letter from EPIC, the proposed energy systems certificate will help systems engineering and engineering management students build necessary skills to be successful in the energy industry.

2. Impact Statement (To include how the program affects the department’s graduate program, any interdisciplinary programs (if applicable), and the Charlotte region.

The proposed certificate program is expected to have positive impact on the overall graduate enrollment in the SEEM department. Since it is a relatively short and focused program (doable within a year in a part-time mode) it is expected to attract more industry professionals, and provide them a means to get familiar with the SEEM, COE and UNC Charlotte as a whole. It is expected that some of the certificate graduates will eventually transition into a more comprehensive Masters of Science degree program (such as MS in Engineering Management) within and outside of the SEEM department. Since the proposed courses exist and already scheduled for ongoing concentrations, there will be minimal impact in terms of deployment.

E. Letters of support and consultation.

Please see the Appendix for letters of support from Dr. Johan Enslin (Director of EPIC and Professor of Electrical and Computer Engineering) and Mr. Afred D’Ambrosio (Sr. Manager, Hess Corporation).

F. UNC General Administration Inventory Information

- CIP code: 15.1501
- Program title and description: Graduate Certificate in Energy Systems Analytics
- Required credit hours: 12 credit hours
- Program type and level: Graduate Certificate
- Date of initiation: May 2014
- Mode of delivery: Face-to-face and Online
- Site (indicate “Internet” if program is online): UNC Charlotte and Online
- County (indicate “Statewide” if program is online): Mecklenburg and Statewide
- Whether program is on-campus or distance education: On-campus and Online
Proposal Format (No New Courses Required or Proposed)

II. TITLE: Graduate Certificate in Lean Six Sigma

A. Summary/Catalog Copy
The Graduate Certificate in Lean Six Sigma provides graduate students and professionals with the opportunity to reach a demonstrated level of competence in the lean manufacturing and six sigma quality management techniques. Students learn techniques to identify and eliminate waste systematically to help companies improve their bottom-line. The graduate certificate may act as a standalone graduate option for post-baccalaureate and post-masters students, or may be pursued concurrently with a related graduate degree program at UNC Charlotte. The twelve credit hours in the certificate may be applied to the graduate programs in the Systems Engineering and Engineering Management (SEEM) department per approval of the department Program Director.

B. Program Requirements
The certificate will be awarded upon completion of four graduate level courses (12 credit hours) in the area of lean six sigma process design, planning and execution. The cumulative GPA must be at least 3.0 and at most one course with a grade of C may be allowed toward the certificate. Requests for related course substitutions may be approved at the discretion of the Program Director. Three credit hours of transfer course work may also be approved at the discretion of the Program Director.

The students need to take the following three courses:
- EMGT6924 Lean Six Sigma Practice and Management (3)
- EMGT6926 Lean Supply Networks (3)
- EMGT 6905 Designed Experimentation (3)

Plus one of the following courses:
- EMGT 6901 Advanced Project Management (3)
- EMGT 6904 Product and Process Design (3)
- EMGT 6142 Quality & Manufacturing Mgmt (3)

C. Admission Requirements
In addition to the general requirements for admission to the Graduate School, the Systems Engineering and Engineering Management department seeks the following:

- Either a bachelor's degree in engineering or a closely related technical or scientific field, or a bachelor's degree in business, provided relevant technical course requirements have been met
- Undergraduate coursework in engineering economics, calculus, or statistics
- An average GPA of 3.0 (out of 4.0)
- Applicants should submit written description of any relevant and significant work experience
- Applicants whose native language is not English, will need to satisfy the UNC Charlotte Graduate School's English proficiency requirements.
- Early-Entry Program - Undergraduate students with a GPA of 3.2 or above and with at least 75 semester hours completed toward a baccalaureate degree in Civil, Electrical, Mechanical, or Systems Engineering, or Engineering Technology at UNC Charlotte may be admitted as an
early-entry student provided they meet all other requirements of admission except the earned bachelor’s degree.

D. Justification
1. Need for program

While started in the automotive sector, lean system design concepts have become widely popular, propagating into every industry sector, including services. Transforming into a lean enterprise is no longer a choice, but a necessity for businesses to stay competitive. Thus the proposed certificate will help the SEEM department align with the industry needs.

Lean System design is an important emphasis of the Systems Engineering and Engineering Management Program, which also hosts the Center for Lean Logistics and Engineered Systems (CLLES). The program and center faculty have been conducting research and training in this area for many years (please see related news on http://ciles.uncc.edu/about-ciles/program-news and press release on the UNC Charlotte web-site: http://publicrelations.uncc.edu/news-events/news-releases/unc-charlotte-partners-local-law-firm-lean-six-sigma-training). The faculty plays an active role in national societies such as the Institute of Industrial Engineers (IIE) Lean Division. Lean Supply Networks course has received IIE Lean Division Excellence in Teaching Award in 2006 from the Institute of Industrial Engineers (IIE).

2. Impact Statement (To include how the program affects the department’s graduate program, any interdisciplinary programs (if applicable), and the Charlotte region.

Being the largest city in NC, Charlotte can be considered as the manufacturing center of Carolinas hosting over 4500 companies and a financial services powerhouse second in the nation after New York (http://charlottechamber.com/eco-dev/charlotte-overview). Thus, the proposed program will help professionals to have the right skills to help the manufacturing and services companies in the Greater Charlotte Region in their lean transformation journey.

The proposed certificate program is expected to have positive impact on the overall graduate enrollment in the SEEM department. Since it is a relatively short and focused program (doable within a year in a part-time mode) it is expected to attract more industry professionals, and provide them a means to get familiar with the SEEM, COE and UNC Charlotte as a whole. It is expected that some of the certificate graduates will eventually transition into a more comprehensive Masters of Science degree program (such as MS in Engineering Management) within and outside of the SEEM department. Since the proposed courses exist and already scheduled for ongoing concentrations, there will be minimal impact in terms of deployment.

E. Letters of support and consultation.

Please see the Appendix for letters of support from Dr. Jonathan Mayhorn (Lean Six Sigma Blackbelt, AT&T) and Mr. Alfred D’Ambrosio (Sr. Manager, Hess Corporation).
F. UNC General Administration Inventory Information

- CIP code: 15.1501
- Program title and description: Graduate Certificate in Lean Six Sigma
- Required credit hours: 12 credit hours
- Program type and level: Graduate Certificate
- Date of initiation: May 2014
- Mode of delivery: Face-to-face and Online
- Site (indicate “Internet” if program is online): UNC Charlotte and Online
- County (indicate “Statewide” if program is online): Mecklenburg and Statewide
- Whether program is on-campus or distance education: On-campus and Online
Proposal Format (No New Courses Required or Proposed)

III. TITLE: Graduate Certificate in Logistics and Supply Chains

A. Summary/Catalog Copy
The Graduate Certificate in Logistics and Supply Chains provides graduate students and professionals with the opportunity to reach a demonstrated level of competence in tools and techniques to make better decisions related to logistics and supply chain design, planning and execution. The Logistics and Supply Chains Graduate Certificate is comprised of existing courses only. The graduate certificate may act as a standalone graduate option for post-baccalaureate and post-master’s students, or may be pursued concurrently with a related graduate degree program at UNC Charlotte. The twelve credit hours in the certificate may be applied to the graduate programs in the Systems Engineering and Engineering Management (SEEM) department per approval of the department Program Director.

B. Program Requirements
The certificate will be awarded upon completion of four graduate level courses (12 credit hours) in the area of logistics and supply chains. The cumulative GPA must be at least 3.0 and at most one course with a grade of C may be allowed toward the certificate. Requests for related course substitutions may be approved at the discretion of the Program Director. Three credit hours of transfer course work may also be approved at the discretion of the Program Director.

The students need to take the following two required courses:
- EMGT 6920 Logistics Engineering and Management (3)
- EMGT 6926 Lean Supply Networks (3)

Plus two of the following
- EMGT 5963 Energy Systems Planning (3)
- EMGT 6142 Quality & Manufacturing Mgmt (3)
- MBAD 6193 Global Business Environment (3)
- MBAD 6208 Supply Chain Management (3)

C. Admission Requirements
In addition to the general requirements for admission to the Graduate School, the Systems Engineering and Engineering Management department seeks the following:

- Either a bachelor’s degree in engineering or a closely related technical or scientific field, or a bachelor’s degree in business, provided relevant technical course requirements have been met
- Undergraduate coursework in engineering economics, calculus, or statistics
- An average GPA of 3.0 (out of 4.0)
- Applicants should submit written description of any relevant and significant work experience
- Applicants whose native language is not English, will need to satisfy the UNC Charlotte Graduate School’s English proficiency requirements.
- Early-Entry Program - Undergraduate students with a GPA of 3.2 or above and with at least 75 semester hours completed toward a baccalaureate degree in Civil, Electrical, Mechanical, or
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Systems Engineering, or Engineering Technology at UNC Charlotte may be admitted as an early-entry student provided they meet all other requirements of admission except the earned bachelor's degree.

D. Justification
1. Need for program

Logistics and Supply Chains graduate certificate program is well aligned with the mission of Center for Lean Logistics and Engineered Systems (CLLES) hosted by the SEEM Department and also with the local industry trends. Charlotte is a logistics, transportation and distribution hub for many Fortune 500 firms and ranked high nationally with respect to the number of trucking companies and wholesaling centers (Charlotte Chamber of Commerce, www.charlottechamber.org). Thus, this graduate certificate will help students to build necessary skills to design, plan and execute global logistics supply networks.

2. Impact Statement (To include how the program affects the department's graduate program, any interdisciplinary programs (if applicable), and the Charlotte region.

The proposed certificate program is expected to have positive impact on the overall graduate enrollment in the SEEM department. Since it is a relatively short and focused program (doable within a year in a part-time mode) it is expected to attract more industry professionals, and provide them a means to get familiar with the SEEM, COE and UNC Charlotte as a whole. It is expected that some of the certificate graduates will eventually transition into a more comprehensive Masters of Science degree program (such as MS in Engineering Management) within and outside of the SEEM department. Since the proposed courses exist and already scheduled for ongoing concentrations, there will be minimal impact in terms of deployment.

E. Letters of support and consultation.

Please see the Appendix for letters of support from Mr. Alfred D'Ambrosio (Sr. Manager, Hess Corporation) and Dr. Cem Saydam (Chair and Professor of Business Information Systems and Operations Management Department).

F. UNC General Administration Inventory Information
- CIP code: 15.1501
- Program title and description: Graduate Certificate in Logistics and Supply Chains
- Required credit hours: 12 credit hours
- Program type and level: Graduate Certificate
- Date of initiation: May 2014
- Mode of delivery: Face-to-face and Online
- Site (indicate "Internet" if program is online): UNC Charlotte and Online
- County (indicate "Statewide" if program is online): Mecklenburg and Statewide
- Whether program is on-campus or distance education: On-campus and Online
November 14th, 2013

To: Dr. Eruoga Ozelika

From: Jonathan Mayhurn - Lean Six Sigma Master Black Belt - AT&T Operations

Subject: Support Letter for Graduate Certificate in Lean Six Sigma

This letter formally serves as industry support for the proposed Graduate Certificate in Lean Six Sigma. As a Lean Six Sigma Master Black Belt for AT&T I believe this program will benefit students as well as the local Charlotte industry. Some of the benefits of such a program are listed below:

- Allow students to develop competitive skills for industry
  - As a manager within a Lean Six Sigma program at AT&T I have learned there are two major benefits for those who go through this type of training program. One is that they become better leaders for the organization because of the intensive focus on improving their skills in project management, presenting to leadership, and data analysis. The second major benefit is that they have a complete mindset change when it comes to solving major problems that plague the business. The Lean Six Sigma methodology teaches participants how to be more proactive and less reactive when it comes to designing new processes or improving existing processes. This mindset allows that participant to save on average $1.5 million per year for an organization when they are working on projects full time.

- Allow local organizations to choose more highly skilled individuals
  - During the economic downturn over the last 5 years or so, many Engineers lost their positions at AT&T. The organization was looking to cut costs and Lean Six Sigma was one of the programs they started to do just that. These Engineers who shifted over to the Lean Six Sigma program not only kept their jobs but were promoted after coming out of the program. The reason for this was because organizations want highly skilled individuals who can go back to their business units and make the processes more efficient while still being cost effective. Therefore graduates with a certificate in Lean Six Sigma will be more attractive to industries because of the efficient and cost effective mindset they bring to the organization from day one.

Thank you for allowing me to comment on the proposed Graduate Certificate in Lean Six Sigma. I highly recommend this certificate program for approval to benefit both the students and local industry.

Sincerely,

Dr. Jonathan Mayhurn

Dr. Jonathan Mayhurn
Lean Six Sigma Master Black Belt - AT&T
November 14, 2013

Dr. Ertunga Uzefkan, Director
UNC Charlotte
Systems Engineering & Engineering Management
9201 University City Blvd.
Cameron 204
Charlotte, NC 28223-0001

Dear Dr. Ozefkan,

With this letter I would like to extend my full support for your proposal to establish an energy systems analytics graduate certificate program under the systems engineering and engineering management department. This graduate certificate program is well aligned with the energy research and education strategy of UNC Charlotte, the William States Lee College of Engineering and the Energy Production and Infrastructure Center – EPIC.

EPIC at UNC Charlotte was formed in response to the need from industry to supply highly trained engineers qualified to meet the demands of the energy industry – through traditional and continuing education, and provide sustainable support the Carolina energy industry by increasing capacity and support for applied research. EPIC is a highly collaborative industry/education partnership that produces a technical workforce, advancements in technology for the global energy industry while supporting the Carolinas’ multi-state economic and energy security.

The proposed program will serve the Greater Charlotte Region which is a major energy hub in the Carolinas, hosting large utility and energy research companies. The need for systems engineers and engineering managers with skills geared towards the energy industry has been steadily increasing and your graduate certificate program is timely.

Sincerely,

Johan Ensmihl, Director
Energy Production and Infrastructure Center (EPIC)

The UNIVERSITY of NORTH CAROLINA at CHARLOTTE
An Equal Opportunity/Affirmative Action Employer
UNC CHARLOTTE
Department of Systems Engineering and Engineering Management
PROPOSAL FOR GRADUATE CERTIFICATES

HESS
HESS CORPORATION
1501 McKinney Street
Houston, TX 77010

ALFRED W. D’AMBROSIO, P.E.
Senior Manager, Commercial - Bakken Asset

18th November 2013

Dr. Ertunga C. Ozelkan, Ph.D.
Interim Chair & Associate Professor,
Systems Engineering and Engineering Management
Associate Director, Center for Lean Logistics and Engineered Systems
UNC Charlotte, Room: Cameron 204
9201 University City Blvd., Charlotte, NC 28223

Re: Support Letter of Support for Graduate Certificate Programs

Dear Dr. Ozelkan,
Having worked as a technical professional and a group manager in several aspects of the Energy Systems value chain; I applaud and whole heartily support the efforts you are making to provide programs which will enable individuals in industry to enhance their skills in this dynamic market. The explosion in technical advances, the globalization of business and the economic constraints that have occurred in last several years have brought changes to the market place well beyond anyone’s expectations. The ability to keep up, much less get ahead is becoming ever more difficult.

Professionals and technicians need programs that will not only keep up with new innovations, but also provide those individuals with a credible recognition of having secured that knowledge. The Graduate Certificates you are proposing provide an excellent opportunity for full-time working professionals and technicians to secure timely and detailed training at a level greatly exceeding three to five day seminars without having to make the longer-term commitment to a graduate degree program.

As a group manager, I have found it most difficult to maintain a high level of broad technical awareness in my group through individual seminars or self-study programs. The certificate programs will fill that educational gap.

Please let me know if there is anything else I can do to help support your effort.

Sincerely,

Fred D’Ambrosio
Ertonga,

I see no problems with this certificate idea, indeed a good one. You probably need to check with Management also since MBAD 6193 is in program too.

Best,

Cem

On Nov 15, 2013, at 12:44 PM, "Ozelkan, Ertunga" <Ertunga.Ozelkan@uncc.edu> wrote:
Hi Cem,
As you remember last year we proposed several concentrations under the MSEM program on
-Logistics and Supply Chains
-Lean Six Sigma
-Energy Systems

We have been receiving positive feedback thus far. Some prospective students have been asking if they can only take these concentration courses and get a certificate for it. It looks like the university has a possibility for offering graduate certificate programs. The graduate certificate program would require the students to take 12 credits (4 courses) to finalize a certificate.

Since we have the concentrations/courses, this is not going to cause us much additional effort and it does not require the lengthy GA approval process. Therefore, we are considering to offer 3 certificate programs in the above concentration areas letting students take the already defined concentration courses.

As you may recall, in the Logistics and Supply Chain concentration, with your blessing, we listed 2 of the MBAD courses as electives as follows.

The students need to take the following two required courses:
- EMTG6920 Logistics Engineering and Management (3)
- EMTG6926 Lean Supply Networks (3)

Plus two of the following
- EMTG 5963 Energy Systems Planning (3)
- EMTG 6142 Quality & Manufacturing Mgmt (3)
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- MBAD 6193 Global Business Environment (3)
- MBAD 6208 Supply Chain Management (3)

Since we have MBAD courses involved, I wanted to check with you whether you see any issues offering the same concentration as a certificate. It is hard to estimate but I would think it may generate a few additional students per semester for the MBAD courses. Let me know.

Thanks and Regards,

Ertunga

Dr. Ertunga C. Ozelkan, Ph.D. | Interim Chair & Associate Professor,
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