



Academic Program Review

Engineering Management Graduate Program Self-Study Report

Academic Years 2015-2020

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Preface and History

A. History of the University of Tennessee at Chattanooga

The University of Tennessee at Chattanooga is a metropolitan university located in the southeastern corner of the state of Tennessee. Chattanooga's metro area has a population of approximately 500,000 people that includes not only Chattanooga, but also portions of North Georgia and Northeastern Alabama.

The University of Tennessee at Chattanooga (UTC) became part of the University of Tennessee System in 1969. The System consists of four major campuses located in Chattanooga, Knoxville, Martin, and Memphis. Governance is provided through a UT System President, Chancellors on each campus, and a UT Board of Trustees. The Governor of the State appoints Board members and serves as Chairman of the Board.

Prior to becoming a part of the UT System (in 1969), the university was a private university known as the University of Chattanooga (UC). UC was founded in 1886. It later merged with East Tennessee Wesleyan University of Athens and became Grant University. In 1907 the name was changed to University of Chattanooga. Other institutions in the Chattanooga area, including Chattanooga City College (CCC), a predominately African-American University, became a part of the UT System merger in 1969.

At the time of the merger in 1969, UC's student population was slightly more than 2,200. Now, UTC, as a public institution, serves more than 11,000 students. Approximately 11 percent of UTC's students are enrolled in graduate programs. Overall, UTC's students represent not only Tennessee (coming from 70 Tennessee counties), but they also come from more than 40 states and 60 foreign countries.

B. Background of the Engineering Management Graduate Program

The graduate program in Engineering Management is housed in the College of Engineering and Computer Science at the University of Tennessee at Chattanooga. The program of study leads to a Master of Science degree in Engineering Management.

Chattanooga has a rich history that is deeply rooted in manufacturing, transportation, and electric power production. In the mid-1900s, Chattanooga was often mentioned as being the "dynamo of Dixie," the "most diversified industrial center of the south," and the "Pittsburgh of the south." Although, the manufacturing base of the city has shifted over the years, the city continues to have a diversity of manufacturing activity – from cookies and snack cakes (McKee Baking) to heavy, industrial products (Astec Industries and VW). Chattanooga is also home for the Power Systems Operations Division of the Tennessee Valley Authority (TVA).

As the engineering programs within the college grew and diversified at UTC, it was recognized that many students and practicing engineering professionals were becoming involved in business and management-related activities. There were emerging requirements for training and educational experiences not only in engineering, but also in economics, marketing, product development, human relations, finance, and strategy assessment. This led to the development of the MS Engineering Management (MSEM) degree in the 1980s.

This degree program is intended primarily for people having either engineering or scientific backgrounds and for those people who have moved, or expect to move, into positions having

broad managerial responsibility. The program requires core courses that address concepts and issues associated with globalization, economics, economic decision-making, statistics, marketing, product development, financial analysis, entrepreneurship, quality control and reliability, project management, leadership, value management, and comprehensive strategic management.

The core courses include six, three-semester-hour courses (18 semester hours of credit) that culminate with a capstone course (three semester hours of credit). The capstone course involves an assessment of an approved topic that relates to an important management issue. The goal is to allow the student to analyze a subject and to express, in writing, a clear understanding of the issues along with suggested recommendations for action. A 20/30 - minute oral presentation of the capstone study is also required.

In addition to the core course, there are 15 semester hours of elective courses required to complete the degree. These elective courses are selected from one of three concentrations. The three concentrations include either: (1) Engineering Management, (2) Construction Management, or (3) Power Systems Management.

Currently, the MSEM degree may be completed either in class or through online study (100 percent). This online alternative enables a student to have the flexibility to pursue the graduate degree while continuing to work full-time or engage in activities totally remote from the UTC campus. Courses are offered in a manner that allows students to watch lectures as they are presented (“live”) in class, or to watch the archived lectures at any time of their choosing.

In addition to the MS degree program, there are four Graduate Certificate Programs that provide advanced training and education for busy professionals. These programs include: (1) Construction Management, (2) Logistics and Supply Chain Management, (3) Project and Technology Management, and (4) Quality Management. Each certificate program requires four courses or a total of 12 semester credit hours. These courses, too, may be taken online.

The online program of courses, which includes all courses in the Graduate Engineering Management Program, are delivered using a combination of Blackboard (now Canvas) and Mediasite. This method of delivery allows for a “live” broadcast as well as the storage (archiving) of each lecture for later use on an “as required” basis. This method of delivery has been well-received by both students and faculty.

A significant strength of the program has been the extensive and diverse education and experience of faculty members who teach the courses. Not only is there a major body of knowledge possessed by virtue of academic accomplishment of the faculty, but there is significant managerial experience, also. For example, there are faculty members teaching in the program who have years of senior level executive experience and experience on boards of directors of major companies. Also, there is experience with start-up companies, operations of national-level, federal programs, and overall corporate development issues associated with acquisitions and divestitures. Such experience is not common with many faculties of universities in the United States.

Since the previous visit, the program has sustained its enrollment in Engineering Management, although the enrollment in Construction Management has decreased significantly. We have taken some initiative to address the enrollment issue. A task force made up of Chattanooga area construction industry leaders has been formed and assigned two tasks for AY 2019-2010. The

two tasks are investigating the reasons for the decreased enrollment in the graduate construction management program and trying to devise a plan to promote the program to help with the enrollment. The taskforce will meet as frequent and as long as needed to address these issues. The taskforce was formed with members suggested by the current president and CEO of the AGC of East Tennessee. The group will meet in the third week of February 2020.

One of the main suggestions from the previous visit was ‘to develop an exhaustive plan for the growth of the online program and a justification for requesting additional resources ... The College of Engineering and Computer Science has made significant commitment and efforts towards this objective.

In May 2019, The University of Tennessee at Chattanooga (UTC), on behalf of the College of Engineering and Computer Science, entered a three-year agreement with Focus EduVation. Focus EduVation is in the business of providing educational institutions certain bundled services, including: marketing; enrollment, online course design and development; student retention services; and development of industry partnerships. UTC is a leading public university and desires to expand its online distance learning programs, which are expected to be national in scope and appeal, open to both in-state and out-of-state students, and allow international student enrollments where applicable.

In September 2019, the College of Engineering and Computer Science hired Teresa Phillips as the Online Program Coordinator. Her role is to support the online MS programs in engineering, computer science and engineering management. Her duties include marketing the programs, responding to inquiries, reaching out to applicants, onboarding new students, coordinating courses with faculty and working with the partners at Focus EduVation.

To date, new online courses are being developed, we’ve seen a dramatic increase in inquiries, and the greater coordination of communication between prospects, applicants, administration and faculty has been implemented. Processes are being documented and procedures are being streamlined. We plan to increase the applicant population in the next year as well as develop online courses that are currently offered face-to-face only. Current online courses will also be reviewed to include enhancements and Quality Matters attributes so eventually all online courses can be Quality Matters certified.

Focus EduVation

FocusEduVation has combined expertly crafted content with innovative media to deliver e-Learning solutions that allow the users to stay on task in memorable and unique way. Their services and learning solutions are personalized and customized to help improve learner outcomes on all levels. With their new processes and techniques, they bring high levels of knowledge, freshness, and talent to the ever evolving of e-Learning.

Teresa Phillips

A graduate of the University of Colorado at Colorado Springs, Teresa joined UTC from the University of Texas at Austin. There she was the senior program coordinator for the McCombs School of Business executive MBA program, managing day-to-day operations, admissions and student support. During her time at University of Texas at Austin, the executive MBA program grew to be recognized as a Top 10 program. In supporting the program, Teresa coordinated graduation events for over 1,200 executive MBA students and led cross-functional planning

teams for all six MBA programs. She also planned conferences and seminars, including seminars in Beijing and London.

Part I. Learning Outcomes

1.1. Learning Outcomes

The desired learning outcomes of the MS Engineering Management program graduates are as follows:

- **Application of Engineering Management Principles:** Ability to apply knowledge, techniques, skills, and modern tools of technology and management to solve a broadly-defined engineering and project management problems
- **Effective and Professional Communication:** An ability to apply written, oral, and graphical communication in technical and non-technical environments; and an ability to identify and use appropriate technical literature.

1.2. Program Evaluation

The outcomes of the MS Engineering Management program are regularly evaluated using rubrics developed by the department (see Appendix I) to measure students' mastery of engineering management principles along with communication and technical writing skills.

Workshops focused on writing and presenting projects are provided each semester to enhance students' preparation for these assessments. Additionally, students who pursue a master's degree in engineering management without an undergraduate technical degree are required to take additional undergraduate courses prior to beginning graduate-level engineering courses to ensure they acquire vital foundational skills.

Building on the goal to enhance student achievement, the department offers a one-hour Research Methodology course to inform graduate students of the research expectations for this degree and to teach the fundamental skills needed to conduct a research project.

A. Capstone Projects

The Capstone Project is the application of engineering management science and theory to real world projects. Rigorous literature review of topics related to the project, data collection, analysis of data, and conclusions, culminating in the submission of the final project documentation of professional quality and oral defense are required.

In order to maintain the high quality and to assist the students in preparation of their projects an organization has been set up in Canvas. Information on the course description, project steps, a report template, resources, such as the library and writing center, previous reports, previous presentations, and online lectures. The last item refers to a recording of the three meetings each semester to aid the students in preparation of their capstone project. These meetings are held live and recorded for online students.

Below are the steps that the graduate student uses toward his/her capstone project:

- Identify potential project areas of interest and discuss with faculty
- Write your project proposal
- Develop a project schedule
- Select your committee members
- Conduct the literature review
- Collect data
- Analyze data
- Write your conclusions and recommendations
- Write the project report and present it

In the last academic year, the Engineering Management graduate students have been involved in a wide variety of capstone projects in various local and regional industries. Table 1 shows a selected list of these capstone projects.

Table 1. Projects Completed by Engineering Management Students (2018-19)

Student	Project Advisor	Project Title
Sherrod Munday	Dr. Aldo McLean	Evaluating the FCC's IBFS Database: A Quantitative and Qualitative Analysis of Satellite Dish Downlink Locations Registered in the IBFS
Ben Cooksey	Dr. Wolday Abrha	A Bamboo Start-up Business
Khanh Nguyen	Dr. Alexandr Sokolov	A Methodology of Increasing Operational Tempo in Asphalt Plant Field Service Repair
Robert Matthews	Dr. Ahad Nasab	The Effect of Scope Creep on Company Indigo's Mechanical Engineering Department Performance Through Utilization of an Engineering Change Notice Process
Brian Taylor	Dr. Alexandr Sokolov	Method for Improving the Competitive Advantage of the In-House Maintenance Team for a Large Manufacturing Facility
Sarah Aseltine	Dr. Alexandr Sokolov	Integration of Supply Chain Management Principles in to the Department of Defense Acquisition, Technology, and Logistics Process
Thomas Minwell	Dr. Alexandr Sokolov	The Effects of Solar Generation on Power System Balancing
Abdulaziz Ghazzawi	Dr. Aldo McLean	Assessing the use of Blockchain in Supply Management

Larry Mendizabal	Dr. Wolday Abrha	Closed-Loop System Between Tier- 1 Supplier and OEM for Quality and Cycle Time Improvement
Tyler Hall	Dr. Wolday Abrha	Reducing Non-Conformances in Air Purifying Respirators
Ramon Williams	Dr. Seong Dae Kim	Minimizing the Impact of Juveniles in Juvenile Detention

B. Assessment and Follow up actions

The performance of graduate students is assessed using student evaluations given during each semester. These evaluation results are reviewed at the departmental level to make corrective actions, if necessary. In addition, each course has a folder, either electronic or hard copy, where faculty keeps their materials, graded work, student artifacts, etc.

Student learning performance is assessed based on the two learning outcomes, from section 1.1, as follows:

Application of Engineering Management Principles: The latest assessment was conducted in Spring 2019. The course ENGM 5540 - Technical Project Management is used as the critical performance indicator for this outcome. Students are graded on their effective application of engineering and management skills to solve a given problem regarding a simulated industry project. Average grade of students in these categories will be at least 80%. The latest assessment data score was greater than 80%. Even though the average grades were above the minimum requirement, a follow up action was deemed necessary for students who did not score well in this course.

Effective and Professional Communication: The most relevant courses for this outcome are ENGM 5540, ENGM 5560, and ENGM 5960. Of these three courses, ENGM 5960 - Capstone Project is the one used for assessment purposes since the writing and oral communication aspect of this course is cumulative. Students are graded on their effective written and oral presentation of technical and non-technical issues. Average grade of students in these categories is 80%. The assessment data for Spring 2019 indicates that all students enrolled in this course received grades greater than 80% in both written and oral sections of the course.

The College of Engineering and Computer Science provides project and thesis workshops throughout the semester to prepare students for their final capstone/thesis presentations. The oral communication assessment rubric for graduate students evaluates organization, content, presentation length, visual aids, attention to audience and speaking skills. The written communication assessment rubric for graduate students evaluates drafting, editing, revision, final draft, and timing. These rubrics are shown in Appendix I.

1.3. Use of Evaluation Information

The Engineering Management has a Graduate Curriculum Committee which reviews and makes necessary changes in the graduate curriculum every year based on student evaluations and assessment results.



Figure 1. Engineering Management Assessment Cycle

The process shown in Figure starts in August of every year when the committee meets to modify or ‘establish new learning goals’ for the upcoming academic year based on the ‘gathered evidence’ from the courses designated as performance indicators as previously identified. The decisions of the committee are then condensed into curriculum modification actions by the committee. Currently each department has until November 15th to propose curriculum changes to the College and the University curriculum committees.

After implementing the new action items, all courses including the affected courses are monitored to see if the modified curriculum had the intended effect. Data is gathered in May of each year and analyzed to identify any red flags or issues that need special attention. The faculty and the department administrative assistant are responsible for gathering and organizing the course data. The graduate committee along with the department Head participate in analysis of the data.

1.4. Institution’s Mission

The MS Engineering Management program is designed to align directly with the UTC and College of Engineering and Computer Science’s mission, vision, and values, as shown in Table 2.

Table 2. Alignment of Mission, Vision, and Values

	UTC	College of Engineering and Computer Science	Engineering Management
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Mission	The University of Tennessee at Chattanooga is a driving force for achieving excellence by actively engaging students, faculty and staff; embracing diversity and inclusion, inspiring positive change and enriching and sustaining our community. At UTC we develop a community on campus, enable students to go into the global community and we provide a nurturing environment that connects students, community and opportunity.	<ol style="list-style-type: none"> 1. Educate and train future technical & engineering management workforce for Tennessee, the nation, and beyond. 2. Discover new knowledge in engineering, management, technology, and computer science. 3. Engage communities through scholarship, service and economic development. 	The mission of the Engineering Technology Management (ETM) program at UTC is to provide accessible education in the principles and application of technology management, while preparing students to understand and be productive in the work environment
Vision	We Engage Students, Inspire Change and Enrich Community. We nurture students through community connections tied to our values and our region grounded in Chattanooga, a great drawing card and we value our place.	To be a preeminent college of engineering, engineering management, technology, and computer science in education and applied research.	To provide one of the best quality educations in Engineering Management and Construction Management to students nationally and internationally.
Core Values/ Goals	<ul style="list-style-type: none"> • Students are the primary reason we exist as an institution. • We live integrity, civility and honesty. • We relentlessly pursue excellence. • We embrace diversity and inclusion. • Creativity, inquiry and scholarship are our culture. <p>We teach, we learn, we interact, we nurture, we grow citizens for tomorrow, and we do the basics and more.</p>	<ul style="list-style-type: none"> • Enrich Student Experience • Cultivate excellence in teaching and learning • Enhance applied research capabilities of the college for broader impact to the society • Engage community through scholarship and service with leadership and distinction • Enhance national/international reputation and recognition 	<p>In support of the mission, graduates of the ETM program will be able to:</p> <ul style="list-style-type: none"> • Demonstrate the necessary understanding of planning, organizing, and problem-solving skills to provide value-added services in technical or management positions; • Demonstrate good communication skills and be able to function well in multi-disciplinary teams as leaders; and • Appreciate the need for, and to pursue, self-directed professional development opportunities, such as graduate work, trainings, and participation in professional organizations.

Part II. Curriculum

2.1 Curriculum Review

The curriculum of the MSEM currently has two concentrations; engineering management and construction management. The number of elective course offerings have recently been modified to facilitate graduation in a timely manner. As stated earlier, curriculum review and proposals take place in August through November of each year. So far, every year, the program has authored many curriculum proposals in an effort to continuously improve the graduate program. The curriculum modification suggestions are initiated by students, faculty, and the Industry Advisory Board. The departmental graduate committee collects all the suggestions and forms them into curriculum proposals. The proposals are then discussed in this committee and action to table or proceed with the proposals is taken.

All graduate core courses are offered at least once a year. All elective courses are offered at least once every other year regardless of enrollment levels. The changes represent a major revision in our curriculum as well as a strong commitment of resources to improve learning opportunities. This new course offering schedule is also very popular within students, employers, and collaborators in the Chattanooga areas and surrounding states.

In the current structure, the requirement of 18 hours core courses and 15 hours elective course stays the same for all concentrations. However, for the construction management concentration, there is a minimum requirement for 9 hours of elective courses to be exclusively from construction elective courses. The additional 6 hours could come from other elective courses available in the curriculum.

Even though the master's level offering in construction disciplines have had a positive impact on private firms, the enrollment in this program has recently dropped significantly. After consulting with our industry partners, we presume that the decrease in enrollment is due to the booming construction activities in the Chattanooga area where there is a significant shortage of commercial and residential buildings.

The certification programs are a response to the increasing need for engineers to have portable knowledge and skill set responsive to different challenges and environments. Therefore, the new curriculum is designed to provide knowledge and skills needed to function effectively as managers on technical and non-technical processes. The certificate programs accommodates the need of the engineer to focus on particular areas of knowledge through the selection of electives. This focus is important for increased effectiveness within the business as well as for longer-term career development.

Increasingly the students need additional knowledge in areas which cannot be addressed through the former program structure. Additionally, with the varying roles of engineers in industry; i.e., consulting, manufacturing, managerial, etc., the certificate programs allow the student flexibility in a course of study not available with the former structure.

The core courses provide the students a strong foundation in the following areas of engineering management: human resources, engineering economics, project management, leadership and entrepreneurship, and strategic management of technology. A comparison of the old and new

curriculum including courses for the Construction Management concentration is shown in Table 3.

Table 3. Comparison of Engineering Management Graduate Program’s New and Old Curriculum

Old Curriculum (2013-14)	New Curriculum (2019-20)
<p>Core Courses (18 hrs.): ENGM 5500 - Concepts in Engineering Management (3 Hrs.) ENGM 5540 - Technical Project Management (3 Hrs.) ENGM 5550 - Technical Entrepreneurship and Leadership (3 Hrs.) ENGM 5580 - Advanced Engineering Economy (3 Hrs.) ENGM 5830 - Strategic Management and Technology (3 Hrs.) ENGM 5960 - Capstone Project (3 Hrs.)</p> <p>Elective Courses* (15 hrs.): ENGM 5040 - Decision Making and Optimization Techniques (3 Hrs.) ENGM 5510 - Legal and Ethical Perspectives in Engineering (3 Hrs.) ENGM 5520 - Reliability Engineering (3 Hrs.) ENGM 5560 - Quality Management Systems (3 Hrs.) ENGM 5570 - Advanced Quality Control (3 Hrs.) ENGM 5800 - Product Development (3 Hrs.) ENGM 5820 - Value Management (3 Hrs.) ENGM 5910 - Special Topics in Engineering Management (3 Hrs.) ENGM 5950 - Research Methods Lab (3 Hrs.) ENGR 5920 - Graduate Internship in Engineering (3 Hrs.)</p> <p>Construction Electives (9 hours) ENGM 5600 - Sustainability and LEED (3 Hrs.) ENGM 5610 - Construction Law: Contracts and Claims (3 Hrs.) ENGM 5620 - Strategic Bidding and Estimating (3 Hrs.) ENGM 5630 - Advanced Operations and Constructability (3 Hrs.)</p>	<p>Core Courses (18 hrs.): ENGM 5040 - Decision Making and Optimization Techniques (3 Hrs.) ENGM 5500 - Concepts in Engineering Management (3 Hrs.) ENGM 5540 - Technical Project Management (3 Hrs.) ENGM 5580 - Advanced Engineering Economy (3 Hrs.) ENGM 5830 - Strategic Management and Technology (3 Hrs.) ENGM 5960r - Capstone Project (3 Hrs.)</p> <p>Elective Courses* (15 hrs.): ENGM 5510 - Legal and Ethical Perspectives in Engineering (3 Hrs.) ENGM 5520 - Reliability Engineering (3 Hrs.) ENGM 5550 - Technical Entrepreneurship and Leadership (3 Hrs.) ENGM 5560 - Quality Management Systems (3 Hrs.) ENGM 5570 - Advanced Quality Control (3 Hrs.) ENGM 5800 - Product Development (3 Hrs.) ENGM 5820 - Value Management (3 Hrs.) ENGM 5910r - Special Topics in Engineering Management (3 Hrs.) ENGM 5950 - Research Methods Lab (3 Hrs.) ENCE 5920r - Graduate Internship in Engineering (3 Hrs.)</p> <p>Construction Electives (9 hours) ENGM 5600 - Sustainability and LEED (3 Hrs.) ENGM 5610 - Construction Law: Contracts and Claims (3 Hrs.)</p>

<p>ENGM 5640 - Design and Construction of Tall Buildings (3 Hrs.)</p> <p>Power Systems Management Electives (15 hours)</p> <p>ESEE 5160 - Introduction to the Smart Grid</p> <p>ESEE 5520 - Power System Operations</p> <p>ESEE 5610 - Power Electronics and Drives</p> <p>ESEE 5620 - Power System Protection</p> <p>ESEE 5650 - Sustainable Electric Energy Systems</p> <p>ESEE 5720 - Power System Analysis and Design</p> <p>TOTAL: 33 hrs.</p> <p>*Please Note: Electives can be taken in areas outside of engineering management, such as other engineering disciplines or science or business.</p>	<p>ENGM 5620 - Strategic Bidding and Estimating (3 Hrs.)</p> <p>ENGM 5630 - Advanced Operations and Constructability (3 Hrs.)</p> <p>TOTAL: 33 hrs.</p> <p>*Please Note: Electives can be taken in areas outside of engineering management, such as other engineering disciplines or science or business.</p>
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Graduate Certificate programs are now offered in four distinctive areas of engineering management, each consisting of 4 graduate level courses for a total of 12 hours. Graduate students, who are actively pursuing a master's degree in the department, can also pursue a graduate certificate by adding a total of 6 graduate hours in the related discipline. The Graduate Certificate programs available in the curriculum are detailed as follow:

- a. Project and Technology Management
- b. Quality Management
- c. Logistics and Supply Management
- d. Construction Management

a. Certificate Program in Project and Technology Management

- ENGM 5540 Technical Project Management (3 Hrs.)
- ENGM 5550 Technical Entrepreneurship and Leadership (3 Hrs.)
- ENGM 5580 Advanced Engineering Economy (3 Hrs.)
- ENGM 5820 Value Management (3 Hrs.)

b. Certificate Program in Quality Management

Core Courses

ENGM 5580 Advance Engineering Economy (3 hrs.)

ENGM 5830 Strategic Management and Technology (3 hrs.)

Choice of two Quality-related courses from the below list:

ENGM 5520 Reliability Engineering (3hrs.)

ENGM 5560 Quality Management Systems (3hrs.)

ENGM 5570 Advanced Quality Control (3 hrs.)

c. Certificate Program in Logistics and Supply Chain Management

ENGM 5580 Advanced Engineering Economy (3hrs.)

ENGM 5830 Strategic Management and Technology (3 hrs.)

ENGM 5870 Supply Chain Management (3 hrs.)

ENGM 5880 Global Logistics (3 hrs.)

d. Certificate Program in Construction Management

Core Requirements

ENGM 5540 Technical Project Management (3 hrs.)

ENGM 5580 Advance Engineering Economy (3 hrs.)

Choice of two Construction-related courses from the below list:

ENGM 5600 Sustainability and LEED (3hrs.)

ENGM 5610 Construction Law: Contract and Claims (3hrs.)

ENGM 5620 Strategic Bidding and Estimating (3 hrs.)

ENGM 5630 Advanced Operations and Constructability (3 hrs.)

ENGM 5650 Lean Construction (3 hrs.)

Individuals will be admitted to the Certificate in Engineering Management program if, either:

- a. They have a bachelor's degree and significant related professional experience and are approved by the Engineering Management Graduate Committee, or
- b. They meet the admission requirements of the Graduate School as stated in the Graduate Catalog, are admitted to the Engineering or Engineering Management M.S. program, and have satisfied all prerequisite courses assigned by the respective Graduate Committee.

2.2. Course Scheduling and Offerings

The curriculum has been designed so students can finish their master’s program in two years, which recommends taking two courses per semester including summers. The department offers at least two core courses and two elective courses per semester in addition to the “Special Topics in Engineering Management” and “Capstone Project” courses, which give adequate options and variety to choose from for Engineering Management graduate students. Table 4 shows the courses that have been offered in the past two years.

Table 4. Engineering Management Courses Offered in the Last Two Years

COURSE INFORMATION		ACADEMIC YR 2017-18			ACADEMIC YR 2018-19		
ENGM NO.	TITLE (CREDIT HOURS)	FALL	SPR	SUM	FALL	SPR	SUM
5040	Decision Making and Optimization techniques (3)		X			X	
5500	Concepts in Engineering Management (3)	X			X		
5510	Legal & Ethical Perspectives in Engineering (3)	X					
5520	Reliability Engineering (3)		X				X
5530	Advanced Ergonomics (3)			X			X
5540	Technical Project Management (3)		X	X		X	
5550	Technology Entrepreneurship & Leadership (3)		X			X	
5560	Quality Management Systems (3)	X				X	
5570	Advanced Quality Control (3)				X		
5580	Advanced Engineering Economy (3)	X			X		
5600	Sustainability and LEED (3)	X			X		
5620	Strategic Bidding and Estimating (3)	X				X	
5630	Advanced Operations & Constructability (3)				X		
5800	Product Development (3)	X					
5830	Strategic Management and Technology (3)					X	
5870	Supply Chain Management (3)					X	

5910	Special Topics in ENGM (3)	X		X	X		X
5910	Transportation Management (3)			X			
5920	Graduate Internship in Engineering (1)	X		X			X
5960	Capstone Project (1-3)	X	X	X	X	X	X

All courses for the Master of Science in Engineering Management, including Construction Management and Power Systems Management courses, are offered in two sections: The C section for in-class students and the D section for distance learners or online students. Students enrolled in the in-class section have the extra benefit of a face-to-face interaction with faculty and peer students during class meetings. These students are generally (1) able to commute to campus at scheduled class meetings, or (2) students residing in on-campus or near-campus housing. Students enrolled in the distance section have the value of going over lecture topics live or on-demand recordings at their own time and schedule. These students are generally (1) students who cannot commute to campus due to constraints of the places they reside including distance, transportation modes, and others, or (2) be local students but are not able to attend the class as scheduled (e.g. work schedules, others), or (3) students often traveling due to their job responsibilities, or (4) their job positions have been transferred away from the Chattanooga area. Table 5 shows the enrollment in the courses that are offered in the last two years.

Table 5. Enrollment in the Engineering Management Graduate Courses Offered in the Last Two Years

COURSE INFORMATION		ACADEMIC YR 2017-18			ACADEMIC YR 2018-19		
		FALL	SPR	SUM	FALL	SPR	SUM
ENGM NO.	TITLE (CREDIT HOURS)						
5040	Decision Making and Optimization techniques (3)		15			18	
5500	Concepts in Engineering Management (3)	35			15		
5510	Legal/Ethical Perspectives in Engineering (3)	14					
5520	Reliability Engineering (3)		17				19
5530	Advanced Ergonomics (3)			9			15
5540	Technical Project Management (3)		33	5		28	
5550	Technical Entrepreneurship & Leadership (3)		29			28	
5560	Quality Management Systems (3)	16				12	
5570	Advanced Quality Control (3)				20		

5580	Advanced Engineering Economy (3)	26			36		
5600	Sustainability and LEED (3)	14			23		
5620	Strategic Bidding and Estimating (3)	9				5	
5630	Advanced Operations & Constructability (3)				9		
5800	Product Development (3)	22					
5830	Strategic Management and Tech. (3)					23	
5870	Supply Chain Management (3)					4	
5910	Special Topics in ENGM (3)	5		1	1		1
5910	Transportation Management			13			
5920	Graduate Internship in Engineering (1)	1		0			3
5960	Capstone Project (1-3)	16	11	2	12	15	11

2.3 Comparison with Similar Undergraduate Courses

The MS Engineering Management course content builds on the principles of engineering management covered at the undergraduate level for both the engineering management and the construction management. In such cases, graduate coursework delves deeper into the conceptual points of the field. Students are encouraged to spend time on key derivations rather than focusing solely on outcomes as a way of illustrating methods they will find useful. The syllabi for two graduate courses (Advanced Engineering Economy and Advanced Quality Control) and their respective undergraduate courses (Engineering Economy and Quality Control and System Reliability) are provided in Appendices H and G, respectively, as examples.

2.4 Alignment with Learning Outcomes

The MS Engineering Management program has clear learning outcomes related to application of engineering management principles and effective and professional communication that graduate students must master to successfully complete the program. The outcomes are aligned with the MS Engineering Management curriculum as shown in Table 6.

Table 6. MS Engineering Curriculum Alignment with Program Outcomes

			Outcome 1	Outcome 2
ENGM	5040	Decision Making and Optimization Techniques	x	
ENGM	5500	Concepts in Engineering Management	x	
ENGM	5510	Legal and Ethical Perspectives in Engineering		x
ENGM	5520	Reliability Engineering	x	

ENGM	5540	Technical Project Management	x	x
ENGM	5550	Technical Entrepreneurship and Leadership		x
ENGM	5560	Quality Management Systems	x	x
ENGM	5570	Advanced Quality Control	x	
ENGM	5580	Advanced Engineering Economy		x
ENGM	5600	Sustainability and LEED	x	
ENGM	5610	Construction Law: Contracts and Claims		x
ENGM	5620	Strategic Bidding and Estimating	x	
ENGM	5630	Advanced Operations and Constructability	x	
ENGM	5800	Product Development	x	x
ENGM	5820	Value Management	x	
ENGM	5830	Strategic Management and Technology	x	
ENGM	5950	Research Methods Lab		x
ENGM	5920R	Graduate Internship in Engineering		x
ENGM	5960R	Capstone Project	x	x
Outcome 1: Application of Engineering Management Principles				
Outcome 2: Effective and Professional Communication				

2.5 Curriculum Structure

A. Engineering Management Program Curriculum Samples

- Sample curricula, requirements, and course descriptions for the program can be found in the Graduate Catalog at http://catalog.utc.edu/preview_entity.php?catoid=17&ent_oid=745&returnto=567. The MS Engineering Management program aims to ensure that course offerings and their contents specifically address the student and industry needs and that appropriate level of rigor and skill mastery is incorporated in its curriculum, as can be seen from course syllabi, shown in Appendix H.

Engineering Management, M.S.

Program Requirements

Students are required to complete a minimum of 33 semester hours of prescribed courses for a major in engineering management. The student's program is planned in consultation between the student and adviser. Each program will be designed to meet the needs of the student, taking into consideration background and experience. In some instances, prerequisite courses may be required. The program requires courses in the core and electives.

Core Courses (18 hours)

- ENGM 5040 - Decision Making and Optimization Techniques
- ENGM 5500 - Concepts in Engineering Management
- ENGM 5540 - Technical Project Management
- ENGM 5580 - Advanced Engineering Economy
- ENGM 5830 - Strategic Management and Technology
- ENGM 5960r - Capstone Project

Electives (15 hours)

- ENGM 5510 - Legal and Ethical Perspectives in Engineering
- ENGM 5520 - Reliability Engineering
- ENGM 5550 - Technical Entrepreneurship and Leadership
- ENGM 5560 - Quality Management Systems
- ENGM 5570 - Advanced Quality Control
- ENGM 5800 - Product Development
- ENGM 5820 - Value Management
- ENGM 5910r - Special Topics in Engineering Management
- ENGM 5950 - Research Methods Lab
- ENCE 5920r - Graduate Internship in Engineering

Total (Core and Elective hours): 33 hours

Engineering Management: Construction Management, M.S.

Program Requirements

Students are required to complete a minimum of 33 semester hours of prescribed courses for a major in engineering management. The student's program is planned in consultation between the student and adviser. Each program will be designed to meet the needs of the student, taking into consideration background and experience. In some instances, prerequisite courses may be required. The program requires courses in the core and electives.

Core Courses (18 hours)

- ENGM 5040 - Decision Making and Optimization Techniques
- ENGM 5500 - Concepts in Engineering Management
- ENGM 5540 - Technical Project Management
- ENGM 5580 - Advanced Engineering Economy
- ENGM 5830 - Strategic Management and Technology
- ENGM 5960r - Capstone Project

Construction Electives (9 hours)

- Take a minimum 3 construction courses.
- ENGM 5600 - Sustainability and LEED
- ENGM 5610 - Construction Law: Contracts and Claims
- ENGM 5620 - Strategic Bidding and Estimating
- ENGM 5630 - Advanced Operations and Constructability

Other Electives (6 hours)

- ENGM 5510 - Legal and Ethical Perspectives in Engineering
- ENGM 5520 - Reliability Engineering
- ENGM 5560 - Quality Management Systems
- ENGM 5570 - Advanced Quality Control
- ENGM 5800 - Product Development
- ENGM 5820 - Value Management
- ENGM 5910r - Special Topics in Engineering Management
- ENGM 5950 - Research Methods Lab
- ETEM 5920r - Graduate Internship in Engineering Management

Total (Core and Elective hours): 33 hours

B. Certificate Programs

The department offers the following four Post-Baccalaureate Certificate programs:

- a. Project and Technology Management
- b. Quality Management
- c. Logistics and Supply Management
- d. Construction Management

An example of the admission and course requirements for two of the certificate programs is shown below. The requirements for other certificates can be found at <http://catalog.utc.edu/content.php?catoid=17&navoid=567>.

Engineering Management Project and Technology Management Post-Baccalaureate Certificate

Admission Requirements

Knowledge of engineering economy is required as demonstrated by the satisfactory completion of ENGR 3520, Engineering Economy, or equivalent. Individuals will be admitted to the Certificate in Project and Value Management program if either:

Have a bachelor's degree and significant related professional experience such as project management, cost accounting, and economic evaluation of projects and are approved by the Engineering Management Graduate Committee.

OR

a. Meet the admission requirements of the Graduate School as stated in the *Graduate Catalog*, are admitted to the Engineering or Engineering Management graduate program and have satisfied all prerequisite courses assigned by the respective Graduate Committee.

Course Requirements* (12 hours)

- ENGM 5540 - Technical Project Management
- ENGM 5550 - Technical Entrepreneurship and Leadership
- ENGM 5580 - Advanced Engineering Economy
- ENGM 5820 - Value Management
-

Additional Information and Notes

**With approval of the graduate program coordinator, students may take a graduate-level course in a similar area of topics to substitute one of the courses in the certificate program if the course is not offered during the study period.*

Engineering Management Construction Management Post-Baccalaureate Certificate

Admission Requirements

Knowledge of engineering economy is required as demonstrated by the satisfactory completion of ENGR 3520, Engineering Economy, or equivalent. Individuals will be admitted to the Construction Management Certificate if either:

A. Have a bachelor's degree and significant related professional experience and are approved by the Engineering Management Graduate Committee.

OR

B. Meet the admission requirement of the Graduate School as stated in the Graduate Catalog, are admitted to the Engineering Management graduate program, and have satisfied all prerequisite courses assigned by the respective Graduate Committee.

Additional Information and Notes:

*With approval of the graduate program coordinator, students may take a graduate-level course in a similar area of topics to substitute one of the courses in the certificate program if the course is not offered during the study period.

- Course Requirements
- ENGM 5540 - Technical Project Management
- ENGM 5580 - Advanced Engineering Economy
- Choose two courses from the list below:
- ENGM 5600 - Sustainability and LEED
- ENGM 5610 - Construction Law: Contracts and Claims
- ENGM 5620 - Strategic Bidding and Estimating
- ENGM 5630 - Advanced Operations and Constructability
- ENGM 5650 - Lean Construction
- Total: 12 Hours

2.6. Professional Practice

The MS Engineering Management program engages students in professional practices and training experiences by offering a variety of seminars, local internship opportunities, and job fairs throughout the year. Students are informed of these via email, bulletin boards, and e-boards. In addition, capstone projects also act as professional practice resources. Examples of these can

be seen in Table 1, Section 1.2. A partial list of companies who offered internship opportunities to our students in academic year 2018-2019 is given below;

VW Group of America
Industrial Fabrication Inc.
WAUPACA Foundry Inc.
Woodbridge Inoac Technical Inc.
Marketing Alliance Group
Civil Constructors
Tennessee Department of Transportation (TDOT)
J C Curtis Construction
Heffernin+Kronenberg Architects

2.7. Online and In-Class Parity

In 2001, we began delivering Engineering Management Graduate Program courses by alternative delivery methods. A variety of online techniques were developed and implemented by various faculty members. One method was to produce MS PowerPoint slides with voice over, while another was to post the PowerPoint slides, reading assignments, and homework in Blackboard, by using the online course management system used by the University of Tennessee at Chattanooga, and communicate by phone and e-mail. In 2006, the Engineering Management graduate program was chosen as the pioneer program by the University of Tennessee (UT) System to offer a fully online program by using shared resources among UT campuses that offer similar courses and/or programs.

Blackboard provides a framework for delivering courses online, as well as in class. All course documents, course information, and assignments are available online to both in class and online students. Another important feature of Blackboard is the discussion board. This feature enables students to have online discussions with the instructor and other students in class on assigned topics.

Mediasite has been used to upgrade two of the classrooms (EMCS 231 and EMCS 202) in the College of Engineering, Mathematics, and Computer Science in order to deliver online courses by using this method, which provides both video and audio delivery for online courses. Mediasite is a lecture capture technology, developed by Sonic Foundry, that records video and audio of the instructor and syncs it with the integrated software used in the class. The presentation is archived and made available to watch at any time streamed from a secure server. This program allows students to take classes from a distance or allows the instructor to pre-record a lecture that they know they will miss and aides in maintaining the class's semester schedule. Mediasite also allows live-streaming of video and is used for broadcasting lectures which allows online students to feel like they are sitting face to face with the instructor.

Online Distance fees are used to support faculty and graduate students to upgrade and deliver all Engineering Management online courses.

The University of Tennessee at Chattanooga (UTC) Walker Center for Teaching and Learning assists in discovering best practices in distance learning and preparing teaching materials for the increasing online environment. It also assists faculty in organizing and designing courses in Blackboard to maximize student learning success. The Walker Center administers course and support service evaluations each semester to allow for the continuous improvement of UTC's online and hybrid courses, as well as the support services which are funded by Online Distance Fees. These fees fund the additional costs to deliver online and distance courses, including faculty and student support for online programming, training, and resources that are not covered by the student technology and online fees.

UTC Learn, which is powered by Canvas, is UTC's Learning Management System that faculty can use to deliver course content, communicate with students, enable student interaction, and provide online assignments and assessments. The Walker Center also provides training for faculty to utilize UTC Learn in their courses and organizations. Currently, UTC is using Canvas in place of the Blackboard system for course learning management system. UTC is also in process of evaluating a few alternative systems to Mediasite in order to upgrade its lecture capture system. Dr. Dawn Ford of the Walker Center for Teaching and Learning leads these efforts.

In April 2017, our M.S. Engineering Management degree was ranked #12 among the top 50 colleges in the U.S. by SuperScholar.org's Smart Choice for online Engineering Management degrees. Of the top colleges for online Engineering Management, schools were evaluated and ranked based on academic reputation, special accreditation, student satisfaction, and cost.

MS Engineering Management program was ranked #7 of the 50 Best Master's in Engineering Management Programs Online for 2018 by BestCollegeReviews.org.

The University of Tennessee - Chattanooga was ranked at #16 for 2019 Most Affordable Online Colleges for Master's Degrees in Engineering Management.

2.8. Pedagogical Methods

Graduate courses are usually offered in the evenings or late afternoons to accommodate working students. Each course uses Canvas software to display class materials, create discussion boards, and post assignments. This system helps students keep up with coursework if they are unable to attend class due to work or illness.

Online offerings are supported by Mediasite to record lectures both synchronously and asynchronously. The College of Engineering and Computer Science has internal technical support personnel and one staff member who is fully responsible for maintaining Mediasite. In addition, Graduate Assistants are trained to assist faculty in administering online graduate-level courses.

Part III. Student Experience

3.1. MS Engineering Management Program Enrollment and Peer Identification

The Engineering Management graduate program provides a focus on human resources, engineering economics, quality management, project management, leadership and entrepreneurship, strategy and other management issues. The program also emphasizes decision-making, integration of management and engineering sciences, and communications.

A. Admission Requirements

All applicants for admission to the Engineering Management master's program at UTC must first be admitted to the graduate program at the University. The Office of the Graduate School is responsible for the administration of the University graduate admission policy. The decision to admit an applicant to pursue graduate study at UTC is based upon evaluations of both qualitative and quantitative information. To ensure adequate consideration, the applicant should submit the completed application and supporting credentials to The Graduate School office by the application dates noted in the Graduate Catalog.

An applicant for admission must furnish the following materials to The Graduate School office:

- A completed online application form
- A Statement of Purpose/Intent
- Payment of the \$30 nonrefundable application fee for domestic applicants or \$35 for international applicants
- An official transcript from each college or university previously attended
- An official report of the applicant's score on the prescribed test(s) for admission, such as the GRE or GMAT. Students whose native language is not English are required to provide scores for the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS). A minimum of 550 paper-based, *or* 213 computer-based *or* 79 internet-based TOEFL score *or* 6.0 on the IELTS are required from international students.

To be eligible for Degree Regular Admission, an applicant must have a baccalaureate degree from a regionally accredited college or university or foreign equivalent and be in good academic standing at the last institution attended. In addition to the previous two requirements, an applicant for regular admission must meet one of the following requirements from a regionally accredited institution or foreign equivalent. All GPAs are based on a 4.0-point scale and the last two years of undergraduate coursework are equivalent to approximately 60-70 semester hours or 90-100 quarter hours. (Updated GPA requirements approved by Graduate Council spring 2011)

- 2.70 minimum GPA for all undergraduate work taken for the baccalaureate degree or
- 3.00 GPA for the last two years of undergraduate academic coursework or
- 3.00 GPA for 30 or more semester hours undergraduate credit after earning the first bachelor's degree or
- 2.70 GPA for the last two years of undergraduate academic coursework and a 3.00
- GPA on fewer than 24 hours graduate coursework or
- 3.00 GPA for 24 or more graduate hours or
- An earned master's degree or higher-level degree with at least a 3.00 GPA.

An applicant who graduated from an unaccredited institution may be considered for admission with a 3.0 cumulative average.

In addition to meeting the above requirements, all applicants for admission to the Engineering Management master's program must also supply results from the GRE or GMAT taken within the past five years and minimum of two letters of reference from employer(s) or university instructor(s).

B. Recruitment

The recruitment of students into the Engineering Management master's program is primarily done through marketing efforts directed toward local and regional companies. Faculty members visit companies to inform them about the Engineering Management master's program at UTC. Alumni of the MS Engineering Management program come also to these recruitment meetings to answer questions asked by prospective students.

The College and Engineering Management websites are always updated, and publications related to the MS Engineering Management program, such as brochures, flyers, posters, etc. are available for prospective students to gain more information about the program, its purpose and availabilities. Local magazines and papers are also used to inform the public about our program and recruit students locally and regionally.

There has been a relative decline in the international recruitment effort due to the decrease in the international recruitment budget. . Alumni of the MS Engineering Management play a crucial role in the recruitment efforts by informing their colleagues, friends, and family members about the Engineering Management graduate program at UTC, its availability and flexibility as a 100% online program. This includes local as well as on-line and international graduates.

C. Enrollment

Enrollment in MSEM has decreased since 2014 mostly due to the decrease in the enrollment in the Construction Management concentration. We are currently forming a task force made of active members of the commercial construction industry representatives to address this issue and suggest ways to promote the program. Since there are many courses common to both the Engineering Management and the Construction Management concentrations, there is only a small number of construction management related courses that may have a low enrollment in the course, otherwise, students enjoy the interaction with large enough group of peers in their classes. Figure 3 shows the enrollment data between Fall 2013 and Fall 2019.

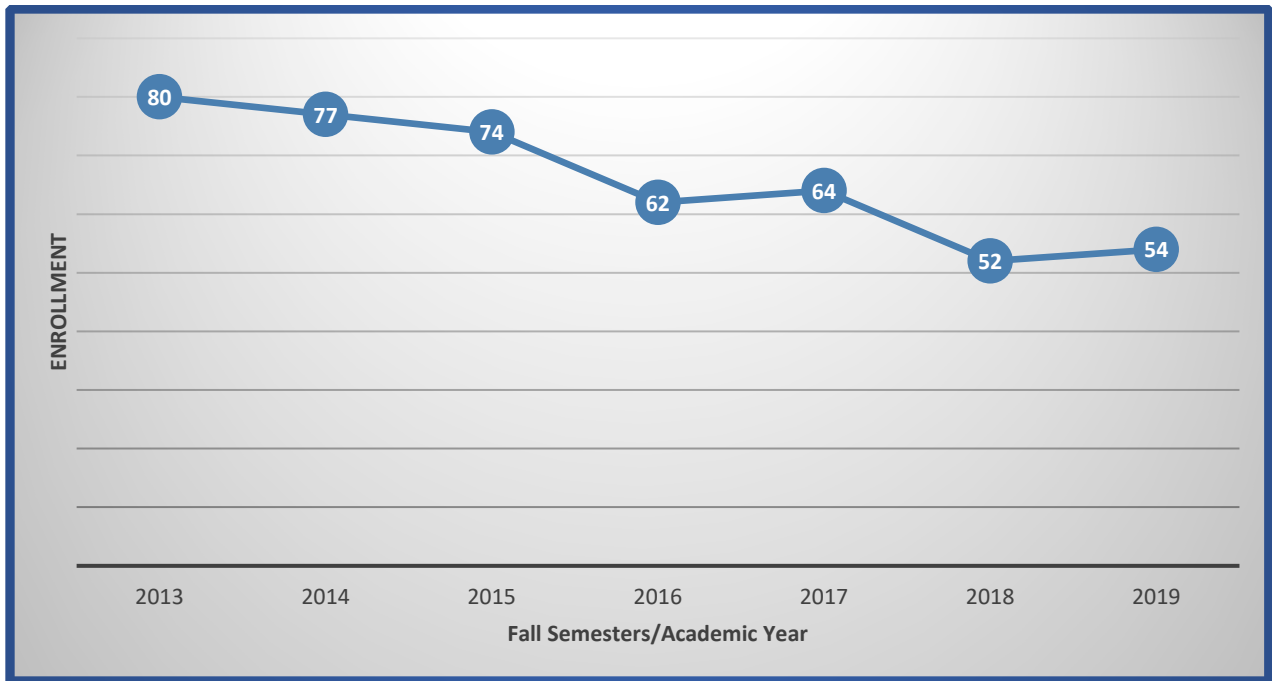


Figure 3. Engineering Management Graduate Program Enrollment Data*

*Source: Office of Planning, Evaluation, and Institutional Research.

D. Degrees Awarded

The number of degrees awarded in the Engineering Management graduate program over the years has also stayed constant over the last six years. Figure 4 shows the number of degrees awarded between 2013-14 and 2018-19.

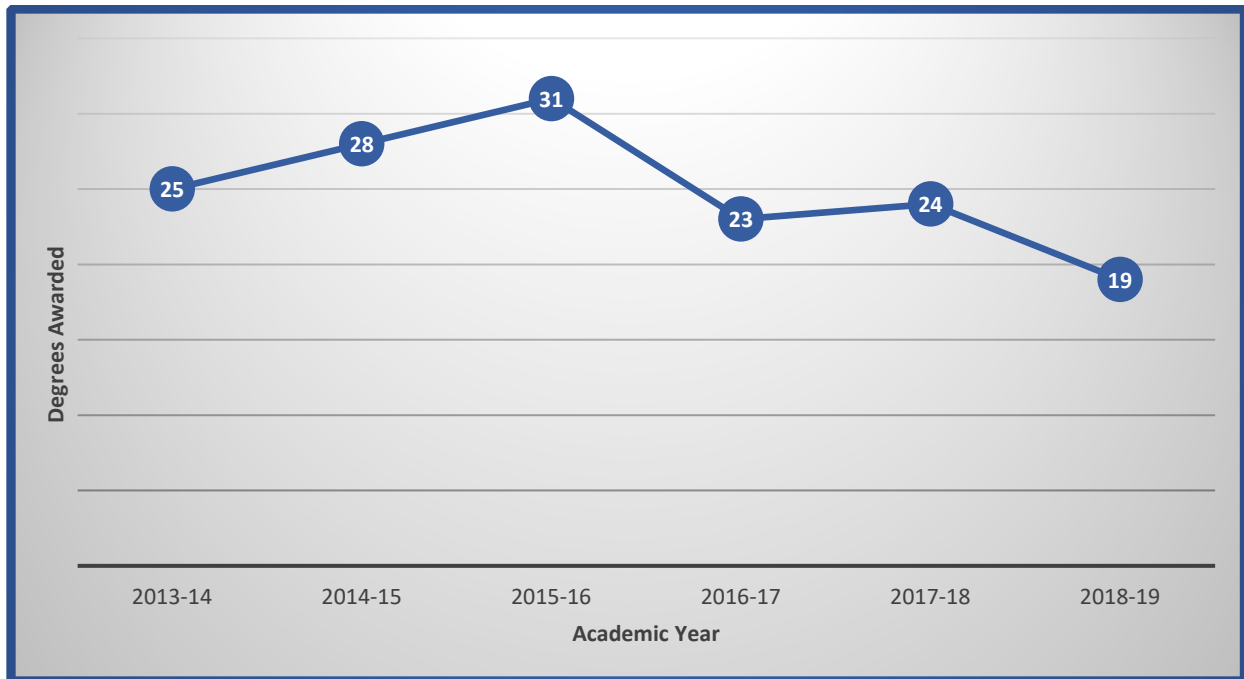


Figure 4. Master of Science in Engineering Management Degrees Awarded*

*Source: Office of Planning, Evaluation, and Institutional Research.

3.2. Quality Evaluation

Students have the opportunity to provide feedback on the program and evaluate faculty's teaching effectiveness through surveys conducted online prior to final exams each semester. Students are routinely notified through e-mail and by the instructors in class to login and complete the survey. As an example, Course Learning Evaluation for Fall 2018 is provided in Appendix C.

3.3. Professional Development Opportunities

The MS Engineering Management program provides professional development opportunities through membership in professional associations such as Tau Beta Pi, Associated General Contractors (AGC), Graduate Student Association (GSA), National Society for Black Engineers (NSBE), the Society of Woman Engineers (SWE), etc. These organizations encourage students to attend conferences and workshops, help students network and find jobs, and provide students with opportunities for publication.

The Center for Career and Leadership Development provides free resources to assist students in finding employment opportunities in line with their qualifications. Its mission is to provide students with tools to be successful in their job search and to be prepared with the right documents for an interview. For more information visit <https://www.utc.edu/career-student-employment>. The College of Engineering and Computer Science also organizes College-level job fairs twice a year, one in the fall and one in the spring, to assist students in finding jobs

<http://www.utc.edu/collegeengineering-computer-science/student-employment/day-of-networking.php>).

3.4. Enrichment Opportunities

To provide adequate enrichment opportunities, the MS Engineering Management program hosts a variety of seminars conducted by local professional speakers from the Tennessee Valley Authority (TVA), Volkswagen (VW), Coca Cola, etc. These seminars are offered at no cost to students and are held in room EMCS 426 for student convenience. These seminars are also videotaped and made available to students who cannot be present in person. This is a valuable service for online students. These seminars create an environment that facilitates student engagement with local industries and enriches students' education. The list below outlines a partial list of distinguished speakers for the last two years. (9/2017 – 11/2019)

Topic: "The Future of Deep Space Human Exploration"

Dr. Paul McConnaughey, *Associate Director, Technical, Office of the Center Director NASA Marshall Space Flight Center*, September 22nd, UTC SimCenter Auditorium, 11 a.m.

Topic: "For Engineers, Does Career Advancement come from Hard Skills or Soft Skills?"

Dr. Ryan M. Brewer, *Associate Professor of Finance, Indiana University*, October 2nd, 5:30 p.m., Card Auditorium

Topic: "From Classroom to Corporation: Adventures of a Tech CEO"

John P. McNeely, *President/CEO, Principal & Co-Founder of Sword & Shield Enterprise Security, Inc., and Principal & Co-Founder – Affenix, LLC*, October 30th, 5:30 p.m., Card Auditorium, EMCS 201*

Topic: "Indoor Positioning Advances Exploiting GPS and WLAN Infrastructures"

Dr. David Akopian, Professor in the Electrical and Computer Engineering, Department of the University of Texas at San Antonio (UTSA), San Antonio, TX, November 17th, SimCenter Auditorium, 10 a.m.

Topic: "Crypto-currency Status and Future Perspectives"

Dr. Richard Brooks, Professor of Electrical and Computer Engineering, Clemson University December 1st, 10 a.m., UTC SimCenter Auditorium

Topic: "Energy, Water, and Climate: Challenges and Opportunities in Africa"

Vahid Alavian, Former Water and Hydropower Advisor, Africa Region at The World Bank January 19th, 10:00 a.m., UTC SimCenter Auditorium

Topic: "Security Challenges for the Internet of Things: A Semantics-Based View"

Csilla Farkas, Professor, Department of Computer Science and Engineering, University of South Carolina, Columbia, February 2nd, 10:00 a.m., UTC SimCenter Auditorium

Topic: "Information Security Careers: Pathfinding on the Digital Battlefield"

Shayne Champion, Cyber Security Professional, February 5th, 2:00 p.m., Maytag Conference Room, EMCS 426

Topic: "Security of Additive Manufacturing: Threats and Research Opportunities"

Mark Yampolskiy, Assistant Professor, School of Computing University of South Alabama

February 22nd, 2:00 p.m., UTC SimCenter Auditorium

Topic: "The Science of Additive Manufacturing and What the Future Holds"

Amy M. Elliott, Associate Research Staff, Oak Ridge National Lab's (ORNL) Manufacturing Demonstration Facility (MDF), February 23rd, 10:00 a.m., UTC SimCenter Auditorium

Topic: "Oak Ridge National Lab Capabilities"

Dr. Jeffrey B. Cornett, Manager, Industrial and Economic Development, Oak Ridge National Lab (ORNL)

March 9th, 10:00 a.m., UTC SimCenter Auditorium

Topic: "Petal: Rejuvenation of MPI Applications / Ariadne: Static Analysis Meets Model Checking"

Dr. Peter Pirkelbauer, Assistant Professor, Department of Computer Science at the University of Alabama at Birmingham, March 19th, 2:00 p.m., UTC SimCenter Auditorium

Topic: "Why do some people advance in their career faster than others?"

Scott C. Pierce, Executive Vice President and COO, BlueCross BlueShield of Tennessee
April 12th, 3:00 p.m., Benwood Auditorium EMCS 230*

Topic: "The implicit bias and microaggressions that are often targeted at women in the STEM fields and what we can do about it", Dr. Christopher Kilmartin, Emeritus Professor of Psychology at The University of Mary Washington in Fredericksburg, VA, March 20th, 3:15 p.m., Benwood Auditorium EMCS 230*

Topic: "Robots that Need to Mislead: Biologically-inspired Machine Deception"

Dr. Ronald Arkin is the Regents' Professor and is the Director of the Mobile Robot Laboratory at the Georgia Institute of Technology., September 7th, - 10:00 a.m., – Maytag Room, EMCS 426

Topic: "After the Engineering Degree: Core Non-Technical Traits that Accelerate Career Success"

Julian Bell is the Executive Vice President of Signal Energy Constructors, one of the top utility scale renewable energy engineering, procurement and construction firms in the United States., October 11th, - 12:15 p.m., – Maytag Room

Topic: The Future of Energy

Hash Hashemian, President & CEO, AMS Corporation and adjunct professor of nuclear engineering at UTK

November 2nd, - 10am, Maytag Room, EMCS 426

Topic: "Product Safety Management and The Human Side of Engineering: Forensics & Manufacturing a Reasonably Safe Product", Tyler Kress, President & Principal Consultant, BEST Engineering Inc and adjunct professor at Virginia Tech, November 16th, - 10:00am; Maytag Room, EMCS 426

Topic: "Maximize Your Value with Diverse Experiences and Views"

John Loudermilk, COO Birla Carbon, February 19th, - 2:00pm; Maytag Room, EMCS 426

Topic: "Engineering Pathways: A Real-World Mix of Engineering and Business"

Tim Barnes, Managing Partner, ByteBackers, April 16th, - 3:00pm; Maytag Room, EMCS 426

Jobs Lost, Jobs Gained: Preparing for the workforce in a time of automation
Rodney Woods is vice president and chief clinical engineer for medical management at BlueCross BlueShield of Tennessee, October 3rd, - 1:45pm; Maytag Room, EMCS 426

Topic: "Oak Ridge National Lab Capabilities"

Dr. Jeffrey B. Cornett, Manager, Industrial and Economic Development, Oak Ridge National Lab (ORNL)

Oct. 17th, - 1:45 pm; Maytag Room, EMCS 426

Topic: "Your Drop Matters: Building a Community of Freshwater Advocates"

Anna George, Tennessee Aquarium Vice President of Conservation Science and Education

Nov. 5th, - 12:30pm; Maytag Room, EMCS 426

Topic: "Problem Solving: A Career Foundation"

Tim Reagan, Chief Operations Officer - Ken Smith Auto Parts Inc., Nov. 12th, - 3:30pm; Maytag Room, EMCS 426

3.5. Diverse Perspectives

The MS Engineering Management program aims to expose students to various perspectives and experiences throughout the program. Field trips to TVA, VW, Electric Power Board (EPB), Amazon, Miller Industries, McKee Foods Corp. and others are held regularly to introduce students to various work environments. Guest speakers from these companies and many others are brought into classrooms by professors every semester to impart practical knowledge and provide opportunities for discussion regarding the diversity of workforce and approaches to technical solutions.

3.6. Academic Support

The availability of instructional resources has improved with the opening of the new library building in January 2015. The program's instructional equipment and facilities within the College of Engineering are adequate. Most of the classrooms have state-of-the-art technology.

Graduate students also have a study room on the second floor, EMCS 241, which provides a quiet study environment. Technical support is provided by technical personnel staffed by the College of Engineering and Computer Science, along with graduate assistants.

Part IV. Faculty

4.1 Engineering Management Graduate Coordinator

The Engineering Management department has six tenured and tenure-track faculty and one lecturer. All faculty members are qualified to teach graduate level courses and advise graduate students.

The department has a graduate coordinator who is appointed in that position for a two-year renewable term. The main responsibilities of the graduate coordinator is to advise graduate students, review all prospective graduate students' applications, recruit graduate students to the program, write and propose all graduate curriculum changes, and teach graduate level courses. Additionally, the graduate coordinator represents the graduate engineering management program at the Graduate Council. All graduate coordinators for the College meet at least once per

semester to discuss the curriculum, assistantships, recruitment, resources, and other related issues.

4.2. Faculty Teaching Load

Most graduate level courses, on-campus and online, are taught by full-time graduate faculty in the department. For the MS Engineering Management program, faculty teaching loads are aligned with the highly individualized nature of graduate instruction. In the case of capstone projects, professors with certain specialties are assigned to guide the students on an individual basis.

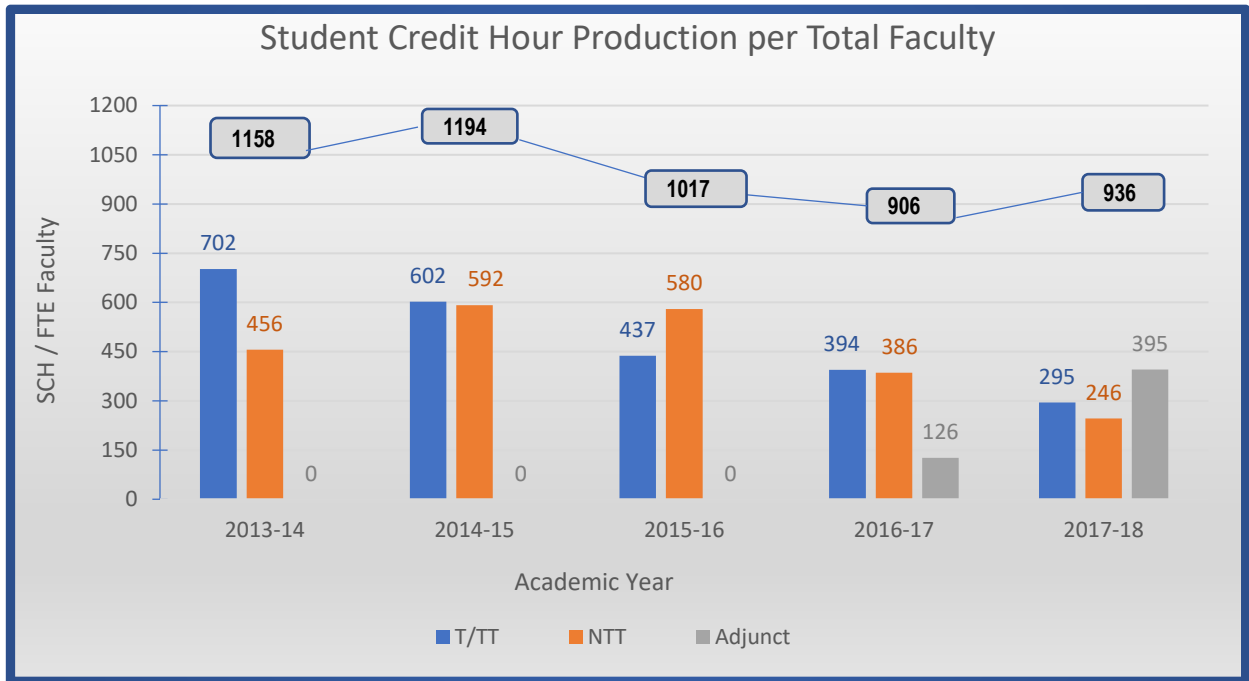


Figure 5. SCH per Total Faculty FTE per Academic Year

Figure 5 shows the Student Credit Hour production per Full-Time and Adjunct Faculty within the Engineering Management & Technology department for the last 5 years. Table 7 shows the SCH/FTE Faculty in comparison to the College and the University.

Table 7. SCH/FTE Faculty/Academic Year

		UTC	College	Department
2013-14	Adjunct	3071	186	N/A
	NTT	3927	507	456
	T/TT	18230	1973	702
	Total	25228	2666	1158
2014-15	Adjunct	1918	137	N/A

	NTT	4472	725	592
	T/TT	18777	2071	602
	Total	25167	2933	1194
2015-16	Adjunct	2424	159	N/A
	NTT	4166	617	580
	T/TT	18968	1584	437
	Total	25558	2360	1017
2016-17	Adjunct	1624	228	126
	NTT	4100	386	386
	T/TT	21334	1590	394
	Total	27058	2204	906
2017-18	Adjunct	3211	539	395
	NTT	3928	262	246
	T/TT	21559	1732	295
	Total	28698	2533	936
Key: TT = FT Tenured/Tenured-Track Faculty; NTT = FT Non Tenure Track Faculty				

4.3. Faculty Diversity

Students enrolled in the MS Engineering Management Program are increasingly diverse. Studies have shown the importance of faculty diversity to enrolling and retaining students from diverse backgrounds. College faculty members have demonstrated a positive impact in shaping campus culture and encouraging students from multiple groups of minorities and genders as well as academic background and training to enroll and persist through graduation. The diversity of faculty and graduate major enrollment are presented in Appendix B.

4.4. Faculty Professional Development

The MS Engineering Management faculty strive for continuous professional development, which can advance teaching methods, scholarship and practice. Ongoing and past research projects led by faculty members draw external funds such as grants and awards. Annual conferences, workshops, expos, meetings, and a multitude of organizational gatherings are regularly attended by faculty. An example Curriculum Vitae of MS Engineering Management Faculty is shown in Appendix F. Other CVs can be viewed online at <http://www.utc.edu/college-engineering-computer-science/profiles/>

The following shows examples of the faculty professional development for a few of the department faculty for the last two years.

Publications – 2017 to current

➤ **Dr. Endong Wang:**

- Yuan J, Li L, Wang E, Skibniewski M (2019). Examining Sustainability Indicators of Space Management in Elderly Facilities---A Case Study in China. *Journal of Cleaner Production* 208:144-59.
- Wang E, Neslihan Alp, Jonathan Shi, Chao Wang, Xiaodong Zhang, Hong Chen (2017). Multi-criteria Building Energy Performance Benchmarking Through Variable Clustering Based Compromise TOPSIS With Objective Entropy Weighting. *Energy* 125: 197-210
- Wang E, Mao P, Chen M, Zhang X, Li L (2017). Climate effects in data envelopment analysis for residential energy performance benchmarking---An empirical case validation. 2018 ASCE Conference, New Orleans, Louisiana, USA, April 2-5, 2018.
- Wang E, Jared Forst, Neslihan Alp and Xiaoni Wang (2018). Optimizing Business Operation Strategies---A Simulation Approach. *Advances in Intelligent Systems Research (CJ)* 151:34-37.
- Cash M, Wang E, Wang X (2018). Building Information Modeling for Nonresidential Construction---An Industry Perspective, 2018 2nd International Conference on Applied Mathematics, Modeling and Simulation, Aug 26-27, 2018.

➤ **Dr. Aldo McLean**

- Ericson, L. M, Abrha, W, and McLean, A. A., (2018) Design of a Visual Board for a Manufacturing Cell, *Proceedings of the American Society for Engineering Management, ASEM 2018*. Accepted for presentation and publication.
- Fortunatus, M, Onyango, M, Fomunung I, McLean A, and Owino J, (2018) Use of a Smart Phone based Application to Measure Roughness of Polyurethane Stabilized Concrete Pavement, *Civil Engineering Research Journal*, Vol. 4, Issue 4.

➤ **Professor Wolday Abrha**

- Abrha, W., Alp, N., and Teklu, T. (2018). Reducing steering gear handling damages – the six sigma way. *Proceedings of the American Society for Engineering Management 2018 International Annual Conference* (accepted).
- Abrha, W., Sawhney, R., Macias de Anda, E. (2018). Application of lean to reduce inter-plant logistics: the marine industry perspective *Proceedings of the American Society for Engineering Management 2018 International Annual Conference* (accepted).
- Erickson, L., McLean, A., and Abrha, W. (2018). Design of a visual board for a manufacturing cell. *Proceedings of the American Society for Engineering Management 2018 International Annual Conference* (accepted).

Conference Presentations – 2017 to current

- Wolday Abrha, **Reducing steering gear handling damages – the six sigma way and Application of Lean to Reduce Inter-Plant Logistics: The Marine Industry Perspective and Design of a visual board for a manufacturing cell**, ASEM international annual conference, Coeur d’Alene, ID, 10/2018
- Ahad Nasab, **An Experimental Adaptive Teaching Practice**, ASEM international annual conference, Coeur d’Alene, ID, 10/2018
- Seong Dae Kim, **Developing a Manufacturing Process for Home-Based Business**, IBII 2019 International Conference – Management, Leadership, and Business Intelligence, Houston, TX, 3/2019
- Seong Dae Kim, **Effects of Major League Baseball Manager Attributes on Team Performance**, INFORMS Annual Meeting 2018, Phoenix, AZ, 11/2018
- Endong Wang, **Climate effects in data envelopment analysis for residential energy performance benchmarking-An empirical case validation**, 2018 ASCE Conference, New Orleans, Louisiana, 4/2018

Applied Research Presentations – 2017 to current

➤ **Dr. Seong Dae Kim**

- Luncheon speech for PMI Chattanooga Chapter “How do we know in what directions a technology-based product will evolve?” scheduled for May 16, 2019.

Awards/Recognition Received by Department – 2017 to current

➤ **Departmental Awards:**

- Outstanding Research: Dr. Endong Wang
- Outstanding Service: Professor Paul Baggett
- Outstanding Service: Professor Wolday Abrha
- Outstanding Teaching: Dr. Alexandr Sokolov
- Outstanding Teaching: Professor Alexandr Sokolov
- Dr. Ron B. Cox Outstanding Graduate Engineering Management Student Award – Hana Karrar
- Dr. Ronald B. Cox Outstanding Graduate Engineering Management Student Award – Aaron Rubel

- Carissa Luck
 - Mr. and Mrs. Paul J. Kinser Scholarship
 - Mr. Thomas J. Kline Scholarship
- Barbara Musgrave
 - Outstanding Graduate Student
 - Deans Student Advisory Council
- Outstanding Graduate Student Award – Hind Ahmed
- Outstanding Seniors Award
 - BS ETM: Constr. Mgmt. – Barbara Musgrave
 - BS ETM: Engr. Mgmt. – Anna Kate Tenpenny
- **Dr. Endong Wang**
 - Outstanding Reviewer, Journal of Cleaner Production (Journal: Impact Factor:5.651), 2018
 - Service Award, University of Tennessee, Chattanooga, 2018
 - First Place in Reusable Abstractions of Manufacturing Process National Competition, 2017, Jointly-Awarded by NIST, NSF, ASTM, ASME (Led by Dr. Chris Yuan at Case Western Reserve University)
 - **National Awards:**
 - First Place in Reusable Abstractions of Manufacturing Process (RAMP) National Competition Led by Chris Yuan at Case Western Reserve University, Jointly-Awarded by The National Institute of Standards and Technology, National Science Foundation, ASTM International E60 Committee on Sustainability, and ASME Manufacturing Science and Engineering Conference 2017 Organizers
- **Dr. Wolday Abrha**
 - Students' projects recognized at CECS Tech Symposium 2019
 - 1st place: Overall design in Engineering Management
 - 3rd place: Senior Design at college level

4.5. Improvement Processes

The faculty actively engages in regular planning, evaluation, and improvement activities that measure and advance student success. To enrich and improve the curriculum, which is

maintained at the department level, faculty members may propose changes including curriculum, program goals, and an overall assessment process based on feedback from students and inputs during departmental meetings. The department reviews the proposal and, if approved, submits it to the graduate committee. The committee then reviews and approves the proposed changes. Once approved, the university implements the changes in the following academic year.

Another activity that contributes to the program improvement and student success is providing internship opportunities for the students. Our extensive database of companies providing internship positions is professionally maintained and continually updated. The Student Success Center maintains the Handshake database where students and employers have access to its resources. This resource is provided free of charge to students and employers.

4.6. Faculty evaluation

The program uses an appropriate process to incorporate the faculty evaluation system explained in detail in Chapter 3 of the Faculty Handbook

(<http://www.utc.edu/faculty-senate/handbook.php>). Generally, supervisors score their faculty based on overall performance. The annual Evaluation and Development by Objectives (EDO) process is the main tool used to assess faculty at UTC. The process measures quality of teaching, research, and service. The annual EDO evaluation consists of objectives, reports and evaluation. The department head's EDO sample format can be found at <http://www.utc.edu/academic-affairs/pdfs/1-provost-pageforms/dept-head-evaluation-rev6-2015.pdf>. Please refer to Section 3.2 for course learning evaluations, as they are another assessment used for evaluation. In the EDO document, faculty are required to articulate specific measurable goals for each section. For example under Research and Scholarly Activities, the faculty may specify the number of conference participation, the number of journal publication, the number of research proposals submitted as a PI or co-PI, etc. This requirement for specificity helps both faculty and the supervisors track the progress of the faculty towards achievement of the specified goals. Examples of EDOs will be provided during the site visit, if requested.

Part V. Learning Resources

5.1. Equipment and Facilities Evaluation

The College of Engineering and Computer Science regularly evaluates its facilities and equipment and makes improvements where necessary. The College is committed to creating an environment that places personal safety and health of the students and faculty first by regularly evaluating laboratories. Room EMCS 334 has been designated as a 'study' room for engineering management students. Students can plan group studies, work on their capstone projects, or use the computer facilities which have engineering management related software loaded on them. The department has also recently spent close to \$30,000 to remodel EMCS 213 so that it can be used for projects related to logistics and order processing. A Flexible Manufacturing System (FMS) worth \$350,000 is purchased to help with studies in process optimization, queuing, order processing, time studies, etc. This laboratory space will be equipped with more facilities which can be used for both on-campus and online students.

The College's safety manual describes policies and procedures that govern access to labs, including handling of hazardous materials, inspection, and inventory control. Anyone accessing the labs to use equipment or handle materials within the college must follow accepted procedures and adhere to the published policies, which are easily accessible by students and faculty. The Laboratory Safety Manual can be viewed at <https://www.utc.edu/college-engineering-computerscience/pdfs/laboratorysafetymanual.pdf>.

5.2. Learning and Information Resources

Students and faculty have access to information resources to support teaching and learning primarily through the newly constructed UTC Library. Additionally, The Walker Center for Teaching and Learning supports faculty by offering development sessions and other teaching resources. Section 5.3 provides more information on the Walker Center, and the following subsections provide information on the new UTC Library.

A. UTC Library General Information

Mission

The mission of the UTC Library is to support the teaching and research of faculty and students of the University of Tennessee at Chattanooga through the development of collections and services to promote and enhance the university's curriculum and research endeavors. Information about the UTC Library is available at <http://www.utc.edu/library>

Personnel, Budget, and General Overview

The UTC Library has 21 faculty librarians, 14 staff specialists, and over 700 hours of student help to support the UTC community. The total library budget for 2018 was approximately \$4.1 million.

UTC opened a new library facility in January 2015. This new 184,725 square foot facility is open 125 hours per week during the academic semester and provides students, faculty, and staff with access to state-of-the-art technology, spaces, and services. The Library boasts access to 37 group study rooms, 2 practice presentation rooms, 8 conference rooms, a theater classroom, and 3 computer classrooms. Furthermore, both group and individual instruction and consultation are provided to students, faculty, and staff at service points throughout the Library including, [Library Instruction](#), Information Commons, [Studio](#), [Special Collections](#), and the [Writing and Communication Center](#). Finally, co-located in the Library are important student and faculty service points including [The Center for Academic Support and Advisement](#) that offers advising, supplemental instruction, and tutoring and the [Walker Center for Teaching and Learning](#) providing UTC Faculty with instruction and consultation in the areas of teaching, learning, and technology integration.

B. UTC Library Collections

Databases, Serials, and Ongoing Expenditures

The Library makes available 103,530 serial titles, including open access titles, through subscriptions to full-text resources, databases, journal packages, and individual journals. The

Library has identified 3,265 print and electronic journals that support the research and curriculum associated with Computer Science and Computer Engineering. Of these journal titles and databases, the College of Engineering and Computer Science is currently responsible for \$196,161.00 of the total \$1,212,145.00 spent toward ongoing serial and database subscriptions.

The majority of journal content is current and online via journal packages from publishers including Springer/Nature, Elsevier, Wiley, Taylor and Francis, Sage, Ovid, and Oxford University Press. These packages provide access to online journal content across the many disciplines associated with Computer Science and Computer Engineering. Titles available online with full text coverage include, but are not limited to: *Journal of the ACM*, *IEEE Transactions on Information Theory*, *Journal of Cryptology*, *IEEE Sensors Journal*, *ACM Transactions on Graphics*, *Information Sciences*, *Logical Methods in Computer Science*, *ACM Transactions on Software Engineering*, *Information and Software Technology*, *IEEE Transactions on Fuzzy Systems*, *Journal of Artificial Intelligence Research*, *ACM Computing Surveys*, *The Computer Journal*, *Journal of Computer and System Sciences*, *Information and Software Technology*, *Algorithmica*, *Theoretical Computer Science*, *Journal of Functional Programming*, *Journal of Machine Learning Research*, *IEEE Transactions on Computers*, *Software and Systems Modeling*, *International Journal of Computer Vision*, *IBM Journal of Research and Development* . See the supplemental [list of full-text journals](#) for the entire listing of applicable titles.

A review of current UTC Library database subscriptions finds the following that support disciplines within Computer Science and Computer Engineering: [Association for Computing Machinery Digital Library](#), [IEEE/IET Electronic Library](#), [Safari Tech Books Online](#), [ScienceDirect](#), [Proquest SciTech Premium Collection](#), [Materials Science & Engineering Database](#), [Advanced Technologies & Aerospace Database](#), [ABI Inform Complete](#), and [Business Source Premier](#). In addition, the Library makes available numerous multidisciplinary databases such as [ProQuest Central](#), [Web of Science](#), and [Academic OneFile](#), to complement subjectspecific resources.

Monographs, Audio-Visuals, and One-Time Expenditures

The Library's print and electronic book collection consists of 727,541 unique titles. 34,316 fall within the subject classifications HE, QA, T-TP, TS, UG, which are applicable to the study of Computer Science and Computer Engineering. The Library's collection of physical A/V consists of 23,012 items of which, 128 are appropriate to the study of Computer Science and Computer Engineering. Additionally, the library provides access to over 150,000 streaming music and video files through various service providers like Alexander Street Press, Henry Stewart Talks, Kanopy, and Naxos Music. Each year, a portion of the Library's materials budget is allocated to purchase books, audio-visual materials, and other one-time resources. In 2017-2018, the Library expended \$17,269 out of a total amount of \$169,000 towards the acquisition of monographs and A/V materials in support of the College of Engineering and Computer Science.

C. UTC Library Services

Interlibrary Loan and Course Reserves

The Library offers interlibrary loan (ILL) and Document Delivery services at no cost to students and faculty who need to acquire materials that are not owned or accessible by the Library. Patrons can submit and track progress of requests, receive email notification of materials that have arrived, and obtain articles electronically through the electronic ILL management system, ILLiad. The Library also participates in a nationwide program, Rapid ILL that expedites article delivery to the patron. In 2017-2018, 6,284 ILL borrowing and document delivery requests were filled for the UTC community; of those, 413 were filled for faculty and students in the College of Engineering and Computer Science.

The Library offers a well-utilized Course Reserve service for faculty and students allowing faculty to place high-demand materials on reserve to ensure they are available to students. In 2017-2018, no materials were placed on reserve for courses in Computer Science or Computer Engineering. In addition to course reserves, the Library also offers a scanning service for faculty--ensuring access to high-quality and accessible scans of materials related to research and courses.

Circulation of Physical Materials

The Library has generous circulation policies and allows semester-long borrowing of monographs for students and year-long borrowing for faculty members. In 2017-2018, monographs and audio-visual materials circulated 19,955 times. In addition, the Library circulates laptop computers, other tech equipment (cameras, calculators, digital recorders, external hard drives, and more), and group study rooms to patrons. Last year, these items circulated 78,626 times.

Research and Instructional Services

The Library boasts a busy, well-respected, and growing instruction program that combines traditional information literacy and research skills instruction sessions with skills-based workshops on topics ranging from preparing powerful presentations to improving skills with Microsoft Office, Adobe, and statistical software. Course-specific instruction sessions are tailored specifically to the curriculum and include information literacy and research skills tied to assignment objectives. Workshops are open to any UTC student, faculty, or staff member and are developed and taught by skilled librarians and technology trainers.

Instruction

The [Library Instruction](#) Team develops and teaches both general and course-specific instructional sessions tailored to specific research needs or library resources. Partnering with UTC Faculty, the Instruction Team teaches students information seeking and evaluation skills necessary to be effective 21st Century researchers. In 2017-2018, Instruction Librarians taught 365 instruction sessions and workshops that reached 5751 participants across all academic

disciplines. Of those 365 instruction sessions and workshops, two were conducted for the College of Engineering and Computer Science with 41 students participating. Instruction Librarians also dedicate time to providing one-on-one individualized attention to students, faculty, and staff seeking research assistance in a particular area. Over the past year, Instruction Librarians participated in 299 individual research consultations.

Studio

The [UTC Library Studio](#) provides a creative space for the campus community to learn innovative technology and media creation. Located on the 3rd floor, the space provides access to 24 work stations with specialized software including the Adobe Creative Suite, the AutoDesk Suite, Camtasia, and other digital design programs. In addition, the space circulates cameras and other production equipment for students to use as they put their projects together. Last year, these items circulated 9,212 times.

The Studio is staffed by expert Librarians and Staff who provide one-on-one consultations, small group and course-specific instruction, curriculum development, as well as a fully-staffed service point to answer point-of-need questions. In addition to the instructional sessions mentioned below, the Studio taught 25 workshops covering everything from 3D Modeling and Photography to Brainstorming for Creative Assignments and Audio Editing. These workshops were attended by 200 participants.

In 2017-2018, the Studio taught 205 classes across campus that reached 3537 students. While none of these classes were for the College of Engineering and Computer Science in particular, Studio faculty and staff answer questions about the Autodesk Suite and Solidworks as they come up.

Writing and Communication Center

The [Writing & Communication Center](#) (WCC) is a free service that supports writers of all backgrounds and proficiency levels with any kind of writing or communication project at any stage in the process. The WCC's goals are for writers to leave with improved confidence and a plan for revising their work. Peer consultants help writers brainstorm, organize ideas, develop or revise arguments, practice speeches, learn citation styles, become better self-editors, and more. In addition to in-person and online consultations, they also offer workshops, a library of writers' resources, and a supportive environment for working independently. In 2017-2018, the WCC conducted a total of 2,737 individual consultations and 99 workshops and presentations. Four of these presentations were for Engineering and Computer Science classes. The WCC also conducted 165 consultations with 82 Engineering and Computer Science majors for courses outside of their department, and 92 consultations for Engineering and Computer Science courses (87 of these appointments were with majors).

Information Commons

The Information Commons provides students, faculty, staff, and community users with the tools and services needed to complete assignments and research. The Information Commons is open 92 hours per week and fields over 12,000 research questions by phone, chat, e-mail, and in-person each year. Within the Information Commons patrons can get individualized research help at the Information Desk, complete research and assignments by utilizing one of 142 Windows and 36 Macintosh computers loaded with [tons of software](#), scan important documents, or simply print out an assignment. Comfortable open seating at tables and loungers also makes the Information Commons a popular spot to complete work within the Library.

Special Collections

The [Special Collections](#) unit of the Library at the University of Tennessee at Chattanooga is the repository for university's collections of manuscripts, university records and publications, rare books and maps, theses and dissertations, and other archival material. The repository supports a wide range of researchers including undergraduate and graduate students, faculty, members of the community, and other scholars whose work relies on primary source materials.

Although no specific instructional sessions were requested by the College of Engineering and Computer Science in 2017-2018, Special Collections' staff conducted 18 instruction sessions that reached 311 students across many departments. Most of these sessions focus on the use of specific collections or primary-source materials available in Special Collections.

Departmental Liaisons

A Library Liaison program is in place where a librarian is assigned to each academic department to enhance communication, collection development, and general support. Librarians are matched with departments based on educational background, work experience, and subject expertise. Typical library liaison activities involve attending departmental meetings, distributing information about new services or resources, organizing one-time purchase requests, teaching classes, maintaining the [Engineering](#) and [Computer Science](#) Subject Guides, creating course guides, meeting with students and faculty, and more. The current Library liaison for the College of Engineering and Computer Science is [Bo Baker](#).

Library Technology and Spaces

Classrooms, Meeting Spaces, and Instructional/Learning Technologies

As previously mentioned, the UTC Library maintains a state of the art facility that provides students, faculty, and staff with access to 37 group study rooms, two practice presentation rooms, either conference rooms, a theater classroom, and three computer classrooms. Each room is equipped slightly differently, but all have access to overhead projection, podiums with Windows computers and HDMI cables for use with laptops, and white boards. All study rooms contain LCD monitors (HDMI and other cables are available for check out) and whiteboards to aid in group assignments and quiet study. Classrooms contain desktop or laptop computers, presentation podiums, and built in speakers. Conference rooms are set up for hosting and

attending online events. Outside of these reservable spaces, students, faculty, and staff have access to a computer lounge with 142 Windows and 36 Macintosh computers and the Studio where high-spec PC's and Macs are available. Printers, b&w and color, as well as scanners and micro format readers are available at various points throughout the Library. Additionally, students, faculty, and staff can check out Windows laptops, Chromebooks, high-end A/V equipment, scientific calculators, and an assortment of cables, chargers, and computer accessories at either the main check-out desk or the Studio.

5.3. Materials and Support Staff

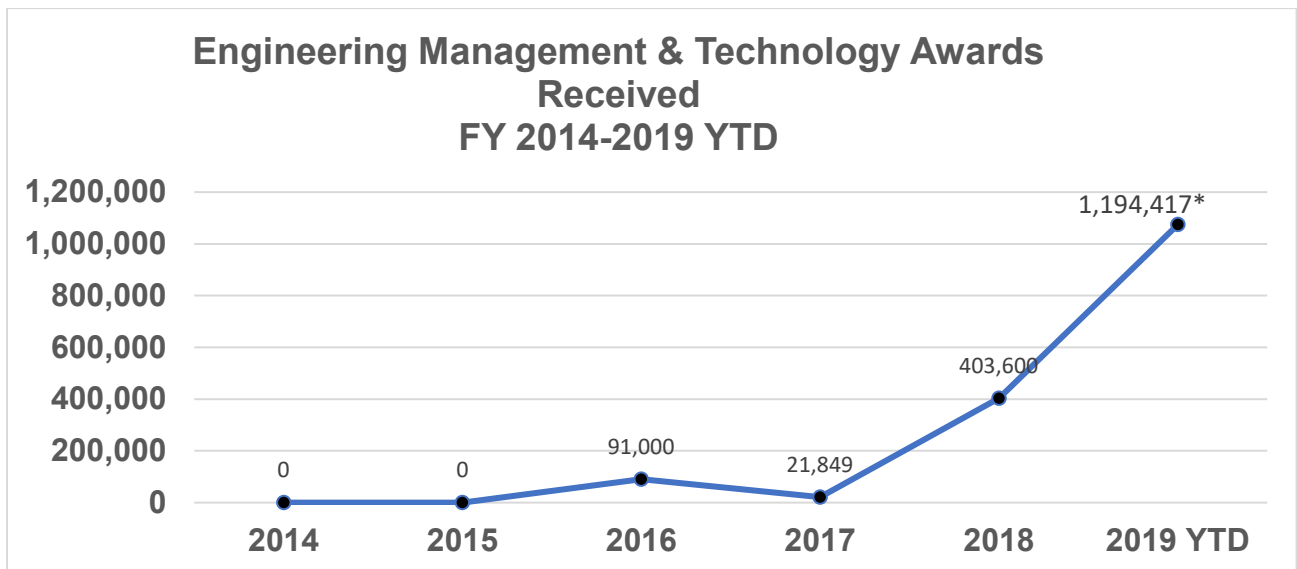
The MS Engineering Management program provides adequate materials and support staff to encourage research and publication. The Walker Center for Teaching and Learning promotes excellence in teaching, learning and the use of technology through dialogue, inquiry, and research. To fulfill these goals, the Center maintains a trustworthy environment to those it serves. The Center also offers faculty feedback and opportunities for reflection on their teaching. Please visit <https://www.utc.edu/walkercenter-teaching-learning/> for more information.

Administrative Assistance staff are a dependable resource for departments to rely on. Graduate Research Assistants are also hired every academic year to collaborate with the faculty. The Library (section 5.2) provides enough material for almost all areas of research interest.

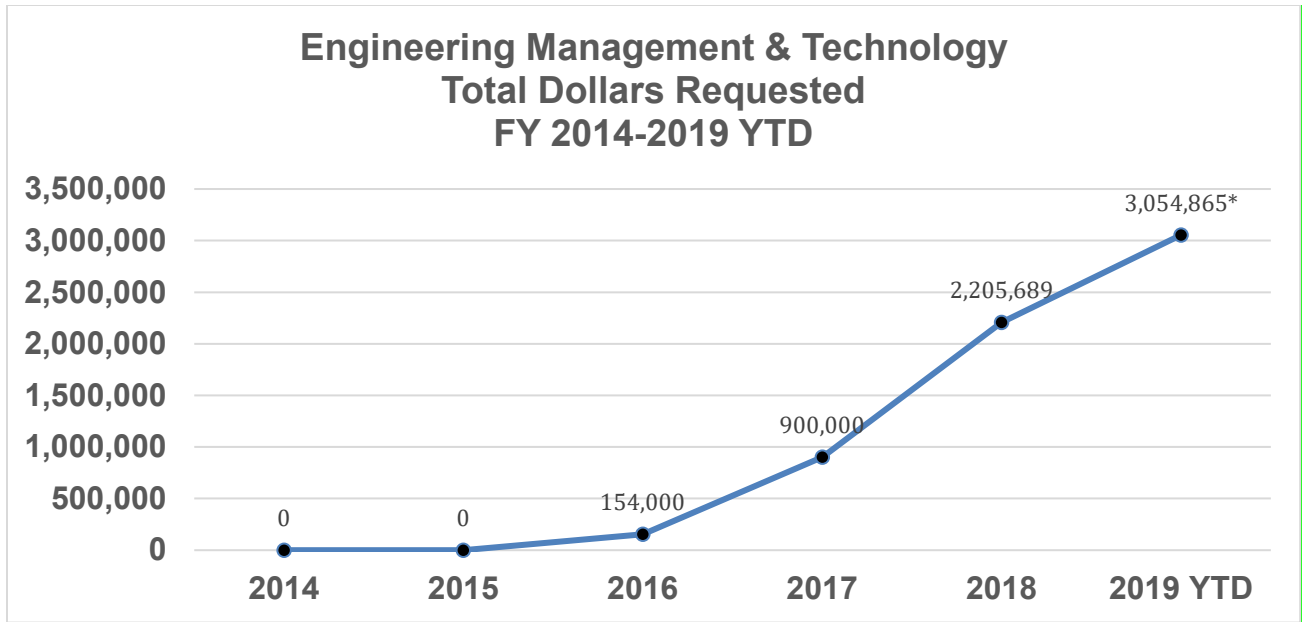
Part VI. Support

6.1. Operating Budget

The MS Engineering Management program's internal and external support are consistent with the budget needs of the program. Figure 6 show the internal and external grants received by the faculty in the department. Appendix A shows the operating budget for the department.



*Includes awards as Co-PI with other CECS Departments.



**Includes proposals submitted as Co-PI with other CECS Departments.*

**Figure 6. Grants (Funded Proposals, FY 2014 through FY 2019)
5-year history of dollars requested/proposed and awards received**

6.2. Enrollment and Effectiveness

Enrollment and graduation rates are key components of accountability at UTC. A high-quality experience has been integrated throughout the graduate program in order to maintain high enrollment rates. Faculty builds strong relationships with students through smaller classes and one-on-one meetings and serves as primary mentors of students. The faculty also encourages local industries to hire MS program students, enabling the maintenance of a high student enrollment and retention rates. Even though the enrollment has declined in the past few years, the number of students in the program is still sufficient to sustain a high quality and cost-effective program. Please see Section 3.1 for recruitment details and enrollment numbers.

6.3. Program Responsiveness

The MS Engineering Management program is responsive to changing local, state, regional and national needs. As mentioned in Section 2.1, the curriculum contents are reviewed regularly, partly to respond to changing regional needs.

Since the last program review, a strategic plan for the College of Engineering and Computer Science has been under development to further propel the responsiveness of programs it contains, including the MS Engineering Management Program. This strategic can be seen at <http://www.utc.edu/collegeengineering-computer-science/pdfs/cccs-strategic-plan-approved-09082016.pdf>.

6.4. Graduate Student Data Collection and Placement Evaluation

Graduate students are connected to the College's LinkedIn page (<https://www.linkedin.com/groups/6715787>) upon graduation. The LinkedIn page helps the College stay connected with alumni and where they currently work. Since 2015, the College has also completed an Annual Review, which is distributed to all alumni in addition to the local and regional businesses. The latest review can be found at <http://www.utc.edu/college-engineering-computer-science/about-us/annual-review.php>.

6.5. Procedure Review

The MS Engineering Management program's procedures are regularly reviewed to ensure alignment to institutional policies and mission. This is done every year to comply with and maintain the standards contained in the guidelines of the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC), the recognized regional accrediting body in the eleven U.S. southern states.

Appendix A. Expenditures

Expenditures					
	2014-15 ¹	2015-16 ¹	2016-17 ¹	2017-18 ¹	2018-19 ¹
Actual Expenditures ^{2,3}	\$674,823	\$763,219	\$650,860	\$760,946	\$716,654
Fall Adjunct Salaries ²	\$84,000	\$62,000	\$66,000	\$72,000	\$69,900
Spring Adjunct Salaries ²	\$80,500	\$75,250	\$84,750	\$85,157	\$86,700
FT Faculty FTE ²	6.0	5.5	4.5	5.1	6.0
Total Major Enrollment	77	72	60	59	49
Fall SCH	533	476	404	427	426
Spring SCH	547	408	381	418	390
Expenditures per FT Faculty FTE	\$139,887	\$163,722	\$178,136	\$178,967	\$145,542
Expenditures per Student Major	\$10,900	\$12,507	\$13,360	\$15,561	\$17,822
Expenditures per SCH	\$777	\$1,019	\$1,021	\$1,087	\$1,070

¹ FY data is July 1 - June 30

² data contains total department (graduate and undergraduate) results from both Engineering (due to some paid from this account) and Engineering Management Technology accounts

³ Actual Expenditures just reflects expenditures in account E041301006. Expenditures from other accounts are not reflected in this amount.

Appendix B. Diversity

Diversity of Faculty and Graduate Major Enrollment **Fall 2018-19**

Gender and Ethnicity
(Graduate Major Enrollment)

Undergraduate Major Enrollment			Graduate Major Enrollment		
Multiple Races	6		Multiple Races	3	
Unknown	5		Unknown	3	
American Indian			Non – Resident Alien	6	
Asian	3		Asian		
Hispanic	5		Hispanic	3	
African American	11		African American	6	
White	139		White	31	
	Female	Male		Female	Male
Total*	20	149	Total*	10	42

Faculty		
Multiple Races	6	
Unknown		
American Indian		
Asian	2	
Hispanic	1	
African American	1	
White	2	
	Female	Male
Total (FT)	0	7
Total (FT & Adjunct)	3	9

Appendix C. Student Ratings

Engineering (ENGM) Fall 2018

	Strongly Agree (%)	Agree (%)	Somewhat Agree (%)	Neither Agree nor Disagree	Somewhat Disagree (%)	Disagree (%)	Strongly Disagree (%)
I am aware of the learning outcomes of this course, as stated in the syllabus	75	21	3	1	0	0	1
The course content addresses the learning outcomes of this course.	76	18	5	1	0	0	1
The course structure assists me in achieving the learning outcomes of this course.	67	22	5	2	1	1	2
I am achieving the learning outcomes of this course.	66	22	8	3	0	0	0
I keep up with all course readings and assigned work.	65	28	7	0	0	0	0
The course encourages my use of critical thinking skills.	64	26	8	1	0	1	1
The way this course is delivered encourages me to be actively engaged.	62	24	8	1	2	1	2
The instructor is willing to assist me with achieving the course learning outcomes.	73	19	3	3	0	0	1
The instructor provides constructive feedback on my coursework.	65	21	6	6	0	1	1
The instructor responds to my questions and emails within the time-frame indicated in the syllabus.	7	15	5	3	1	2	2

College of Engineering & Computer Science							
	Strongly Agree (%)	Agree (%)	Somewhat Agree (%)	Neither Agree nor Disagree (%)	Somewhat Disagree (%)	Disagree (%)	Strongly Disagree (%)
I am aware of the learning outcomes of this course, as stated in the syllabus	64	23	7	2	2	1	1
The course content addresses the learning outcomes of this course.	62	24	8	2	2	1	1
The course structure assists me in achieving the learning outcomes of this course.	56	22	9	4	4	3	4
I am achieving the learning outcomes of this course.	53	23	12	4	3	2	3
I keep up with all course readings and assigned work.	57	26	11	2	2	1	1
The course encourages my use of critical thinking skills.	58	23	10	2	2	1	3
The way this course is delivered encourages me to be actively engaged.	52	20	11	5	4	4	4
The instructor is willing to assist me with achieving the course learning outcomes.	62	20	7	4	2	2	2
The instructor provides constructive feedback on my coursework.	53	20	10	6	4	3	4
The instructor responds to my questions and emails within the time-frame indicated in the syllabus.	60	20	6	7	2	2	4
Total University							
	Strongly Agree (%)	Agree (%)	Somewhat Agree (%)	Neither Agree nor Disagree (%)	Somewhat Disagree (%)	Disagree (%)	Strongly Disagree (%)
I am aware of the learning outcomes of this course, as stated in the syllabus	70	20	6	2	1	1	1
The course content addresses the learning outcomes of this course.	68	21	6	2	1	1	1
The course structure assists me in achieving the learning outcomes of this course.	63	19	8	3	3	2	2
I am achieving the learning outcomes of this course.	60	21	9	3	2	2	2
I keep up with all course readings and assigned work.	59	24	11	2	2	1	1
The course encourages my use of critical thinking skills.	60	22	10	3	2	2	1
The way this course is delivered encourages me to be actively engaged.	58	19	10	4	4	3	3
The instructor is willing to assist me with achieving the course learning outcomes.	67	18	6	4	2	1	2
The instructor provides constructive feedback on my coursework.	60	17	8	6	3	3	3
The instructor responds to my questions and emails within the time-frame indicated in the syllabus.	65	18	5	8	2	1	2

Appendix D. Library Information

New University Library Facts:

- 180,000 square feet
- 5 floors
- Opened January 2015

The new LEED-certified library is chock full of new strategic campus partnerships and is the premier location for student academic needs outside the classroom. New and expanded partnerships represented in the new building include: Art Department, Center for Advisement and Student Success, Copy Services, Information Technology Division, Disability Resources Center, Southern Writers, Walker Center for Teaching and Learning, and Writing and Communication Center. Designed with a robust technological infrastructure and themes of transparency, collaboration, and flexibility, student access and success was at the center of building planning processes.

- 37 study rooms (29 small, 7 medium, 1 large)
- 2 practice presentation rooms
- 24 hour student study space, opened Sunday to Thursday
- 4 lounges (2 quiet, computer and graduate student)
- Starbucks
- Information Commons (research assistance and 175+ computers)
- Studio 305: advanced media studio and creator space
- Seating for over 2,100
- 7 classrooms
- 8 seminar and conference rooms
- 29 faculty and graduate student carrels
- 2 visiting scholar rooms
- Grand reading room
- Moveable compact stacks with storage for ~600,000 volumes
- New material browsing area (think more Barnes and Noble)
- Media viewing room
- Expanded special collections storage with unique climate controls
- New auditorium housing 2 lecture halls of ~225 seats each adjacent to the new library.

Appendix E. Journals

Most journals are available online and can be accessed through the UTC Library Journals Search feature. A sample of the full-text journals (online and print) at UTC Library that include engineering and engineering management-related content are presented below.

Full-text Journals
Advanced Cement Based Materials ACBM
Advanced Composites Bulletin
Advanced Engineering Materials
Advanced Functional Materials
Advanced Imaging
Advanced Materials
Advanced Materials and Composites News
Advanced Materials and Processes
Advanced Materials for Optics and Electronics
Building Products
Bulletin of Earthquake Engineering
Bulletin of Engineering Geology and the Environment
Bulletin of Materials Science
Cement and Concrete Composites
Cement and Concrete Research
Chemical Vapor Deposition
Civil Engineering and Environmental Systems
Design Engineering
Designing for User Experiences
Diesel Progress North American
Dynamics and Control
Earthquake Engineering and Engineering Vibration
Earthquake Engineering and Structural Dynamics
Geomechanics and Geoengineering: An International Journal

Geomechanics for Energy and the Environment
Geosystem Engineering
Granular Matter
Home Energy
Hydraulic and Mechanical MRO
IBM Journal of Research and Development
Industrial Distribution
Machine Design
Machining Science and Technology
Mainframe Computing
Manufacturing Engineering
Materials and Design
Materials and Structures
Materials at High Temperatures
Materials Letters
Materials Research Innovations
Materials Science
Materials Science and Engineering A Review Journal
Materials Science and Engineering B Solid State Materials for Advanced Technology
Materials Science and Technology MST: A Publication of the Institute of Metals
Materials Science in Semiconductor Processing
Materials Technology
Materials Today Proceedings
Polymer Science
Polymer Testing
Polymers and Polymer Composites
Powder Technology
Power Engineering
Power Quality Assurance
Residential Systems

Robotics and Autonomous Systems
Rock Mechanics and Rock Engineering
Soil Dynamics and Earthquake Engineering
Soil Mechanics and Foundation Engineering
Soils and Foundations
Steel Construction Design and Research
Strength of Materials
Structural and Multidisciplinary Optimization
Structural Concrete Journal of the FIB
Structural Safety
Structural Survey
Structure and Infrastructure Engineering Maintenance Management Life Cycle
Design and Performance
Structures
Super Street bike
Surface Engineering
Survey Review
Surveying and Land Information Systems
Sustainable Energy Grids and Networks
Sustainable Energy Technologies and Assessments
Sustainable Materials and Technologies
Systems Engineering Theory and Practice
Wind Energy
Wind power Monthly Newsmagazine
Wood Material Science and Engineering
Wood Science and Technology

Appendix F. Example Curriculum Vitae

A. Resume of Seong Dae Kim

Seong Dae Kim, Ph.D., PMP, aCAP

Phone: 1-423-
425-5786

Email:
[seongdae-
kim@utc.edu](mailto:seongdae-kim@utc.edu)

EDUCATION

2009 Texas A&M University, College Station, Texas

Ph.D. in Industrial Engineering (degree conferred 2009)

Dissertation title: “The Tradeoff between Investments in Infrastructure and Forecasting
in the face of Natural Disaster
Risk”

Advisor: Prof. J. Eric Bickel

2002 SungKyunKwan University, Korea (South)

M.S. in Industrial Engineering (degree conferred 2002)

Thesis title: “A Study on the Application of TRIZ to the Areas of Management Science
- With Regard to Inventory Control and Queuing Models”

1999 SungKyunKwan University, Korea (South)

B.S. in Industrial Engineering (degree conferred 1999)

EMPLOYMENT HISTORY

08/01/2018-present Associate Professor of Engineering Management & Technology Department, College of Engineering and Computer Science, University of Tennessee at Chattanooga, Chattanooga, TN.

05/28/2015-
06/30/2018 Program Chair of Engineering & Science Management (ESM)

07/2015-06/30/2018 Associate Professor of Engineering, Science, and Project Management (ESPM) Department, College of Engineering, University of Alaska Anchorage (UAA), Anchorage, AK.

12/2009-06/2015 Assistant Professor of ESPM Department, College of Engineering, UAA, Anchorage, AK.

PUBLICATIONS

- Jonathan Sinclair and Seong Dae Kim (2019), “Economic Feasibility of the Residential Applications of Photovoltaics in Alaska”, *Proceedings of ASEM International Annual Conference 2019*, Philadelphia, Pennsylvania.
- Tom Riley and Seong Dae Kim (2019), “Developing a Manufacturing Process for Home-Based Business”, *The 2019 IBII International Conferences Proceedings*, Houston, Texas.
- Sowmini Sengupta, Jisun Kim, and Seong Dae Kim (2018), Forecasting new features and market adoption of wearable devices using TRIZ and growth curves: Case of Fitness Tracking Products, *International Journal of Innovation and Technology Management*, Vol. 15, No. 1.
- Seong Dae Kim (2017), Understanding hidden risks from disasters: Cases of hurricane Katrina and Fukushima nuclear meltdown, ASCE’s *Journal of Management in Engineering*, DOI: [http://dx.doi.org/10.1061/\(ASCE\)ME.19435479.0000539](http://dx.doi.org/10.1061/(ASCE)ME.19435479.0000539), published online 4/13/2017.
- Seong Dae Kim (2017), Characterization of unknown unknowns using separation principles in case study on Deepwater Horizon oil spill, *Journal of Risk Research*, Vol. 20, No. 1, pp. 151-168, DOI: 10.1080/13669877.2014.983949.
- Seong Dae Kim and Chong M. Kim (2016), Survey of road design and maintenance in cold region metropolitan areas, *Proceedings of the 11th International Symposium on Cold Regions Development*, Inchon, Republic of Korea, May 18-20, 2016.
- Seong Dae Kim (2016), Decision analysis on wind energy technologies in Alaska, *Proceedings of the 11th International Green Energy Conference*, Anchorage, Alaska, May 8-11, 2016.
- Sowmini Sengupta, Jisun Kim, and Seong Dae Kim (2015), Applying TRIZ and Bass model to forecast fitness tracking devices technology, *Proceedings of PICMET 2015*, Portland, Oregon, August 2-6, pp. 2177-2186.
- Seong Dae Kim (2014), Book Review: “Cox, Jr., Louis Anthony. 2012. *Improving Risk Analysis*. Springer. 412 pp.”, *Interfaces*, Vol. 44, Issue 6, November-December, Accepted for publication.
- J. Eric Bickel and Seong Dae Kim (2014), Reexamining the efficiency of the Major League Baseball over-under betting market, *Applied Financial Economics*, Vol. 24, No. 18, pp. 1229-1234, DOI: 10.1080/09603107.2014.925052.
- Seong Dae Kim, Robert K. Hammond, and J. Eric Bickel (2014), Improved mean and variance estimating formulas for PERT analyses, *IEEE Transactions on Engineering Management*, Vol. 61, No. 2, May 2014.
- Seong Dae Kim (2012), Characterizing unknown unknowns, *Proceedings of PMI Global Congress 2012-North America*.
- J. Eric Bickel, Eric Floehr, and Seong Dae Kim (2011), “Comparing NWS Pop forecasts to Third-Party Providers,” *Monthly Weather Review*, Vol. 139, No.10, October 2011.

- Seong Dae Kim, Teresa Brewer, Gary Kretchik, Donghwoon Kwon, Harrison Yeo, and Kelly Brown (2011), Prioritization of Future Freight Infrastructure Projects within the Anchorage Metropolitan Area Transportation solutions (AMATS), Proceedings of 13th TRB National Transportation Planning Applications Conference, Reno, Nevada, May 8-12, 2011, Available at <http://trb-appcon.org/program.html#s8>.
- Seong Dae Kim and J. Eric Bickel (2010), “Roads or Radar: The Tradeoff Between Investments in Infrastructure and Forecasting When Facing Hurricane Risk,” *IEEE Systems Journal*, Vol. 4, Issue 3, pp. 363-375.
- J. Eric Bickel, Eric Floehr, and Seong Dae Kim (2010), “Comparing NWS POP Forecasts to Third-Party Providers,” *Proceedings of 20th Conference on Probability and Statistics in the Atmospheric Sciences*, The 90th American Meteorological Society Annual Meeting, Atlanta, GA, January 18, 2010. (http://ams.confex.com/ams/90annual/techprogram/session_23848.htm)
- J. Eric Bickel and Seong Dae Kim (2008), “Verification of The Weather Channel Probability of Precipitation Forecasts”, *Monthly Weather Review*, Vol. 136, Issue 12, December 2008. Featured in New Scientist (<http://www.newscientist.com/blogs/shortsharpscience/2009/02/how-good-are-the-weather-chann.html>).
- Seong Dae Kim and J. Eric Bickel (2008), “Roads or Radar: Investing in Infrastructure or Improved Forecasting in the Face of Tropical Cyclone Risk,” Proceedings of the 28th Conference on Hurricanes and Tropical Meteorology, AMS Annual Meeting, Orlando, FL, April 30, 2008.
- J. Eric Bickel and Seong Dae Kim (2008), “Verification of The Weather Channel Probability of Precipitation Forecasts,” Proceedings of the 19th Conference on Probability and Statistics, 88th AMS Annual Meeting, New Orleans, LA, January 23, 2008.
- Seong Dae Kim and J. Eric Bickel (2007), “Roads or Radar: Investing in Infrastructure or Improved Forecasting in the Face of Hurricane Risk,” Proceedings of the 44th Annual Technical Meeting of the Society of Engineering Science, College Station, TX, October 23, 2007.

MANUSCRIPTS IN PREPARATION

- J.C. Kim and Seong Dae Kim, “Experienced Veteran or Promising Rookie: The Effects of MLB Managers’ Salary and Experience on Team Success”, target journal to be determined.
- Seong Dae Kim and J.C. Kim, “Inquisitive view on the fairness of 2015 World Baseball Softball Confederation (WBSC) Premier 12 Schedule”, to be submitted to *Journal of Applied Sports Management*.

CONFERENCE PRESENTATION

- Jonathan Sinclair and Seong Dae Kim*, “Economic Feasibility of the Residential Applications of Photovoltaics in Alaska”, presented at ASEM International Annual Conference 2019, Philadelphia, Pennsylvania, October 25, 2019.
- Tom Riley and Seong Dae Kim* (2019), “Developing a Manufacturing Process for Home-Based Business”, presented at IBII 2019 International Conference on Management, Leadership and Business Intelligence, Houston, Texas, March 1, 2019.
- Seong Dae Kim and J.C. Kim (2018), “Effects of Major League Baseball Manager Attributes on Team Performance”, presented at INFORMS Annual Meeting 2018, Phoenix, Arizona, November 4, 2018.
- J.C. Kim and Seong Dae Kim (2017), “Experienced Veteran or Promising Rookie: The Effects of MLB Managers’ Salary and Experience on Team Success”, presented at New England Symposium on Statistics in Sports (NESSIS), Cambridge, Massachusetts, September 23, 2017.
- Seong Dae Kim and J. C. Kim (2016), “Analysis of World Baseball Softball Confederation Premier 12 Schedule”, INFORMS Annual Meeting 2016, Nashville, Tennessee, November 16, 2016.
- Seong Dae Kim and Chong M. Kim (2016), “Survey of Road Design and maintenance in Cold Region Metropolitan Areas”, 11th International Symposium on Cold Regions Development (ISCORD 2016), Inchon, Republic of Korea, May 18-20, 2016.
- Seong Dae Kim (2016), “Decision analysis on wind energy technologies in Alaska”, 11th International Green Energy Conference (IGEC 2016), Anchorage, Alaska, May 8-11, 2016.
- Sowmini Sengupta, Jisun Kim, Seong Dae Kim (2015) “Applying TRIZ and Bass model to forecast fitness tracking devices technology” PICMET 2015, Portland, Oregon, August 2-6, 2015.
- Seong Dae Kim (2014) “Characterizing Hidden Risks using Knowledge Gap and Separation Principles,” INFORMS Annual Meeting San Francisco 2014, November 12, 2014.
- Seong Dae Kim (2012) “TRIZ as a Problem Solving Method for Stalled Projects,” Alaska Quality Conference, Anchorage, AK, October 31, 2012.
- Seong Dae Kim (2012) “Characterizing Unknown Unknowns,” PMI Global Congress 2012-North America, Vancouver, British Columbia, Canada, October 22, 2012.
- Seong Dae Kim (2012) “Characterizing Unknown Unknowns When Facing Natural Disasters,” INFORMS Annual Meeting Phoenix 2012, October 16, 2012.
- Seong Dae Kim (2011) “Sustainable Risk Management for Arctic Offshore Oil & Gas Development”, INFORMS Annual Meeting 2011, Charlotte, North Carolina, November 16, 2011.

- Seong Dae Kim and Teresa M. Brewer (2011), “Prioritizing Future Freight Infrastructure Projects within the AMATS Area,” 13th TRB National Transportation Planning Applications Conference, Reno, Nevada, May 9, 2011.
- Seong Dae Kim (2010), “Hurricane Risk Analysis,” A University of Alaska North by 2020 Forum / International Arctic Research Center Seminar Series, Anchorage, AK, November 11, 2010, Slides available at <http://www.iarc.uaf.edu/NX2020/seminar-defining-risk-in-arctic>.
- Seong Dae Kim (2010), “Curriculum Development for the Innovation Management Program for Sustainability,” INFORMS Annual Meeting 2010, Austin, TX, November 10, 2010.
- Seong Dae Kim and J. Eric Bickel (2010), “Investments in Infrastructure and Forecasting When Facing Hurricane Risk,” INFORMS Annual Meeting 2010, Austin, TX, November 9, 2010.
- Seong Dae Kim (2008), “Investments in Infrastructure and Forecasting in the face of Hurricane Risk,” INFORMS TAMU Student Chapter Seminar, College Station, TX, October 24, 2008.
- Seong Dae Kim and J. Eric Bickel (2008), “The Tradeoff between Investments in Infrastructure and Forecasting in the face of Hurricane Risk,” INFORMS Annual Meeting 2008, Washington D.C., October 15, 2008.
- J. Eric Bickel and Seong Dae Kim (2008), “Baseball Betting Markets and Player Valuation,” INFORMS Southwest Regional Conference 2008, College Station, TX, April 18, 2008.
- Seong Dae Kim and J. Eric Bickel (2008), “Roads or Radar: Investing in Evacuation Infrastructure or Improved Forecasting in the face of Hurricane Risk,” INFORMS Southwest Regional Conference 2008, College Station, TX, April 18, 2008.
- Seong Dae Kim, Farnaz Akhavi, and Ben Zoghi (2005), “Industry Trend of Evolution Analysis Tool”, Proceedings of Industrial Distribution Educators Association (IDEA) Second Annual Meeting, 32nd Annual Meeting of Federation of Business Disciplines, Dallas, Texas, March 2 - March 5, 2005.
- Seong Dae Kim, Farnaz Akhavi, and Ben Zoghi (2005), “How to Design New Services using TRIZ”, Proceedings of Industrial Distribution Educators Association (IDEA) Second Annual Meeting, 32nd Annual Meeting of Federation of Business Disciplines, Dallas, Texas, March 2 - March 5, 2005.

SEMINARS AND LECTURES

- Invited lecture for UTC ETEM 1000 (Engineering Management Seminar) “Evolution Patterns of a Technology/Business”, September 27, 2019.
- Invited luncheon speech for PMI Chattanooga Chapter “In what directions will a product/service evolve?”, Chattanooga, May 16, 2019.

- Invited lecture for UTC ENCH 4300 (Chemical System Design) “Project management challenges in engineering projects”, April 4, 2019.
- Invited lecture for UTC ETEM 1000 (Engineering Management Seminar) “Possibilities in Engineering Management”, September 14, 2018.
- Internet broadcasting “I am PM”, Seoul, Korea, June 28, 2016. Advertised at <http://talkit.tv/Event/1373>.
- Graduate seminar: Forecasting Fitness Tracking Devices Technology Using TRIZ and Bass model, Pohang University of Science and Technology (POSTECH), Pohang, Korea, June 22, 2016.
- Monthly seminar: Creativity in Project Risk Management, PMI (Project Management Institute) Korea Chapter monthly seminar, Seoul, Korea, June 15, 2016.
- Graduate seminar: Forecasting Fitness Tracking Devices Technology Using TRIZ and Bass model, Sungkyunkwan University, Suwon, Korea, June 11, 2016.
- Undergraduate seminar: What Engineers Can Do about Incubators in Developing Countries, WBSC Premier 12, and Fitness Tracking Devices, Sungkyunkwan University, Suwon, Korea, June 8, 2016.
- Graduate seminar: Forecasting Fitness Tracking Devices Technology Using TRIZ and Bass model, Pusan National University, Pusan, Korea, June 2, 2016.
- Lecture 17: TRIZ-based Creative Problem Solving Method, Engineering Project Management Program, Seoul National University, May 27, 2016.
- Lecture 16: Creativity in Project Risk Management, Engineering Project Management Program, Seoul National University, May 27, 2016.
- Seong Dae Kim (2015), “TRIZ Patterns of Technological Systems Evolution”, special seminar for Bonneville Power Administration (BPA), Portland, OR, August 4, 2015.
- Seong Dae Kim (2010), “PM, TRIZ, and Beyond,” Korea PM Forum, Seoul, Korea, December 21, 2010.
- Seong Dae Kim (2010), “Why Project Management?” Special seminar presented to POSCO, Seoul, Korea, December 21, 2010.

AWARDS AND HONORS

- 2018 UTC Faculty Grant, \$1,500 for presenting a sports analytics research at INFORMS Conference at Phoenix, AZ, on Nov. 4-7, 2018.
- 2017 UNAC Travel Award, \$974.20 for travel expenses and registration expenses for travel on Nov. 13-16, 2016 to Nashville, Tennessee for INFORMS 2016 Conference.
- 2015 UNAC Release time Faculty Development Award I, \$900 for salary and benefits between May 10th and May 16th, 2015 to prepare for workshop on TRIZ for BPA and Technology Innovation Office, Portland, OR.
- Research Travel Grant, Round 1, FY16, UAA, \$615.00 for travel on August 2-6, 2015 to Portland, OR for PICMET conference and special workshop on TRIZ for BPA.

- 2014 UAA Faculty and Staff Longevity Award: 5 years, April 20, 2014.
- Research Travel Grant, Round 2, FY14, UAA, \$541.34 for presentation at INFORMS Conference 2014, San Francisco, CA.
- Fall 2013/Spring 2014 United Academics Travel Grant, UAA, October 8, 2013, \$360 for IIE Best Practices in Lean & Six Sigma Applied to Healthcare (Online Virtual Conference) on Oct. 23, 2013 & IIE Best Practices in Managing Continuous Improvement(Online Virtual Conference) on Nov. 20, 2013.
- INFORMS Decision Analysis Society (DAS) Student Travel Award, 2008.
- Invited to 2008 INFORMS Future Academician Colloquium in Washington, D.C.
- Department Scholarship, Texas A&M University, 2002 - 2008.
- Toegye Scholarship (four years, 100% tuition and fee), SungKyunKwan University, 1992, 1996 - 1998.

SPONSORED RESEARCH

11/2013- 06/2014	PI, “Professional Training for Oil and Gas Process Lifecycle Planning, Risk Reduction, Optimization and Safety”, Alaska Oil and Gas Occupations Training Grant by State of Alaska Department of Labor and Workforce Development, award amount: \$40,000.
01/2010- 05/2010	PI, “Prioritization of future Freight Infrastructure Projects within the Anchorage Metropolitan Area Transportation Solutions (AMATS),” research project sponsored by Municipality of Anchorage.
06/2008- 05/2009	Student Technician II, Decision & risk analysis on investment decision associated with hurricane evacuation, supervised by Dr. J. Eric Bickel.
09/2006- 08/2007	Student Technician II, Probability assessment and verification on sports gambling, supervised by Dr. J. Eric Bickel.
09/2005- 08/2006	Research Assistant, “Value of information from 4D seismic technology for oil/gas exploration” sponsored by Schlumberger, supervised by Dr. J. Eric Bickel, Develop economic module to estimate the value of information.
01/2005- 08/2005	Student Technician II, Probability assessment and verification on weather forecast, supervised by Dr. J. Eric Bickel.
06/2004- 12/2004	Research Assistant, “Fee-Based Service for National Association of Wholesaler-Distributors (NAW)” supervised by Dr. Ben Zoghi in the Department of Engineering Technology & Industrial Distribution, Texas A&M University, Develop a model for developing and pricing new services for NAW members.
06/2004- 12/2004	Research Assistant, “Elk Customer Service Survey” supervised by Dr. Ben Zoghi in the Department of Engineering Technology & Industrial Distribution, Texas A&M University, Documentation and analysis of the survey to Elk's distributors nation-wide.

01/2000-05/2000 Research Assistant, “Reconstruction of Demand Forecasting and Inventory Control System for Automobile Spare Parts” sponsored by Hyundai MOBIS (former Hyundai Precision Industry Company), Korea (South), Generate ideas for various alternative inventory control systems, conduct simulation of the alternatives, and analyze the result.

PROPOSALS

- Center of Excellence in Applied Computational Science & Engineering (CEACSE) Grant proposal “Measuring the Impact of Smart City Technologies to the Performance of Road System Using Agent-Based Simulation” requesting \$93,531. Submitted as PI on October 14, 2019.
- Research proposal “Rapid Emergency Evacuation Planning/Assessment for Tourist Attractions and Isolated Communities” submitted to TDOT as PI in April 2019. Not funded.
- Research proposal “Understanding Freight Impacts on Tennessee Communities” submitted to TDOT as Co-PI in April 2019. Not funded.
- Grant proposal “UT-Chattanooga Workforce Development for Smart Factories” submitted to NSF S-STEM as Co-PI in March 2019. Under review.
- Research proposal “Investigation on wrong-way prevention technologies and systems” requesting \$180,394, submitted to Tennessee Department of Transportation (TDOT) as PI on September 4, 2018. Not funded.

TEACHING

Spring 2019	Decision Making and Optimization Techniques (ENGM 5040)
Spring 2019	Technical Project Management (ENGM 5540)
Fall 2018, 2019	Project Management and Practice (EEM 3550)
Spring 2018	Engineering Economy (ESM 605)
Spring 2017	Economic Analysis and Operations (ESM 450)
Fall 2016, Spring 2017	Engineering Practices II (ENGR 161): MATLAB course for engineering students
Fall 2015	Introduction to Engineering (ENGR 151)
Springs 2015 – 2016	Total Quality Management (ESM 623), with emphasis on Lean Six Sigma and TRIZ
Falls 2013 – 2016	Operations Research (ESM 621)
Springs 2013 – 2018	Project Management Application Tools (PM 653), developed and taught this course
Falls 2012 – 2017	Project Definition and Research Methods (PM 652), developed and taught this course
Fall 2011 – 2015	Capstone Project: Initiating and Planning (PM 686A)
Spring 2012 – 2015	Capstone Project: Executing, Controlling and Closing (PM 686B)
Fall 2012 – Summer 2018	Final Project/Thesis (ESM 684/699)
Falls 2010, 2011	Project Risk Management (PM 624)

Springs 2010 – 2012 Project Quality Management (PM 616)
 Spring 2010 – Spring 2012 Case Study and Research (PM 685)
 Springs 2008, 2009 Instructor for Economic Analysis of Engineering Projects (ISEN302) (TAMU).
 Fall 2007 Teaching Assistant for Prof. J. Eric Bickel’s Engineering Analysis for Decision Making “Decision Analysis I” (ISEN627). Assist the instructor during the class, grade homework, quizzes, and tests, make test problems, teach problem sessions (TAMU).
 2007 Teaching Assistant Training and Evaluation Program (TATEP), August 22 - August 23 (TAMU).

ACADEMIC SERVICE

- Chair, Construction Management Faculty Search Committee, UTC, September 27, 2019 – present.
- Chair, Department of Engineering Management & Technology (EMT) Curriculum Committee, September 24, 2019 – present.
- Member, EMT Scholarship and Awards Committee, September 24, 2019 – present.
- Member, EMT Distance and Online Education Committee, September 24, 2019 – present.
- Member, College of Engineering and Computer Science (CECS) Graduate Curriculum Committee, October 8, 2019 – present.
- Chair, Engineering Management Faculty Search Committee, UTC, September 9, 2019 – present.
- Technical program committee for IEEE TEMS International Conference TEMSCON 2020.
- Graduate Program Coordinator for EMT, UTC, August 23, 2019 – present.
- Journal paper reviewer, *Energies*, July 2019.
- Journal paper reviewer, *IEEE Transactions on Engineering Management*, June 2019.
- Conference paper reviewer, ASEM 2019 International Annual Conference, June 2019.
- Journal paper reviewer, *IEEE Transactions on Engineering Management*, May 2019.
- Journal paper reviewer, *IEEE Transactions on Engineering Management*, January 2019.
- Journal paper reviewer, *Risks*, December 2018.
- Journal paper reviewer, *IEEE Transactions on Engineering Management*, November 2018.
- Technical program committee for IEEE TEMS International Conference TEMSCON 2019.
- Journal paper reviewer, *IET Software*, September 2018.
- Conference paper reviewer, IEEE International Conference on Technology Management, Operations and Decisions (IEEE ICTMOD) to be held November 21-23, 2018. September 2018.

- Journal paper reviewer, *IET Software*, April 2018.
- Journal paper reviewer, *International Journal of Environmental Research and Public Health*, April 2018.
- Journal paper reviewer, *Sustainability*, April 2018.
- Journal paper reviewer, *Symmetry*, December 2017.
- Journal paper reviewer, *Journal of the Operational Research Society*, November 2017.
- Technical program committee for IEEE TEMS International Conference TEMSCON 2018.
- Journal paper reviewer, *Sustainability*, November 2017.
- Journal paper reviewer, *IEEE Transactions on Engineering Management*, August 2017.
- Journal paper reviewer, *Sustainability*, August 2017.
- Journal paper reviewer, *Computers & Industrial Engineering*, July 2017.
- Journal paper reviewer, *IEEE Software*, June 2017.
- Journal paper reviewer, *The Journal of Engineering*, April 2017.
- Journal paper reviewer, *International Journal of Environmental Research and Public Health*, March 2017.
- Journal paper reviewer, *Applied Economics*, October 2016.
- Journal paper reviewer, *Sustainability*, August-September 2016.
- Chair, local organizing committee of 11th International Green Energy Conference (IGEC 2016), Anchorage, AK, May 8-11, 2016. Served September 2015 – May 2016. Took lead in weekly committee meeting, fund raising, finding invited speakers, recruiting volunteers, soliciting papers, finding support from the university and the municipality, technical support during the conference, master of ceremony, advertising the conference, scheduling all the sessions, updating conference website, creating conference mobile app, editing and producing conference proceedings, producing conference program and other materials, etc.
- Journal paper reviewer, *Journal of Management in Engineering*, June 2016. •
Journal paper reviewer, *Journal of Management in Engineering*, May 2016.
- Journal paper reviewer, *Computer & Industrial Engineering*, May 2016.
- Journal paper reviewer, *International Journal of Technoentrepreneurship*, November 2015.
- Journal paper reviewer, *Applied Economics*, April 2015.
- Journal paper reviewer, *Computers & Industrial Engineering*, December 2014.
- Journal paper reviewer, *Science World Journal*, August 2014.
- Member, College of Engineering Assessment Committee, UAA, Spring 2014.
- Member, Faculty Senate Committee on Research & Creativity Activity, UAA, Fall 2013 – present.
- Chair, Engineering, Science, and Project Management (ESPM) Bylaws project committee, UAA, Spring, 2013.
- Member, Faculty Senate Ad-Hoc Committee on Research & Creativity Activity, UAA, Fall 2012 – Spring 2013.

- Member, College of Engineering Peer Review Committee, UAA, Fall 2015 – present.
- Member, College of Engineering Curriculum Committee, UAA, Fall 2011 – present.
- Member, Faculty Grants & Leaves Committee, UAA, Fall 2011 – Spring 2012.
- Journal paper reviewer, *Risk Analysis: An International Journal*, October 2010.
- Journal paper reviewer, *Computer and Industrial Engineering*, October 2010.
- Session Chair, Session: Decision Analysis of Major Capital Investments, Cluster: Decision Analysis, INFORMS Southwest Regional Conference 2008, College Station, TX, April 18, 2008.
- Supervisory experience, Supervised a master student. Assisted in his master project on probability verification of hurricane forecasts from National Hurricane Center (Sep. 2007 - Aug. 2008)
- Supervisory experience, Supervised a master student. Assisted in his master project on probability assessment and verification in baseball betting market (Sep. 2006 - Aug. 2007)

STUDENT ADVISING (as primary advisor)

- 2019
 - Adam Needham, MS Engineering Management student
 - Brad Grubb, MS Engineering Management student
 - Mohammad Aman Ullah Al Amin, MS Engineering Management student
 - Jose Martinez, MS Engineering Management student
 - Ramon Williams, MS Engineering Management student
- 2018
 - Fabiha Durrani, MS Science Management: “Decision to buy or rent in Municipality of Anchorage Alaska”
 - Marko Lemtukei, MS Science Management: “The enabling technologies in fifth generation cellular networks and their application in the Internet of Things”
 - Katie Johnson, MS Engineering Management: “Lessons learned mechanism for Coffman Engineers”
 - Jon Sinclair, MS Engineering Management: “A look at photovoltaics and the economics of residential applications in Alaska”
 - Forest Walker, MS Engineering Management: “Replacement option for foundations of structures on melting permafrost and erosion in rural Alaska”
 - Andrew Tarnas-Raskin, MS Science Management: “Technical talent retention strategies and the cost of turnover in an Alaskan science and engineering firm”
 - Stefanie Armstrong, MS Engineering Management: “Analysis of multi-use drone capabilities in Alaska”
 - Josh Craft, MS Engineering Management: “An Investigation of, and Guide to, Holistic Energy Project Planning in Rural Alaskan Communities”

- Dustin Campbell-Hutchinson, MS Engineering Management: “Biomass system feasibility study using reclaimed wood waste products”
- Tom Riley, MS Engineering Management: “Developing home-based business manufacturing processes”
- Jennifer Sanders, MS Engineering Management: “A single case demonstration of the implementation of marginal analysis on the project planning structure process”
- Kean Finnegan, MS Science Management: “Port of Alaska TRIZ analysis: a technical study of the Port of Alaska with an emphasis on a stable and reliable seismic design”
- Michael Ulroan, MS Engineering Management: “Redefining college readiness: acceleration model Alaska Native Science & Engineering Program (ANSEP)”
- Patrick Horst, MS Engineering Management: “Comparison between physical and cloud infrastructure for a small business technology upgrade”
- William Dale Hardcastle, MS Engineering Management: “The seismic risks associated with burying electric lines in Anchorage, Alaska”
- 2017
 - Saara Altervo, MS Science Management: “Massive Multiplayer Online Roleplaying Game (MMORPG) Final Fantasy XIV: User assessment & intent towards real money transfers (RMT)”
- 2016
 - Susan Giedt, MS Project Management: “Internal audit of Juland incorporated’s ISO 9001 quality management system”
 - Jasen Kintner, MS Engineering Management: “Economic optimization of fiber optic network design in Anchorage”
- 2015
 - Elliot Jae Yi, MS Project Management: “Anchorage therapeutic court drug testing policy & procedure training manual project”
 - Scott You, MS Project Management: “Differentiation strategy for marketing of Sung Sim Dang bakery & latte art espresso coffee shop plan”
 - Yolima Florez, MS Engineering Management: “Analysis of the journal voucher process in the budget department at the University of Alaska Anchorage”
- 2013
 - Andrew Ray, MS Project Management: “Emergency preparedness and response plan for community groups”
 - Charles Wagner, MS Project Management: “A synthesis of traffic signal timing practices”
 - Tristen Kim, MS Project Management: “Wells Fargo Home Mortgage (WFHM) Alaska Servicing Center microfilm conversion project”
- 2012
 - Robert O’Neal, MS Project Management: “Will standardizing training impact worker performance on a drilling rig?”

- Owen Rose, MS Project Management: “A project management approach to improving the issues generation and submittals process of the Army Family Action Plan (AFAP)”
- Nicholas Ricketts, MS Project Management: “Implementing project management at Alaska Glazing Inc., and similar small business construction subcontractors in Alaska”
- 2011
 - Alicia Marie Belardi, MS Project Management: “Conflict management in project management: Do project managers use dispute resolution techniques?”
 - Mandy Kämpf, MS Project Management: “Risk complexity: The Arctic offshore as a case study”
 - Frederick “Rick” Williams, MS Engineering Management: “A risk assessment of delivering cutting edge communications technology to rural Alaskan communities”
- 2010
 - Donghwoon Kwon, MS Project Management: “How to apply project management in research and development”
 - Hyeon Ki Lee, MS Project Management: “Implementing PMIS for reorganizing project team”
 - Hyuk Chun Kwon, MS Project Management: “Calculating the optimal contingency and management reserves for project budget”
 - Mi Young Shin, MS Project Management: “Approach for maximizing the use of timesheet benefits”
 - William Thompson, MS Project Management: “A course titled “project management with an emphasis on capital projects and Alaska’s petroleum industry”

RESEARCH INTERESTS

- Characterizing and identifying hidden risks
- Decision & Risk Analysis for energy technologies
- Emergency management modeling regarding natural disasters
- Value of Information and Response Speed in multi-stage setting
- Efficiency of sports betting market
- Sports analytics for baseball teams and managers
- Data analytics for decision making
- Technology forecast using TRIZ method
- Forecast verification for weather information
- Creative problem solving methods for system improvement

TEACHING INTERESTS

- Project risk management
- Lean Six Sigma process improvement
- IT project management (Agile focused)
- Decision analysis
- Operations research / management science
- Operations management
- Computer simulation of systems (discrete/continuous event, agent-based, and system dynamics) • Business intelligence and analytics
- Creative problem solving methods including TRIZ
- Human-centered innovation (design thinking)
- Research methods
- Project management application tools

ACTIVITIES

- Co-Guest Editor of Special Issue of International Green Energy Conference (IGEC) 2016 for International Journal of Green Energy (IJGE), appointed in May 2016.
- Member, American Society for Engineering Management (ASEM), October 2016-present.
- Member, Korean Community of Anchorage Scholarship Committee, Spring 2012-2015.
- Member, Alaska Chapter of National Unification Advisory Council (NUAC) of South Korea, July 2011 – June 2015.
- Member, Project Management Institute (PMI), September 2009-present.
- Member, INFORMS, November 2006-present.
- Member, Society of Petroleum Engineers (SPE), U.S.A., August 2005-2006. •
Member, Council of Logistics Management (CLM), U.S.A., February 2004-2005.

PROFESSIONAL DEVELOPMENT

- Attended Supply Chain Lunch and Learn “Managing Risk in the Supply Chain” by Dr. Thomas J. Goldsby on August 9, 2019.
- Online course: Introduction to IE in Healthcare, March-July, 2019.
- Online course: Principles I Patient Flow and Throughput, March-July, 2019.
- Online course: Healthcare Labor Management, March-August, 2019.
- Attended CECS Research Workshop by Office of Research Compliance (ORI) on January 11, 2019.
- Took online training “My Mocs Degree Learning Module” by UTC on January 3-4, 2019.
- Attended open house / plant tour by Colonial Chemical Inc. on December 14, 2018.
- Took pedagogy course for new faculty by UTC Teaching and Learning Institute on September 5 – December 7, 2018.

- Observed and participated in PEAK Program by City of Chattanooga on November 26 – December 5, 2018.
- Took online training “Title IX” by UTC on November 11, 2018.
- Attended and presented at conference INFORMS Annual Meeting 2018 at Phoenix, AZ on November 4-7, 2018.
- Attended UTC CECS Distinguished Speaker Series by Dr. Hashemian on November 2, 2018.
- Attended seminar in UTC Department of Chemistry and Physics on October 26, 2018.
- Attended StartUp Week CHA: UTC Entrepreneurship Breakfast 2018 by College of Business on October 24, 2018.
- Attended ASEM International Annual Conference in Coeur d’Alene, Idaho on October 18-20, 2018.
- Attended Lunch & Learn workshop by Center for Innovation and Entrepreneurship “Building an Exceptional Startup Team” by UTC College of Business on October 17, 2018.
- Attended EPB Green Business Expo on October 12, 2018.
- Attended seminar and lunch “Manufacturing as a Service” by UTC College of Business on October 8, 2018.
- Attended Chattanooga Regional Manufacturers Association (CRMA) Annual Meeting Luncheon on October 5, 2018.
- Attended UTC CUIP Information Session on October 5, 2018.
- Attended Search Committee Training by UTC Office of Equity and Inclusion on October 5, 2018.
- Attended Community Engagement Panel by UTC on October 2, 2018.
- Attended IRB Basics 101 training by UTC on September 27, 2018.
- Attended workshop “Research & Funding for New Faculty” by UTC CECS on September 28, 2018.
- Attended Tenure Information Session by UTC CECS on September 13, 2018.
- Attended CECS Faculty Forum on September 7, 2018.
- Attended Supply Chain Lunch and Learn seminar by UTC Center for Professional Education on September 7, 2018.
- Attended CEACSE workshop on September 7, 2018.
- Took IT Security Awareness Training online on August 28, 2018.
- Attended CECS new faculty orientation on August 17, 2018.
- Attended Teaching and Learning Orientation by UTC on August 10, 2018.
- Attended HR onboarding session by UTC on August 9, 2018. • Took Self-Service Banner (SSB) training (Records Training) online on August 7, 2018.

CREDENTIALS

- Associate Certified Analytics Professional (aCAP), June 2017 - present.
- Lean Six Sigma Green Belt, January 2016 - present. •
Project Management Professional (PMP), December 2010 - present.

SOFTWARE SKILLS

- AnyLogic
- Palisade DecisionTools (PrecisionTree, @Risk, TopRank)
- MS Office (especially, Excel)
- MS Project
- SPSS
- MATLAB
- Tableau • R
- Hadoop

B. Resume of Aldo McLean

ALDO A. McLEAN, Ph.D., P.E.

Tenured Assistant Professor

University of Tennessee at Chattanooga
College of Engineering and Computer Science
615 McCallie Avenue
Chattanooga, TN 37403

Office 326E, CECS Building
Voice: (423) 425-5328
E-mail: aldo-mclean@utc.edu
Faculty Website: Aldo McLeanPhD

EDUCATION

Doctor of Philosophy (PhD) in Industrial Engineering, 2008

University of Louisville, Louisville, KY
Dissertation: “Discrete-event Simulation Approach for the Analysis of Liner Shipping Services of Containerized Cargo.” Advisor: Dr. William E. Biles

Master of Engineering in Engineering Management, 2000

University of Louisville, Panama City, Panama

Bachelors of Science in Electronic Engineering, Concentration in Telecommunication, 1996

Universidad Santa Maria la Antigua, Panama City, Panama
Thesis: “Establecimiento de una Estación Terrena para la Recepción de Señales Provenientes de Satélites de Baja Orbits / Design and Operation an Earth Station for Low Earth Orbiting (LEO) Satellite Communications.”

PROFESSIONAL LICENSURE

Professional Engineer (PE), **License No. 31132**, Commonwealth of Kentucky

REFERRED PUBLICATIONS

1. Munday, S., **McLean, A.**, and Reising, D. “Analysis of Satellite Dish Downlink Locations Registered in the IBFS”. (manuscript in draft)
2. **McLean, A.**, and Abrha, W. “Process Improvement to Creeling Process during Tufting Operations in Carpet Manufacturing.” (Manuscript in draft)
3. Swalen, M., **McLean, A.**, and Helms, M. “Can Clusters Survive: A Case Study of the Flooring Industry’s Evolution”, (submitted for review and publication to the Journal of Competitiveness Studies, office.asc@gmail.com to Abbas Ali at Indiana University of Pennsylvania)
4. Erickson, L. M., Abrha, W., and **McLean, A.** “Design Of A Visual Board For A Manufacturing Cell.” Proceedings of the International Annual Conference of the American Society for Engineering Management (ASEM). 2018. ProQuest. Web. 30 Sep. 2019.
5. Fortunatus M, Onyango M, Fomunung I, **McLean A**, Owino J. “Use of a Smart Phone based Application to Measure Roughness of Polyurethane Stabilized Concrete Pavement.” Civil Eng. Res J. 2018; 4(4): 555645. DOI: 10.19080/CERJ.2018.04.555645.
6. Rodriguez-Garcia, M., **McLean-Carranza, A.**, Prado-Prado, C. and Dominguez-Camaño, P. “Managing Waiting Times to Predict No-Shows and cancelations at a Children’s Hospital.” *Journal of Industrial Engineering and Management*, vol. 9, no. 5, 2016, pp. 1107-1118.

7. Wiltshire, A., and **McLean, A.** “Parts Kitting Process for Material Flow Efficiency in Engines Pre-assembly Operations.” *In the proceedings of The American Society for Engineering Management International Annual Conference (ASEM)*, October 26-29, Charlotte, NC, 2016.
8. Ryon, R., **McLean, A. A.**, and McMahon, E. “Small Construction Firm Practice to Minimize Risk to Fixed Price and Reimbursable Contracts.” *In the Proceedings of the Institute of Industrial and Systems Engineering (IISE) Annual Conference*, May 21-24, Anaheim, CA, 2016.
9. **McLean, A. A.**, Yates, W., and Landaeta, R. Material Flow Improvement for Change Management in a Manufacturing Plant. *In the Proceeding of the American Society of Engineering Management (ASEM) Annual Conference*, October 15-18, Virginia Beach, VA, 2016.
10. **McLean, A. A.**, Rorex, C., and Smith, G. Assessment of Design-Build vs Design-Bid-Build Construction Delivery Methods. *In the Proceedings of the American Society of Engineering Management (ASEM) Annual Conference*, October 2-4, 2013, Minneapolis, Minnesota.
11. Gomez, A., and **McLean, A.A.** Process and Documentation in Maxxpro MRV Production. American Society of Engineering Management (ASEM) Annual Meeting, October 19-21, 2011, Lubbock, Texas.
12. **McLean, A.A.**, and Biles, W. E. A Simulation Approach to the Evaluation of Operational Cost and Performance in Liner Shipping Operations. *Proceedings of the 2008 Winter Simulation Conference*, December 9-11, 2008, Miami, FL.
13. **McLean, A. A.**, and Biles, W. E. Evaluation of Operation Cost in Liner Shipping: A Discrete-Event Simulation Approach. *Proceedings of the 11th International Workshop on Harbor, Maritime & Multimodal Logistics Modeling & Simulation*, September 17-19, 2008, Campora S. Giovanni, Italy, 129-133.

PRESENTATIONS & INVITED MEETINGS

1. McLean, A. “Risk Management Approach for Assessing Production Performance in Towing and Recovery Products Assembly.” American Society for Engineering Management (ASEM) Annual Conference 2016.
2. McLean, A. “Outsourcing Linen and Laundry Services in Level 1 Trauma Hospital.” ISERC 2016.
3. Sasso, D., and McLean, A. Integration of Real-Time Vessel Location Data with a Geographic Information System for the Simulation of an Inland Waterway. Alabama Simulation Conference (ALASIM), May 2016.
4. McLean, A. Sasso, D., and Villar, S. “Exploring Potential Impacts of the Northern Shipping Route (NSR) on Spanish Ports.” Alabama Simulation Conference (ALASIM), May 2016.
5. McLean, A. A., and Smith, G., “Construction Details of the New Library Building”, New Library Grand Opening Event, University of Tennessee at Chattanooga, January 2015. Presentation
6. Crowe, R., and McLean, A. A. Performance Assessment of Cost-Plus Contracts. American Society of Engineering Management (ASEM) Annual Meeting 2012, Virginia Beach, VA. Presentation

7. Green, L., and Mc Lean, A. A. Analyzing the Ambessa City Bus Enterprise of Addis Ababa, Ethiopia. Engineering Exposition 2008, University of Louisville, Louisville, KY. Poster Presentation
8. McLean, A. A. An Analysis of Container Carriers Networks through Simulation. Presented at the Institute for Operation Research and Management Science (INFORMS) Annual Meeting, November 5-8, 2006, Pittsburgh, Pennsylvania.
9. McLean, A. A. Fuel Consumption Equation for a Container Carrier. Engineering Exposition 2006, University of Louisville, Louisville, KY. Poster presentation
10. McLean, A. A., and Mora, R. (2005). Fundamental of Ocean Transportation. Engineering Exposition, University of Louisville, Louisville, KY. Poster presentation

ACADEMIC EXPERIENCE

Tenured Assistant Professor, Fall 2016 – Present

Department of Engineering Management & Technology, University of Tennessee
Chattanooga, TN

Program Coordinator, M.S. in Engineering Management, May 2017 – August 2019
UT Chattanooga Graduate School and Department of Engineering Management & Tech.

Tenure-Track Assistant Professor, Fall 2010 – Spring 2016

Department of Engineering Management and Technology, University of Tennessee
Chattanooga, TN

Researcher - Collaborator, Cranston Pearce Center for Applied Engineering Technology,
University of Tennessee Chattanooga, 2011 – 2016

Faculty Advisor, Engineering Management Club, University of Tennessee at Chattanooga, 2014
- present.

Faculty Advisor, UTC-AGC Student Chapter, University of Tennessee at Chattanooga, 2011 –
2013, 2015

Adjunct Assistant Professor, Summer 2008 – Summer 2010

Department of Industrial Engineering, University of Louisville
Louisville, KY

Teaching topics: Engineering Management, Quality Control, Project Management,
transportation management, Engineering Financial management. Also IE 541
Methods for Simulation Analysis (undergraduate), IE 525 Project Management
(undergraduate), IE 360 Probabilities and Statistics for Engineers (undergraduate).
Guest lecturer for EM 57, Engineering Statistics I (graduate), IE 550 Fundamental of
Logistics Systems (undergraduate)

President, *Toastmaster Club*, University of Louisville, 2009 - 2010

Vice-president of Public Relations, *Toastmaster Club*, University of Louisville, 2008-2009

Advisor for Membership, *Institute of Industrial Engineering (IIE)*, University of Louisville,
2008 - 2010

Faculty Co-Advisor, *INFORMS Student Chapter*, University of Louisville, 2008 - 2010

Future Faculty Program, August 2006

College of Education & Human Development, University of Louisville, Louisville, KY
– Program designed to train Ph.D. candidates to learn teaching techniques and
methodologies, research, service, mentoring skills, and faculty life.

Graduate Teaching Assistant, Summer 2005 – Spring 2008

Department of Industrial Engineering, University of Louisville, Louisville, KY
President, INFORMS Chapter of the University of Louisville, 2006 – 2007

Vice-president, 2005 -2006

Graduate Research Assistant, Fall 2003 – Spring 2005

Department of Industrial Engineering, University of Louisville, Louisville, KY

- GRA responsibilities included: assisting in preparation of reports and conferences; designing and analyzing discrete-event and continuous simulation models in logistics and production systems; processing research data.

Internship in Micro-satellite Technology, January – March 1995

Universidad Tecnológica de Madrid, Madrid, Spain.

GRANTS AND OUTREACH ACTIVITIES

- M. Chan, **A. McLean (Honor Project Advisor)**, “From Industry to Education: Training K-12 Teachers and Administrators in Process Improvement Principles”, \$700, agency: SEARCH Award, UTC. 2019, **Funded**.
- A. McLean (PI)**, I. Fomunung (Co-PI), L. Brown, G. Stark, C. Ward, C. Mix, R. Johnson, “Understanding Freight Impacts on Tennessee Communities,” **\$149,232**, agency: Tennessee Department of Transportation (TDOT), 2019. **Not Funded**
- I. Fomunung (PI), **A. McLean (Co-PI)**, “Improvement of Park-and-Ride Facilities and Service in Metropolitan Areas in Tennessee,” **\$147,811**, agency: Tennessee Department of Transportation (TDOT), 2018. **Not Funded**
- W. Abrha (PI), **A. McLean (Co-PI)**, C. Mix, “Investigating the Service of App-based Rideshare and Transportation Network Companies in Tennessee,” **\$84,298**, agency: Tennessee Department of Transportation (TDOT), 2018. **Not Funded**
- A. McLean (PI)**, I. Fomunung (Co-PI), C. Mix, A. Sokolov, “Truck Parking Needs in Tennessee,” **\$134, 215**, agency: Tennessee Department of Transportation (TDOT), 2018. **Not Funded**
- A. McLean (PI)**, M. Onyango (Co-PI), W. Abrha, “Autonomous Truck Mounted Attenuator (TMA) Pilot,” **\$109,146**, agency: Tennessee Department of Transportation (TDOT), 2018. **Not Funded**
- M. Onyango (PI), **A. McLean**, J. Owino, E. Wang, W. Wu, “Friction Course Pavements,” **\$99,997**, agency: Tennessee Department of Transportation (TDOT), 2018. **Funded**
- N. Alp (PI), **A. McLean (Co-PI)**, “2+2 MET: Developing an Industry Responsive Mechatronics AAS to BAS Pipeline for Engineering Technicians,” **\$586,997**, agency: National Science Foundation (NSF), 2017. **Not Funded**
- D. Loveless (PI), D. Reising (Co-PI), **A. McLean**, N. Sisworahardjo, R. Ahmed, L. Elliott, A, “REU Site: An Interdisciplinary CubeSat Research and STEM Education Platform at the University of Tennessee at Chattanooga (UTChattSat),” **\$359,783**, agency: National Science Foundation (NSF), 2017. **Funded (2018-20121)**
- I. Fomunung (PI), M. Onyango, J. Owino, **A. McLean**, M. Sartipi. “Effectiveness of HOV Lanes as a Congestion Relief and Air Quality Reduction Tool”, **\$199,939**, agency: Tennessee Department of Transportation (TDOT), 2017. **Not Funded**.
- L. Elliot (PI), A. Rollins (Co-PI), D. Loveless (Co-PI), **A. McLean**, D. Wu, “PT Ribbon Rail Applied Research Proposal,” **\$259,877**, agency: PT Solution, LLC. Private Grant. **Not Funded**

- D. Loveless (PI), D. Reising (Co-PI), **A. McLean**, N. Sisworahardjo, R. Ahmed, L. Elliott, A, “REU Site: An Interdisciplinary CubeSat Research and STEM Education Platform at the University of Tennessee at Chattanooga (UTChattSat),” **\$322,155**, agency: National Science Foundation (NSF), 2016. **Not Funded**
- I. Fomunung (PI), J. Ellis, N, Alp, R. Ahmed, **A. McLean**, B. Harris, T. Elliot, “UTC Academic Scholarship to Inspire and Recruit Engineers (UTC ASPIRE)”, **\$998,489**, agency: National Science Foundation (NSF), 2016. **Not Funded**
- M. Onyango (PI), J. Owino (CO-PI), I. Fomunung (Co-PI), L. Elliot (Co-PI), **A. McLean (Co-PI)** “Improving Rigid Pavement Smoothness Using Polylevel,” 2015, **\$154,457**, agency: Tennessee Department of Transportation (TDOT). **Funded.**
- I. Fomunung (PI), R. Ahmed (Co-PI), J. Ellis (CO-PI), T. Elliot (Co-PI), B. Harris (Co-PI), **A. McLean (Co-PI)**, “UTC ASPIRE: Academic Scholarship Program to Inspire and Recruit Engineers,” **\$991,725**, agency: National Science Foundation (NSF), Engineering S-STEM, 2015. **Not Funded**
- D. Loveless (PI), D. Reising (Co-PI), R. Ahmed, **A. McLean**, A. Ofoli, N. Sisworahardjo, “REU Site: An Interdisciplinary CubeSat Research and STEM Education Platform at the University of Tennessee at Chattanooga (UTSTEMSat)”, **\$354,044**, agency: National Science Foundation (NSF). 2015. **Not Funded**
- M. Onyango (PI), J. Ellis (Co-PI), J. Owino (Co-PI), I. Fomunung (Co-PI), N. Sisworahardjo (Co-PI), W. Wu (Co-PI), **A. McLean (C-PI)**, “Securing the Pipeline for Undergraduate Engineering Education (SPUE) Using Data Analytics”, **\$249,936**, agency: National Science Foundation, 2014. **Not Funded**
- M. Onyango (PI), J. Kizza (Co-PI), J. Ellis, J. Owino, I. Fomunung, W. Wu, A. Rollins, **A. McLean**, “Southeastern Region Surface Transportation Workforce Center at the University of Tennessee at Chattanooga,” **\$987,766**, agency: Federal Highway Administration (DOT-FHWA), 2014. **Not Funded**
- Ben Taylor (PI), **A. McLean (Senior Personnel)**, “Safe Routes to School Program – Woodmore Elementary,” **\$250,000**. agency: Tennessee Department of Transportation (TDOT) and The City of Chattanooga, 2014. **Funded**
- Ben Taylor (PI), **A. McLean (Senior Personnel)**, “Safe Route to Schools Program – Lakeside Academy,” **\$243,222**, agency: Tennessee Department of Transportation (TDOT) and The City of Chattanooga, 2014. **Funded**
- W. Sutton (PI), P. Dhamshala (Co-PI), **A. McLean (Co-PI)**, “Determining and Analyzing Carbon Footprint During Manufacturing and Operations at Playcore Inc.”, **\$25,000**, Private Grant, 2013. **Completed**
- A. McLean (PI)**, “Efficiency of Pharmacy Flow and Inventory Analysis,” Erlanger Hospital System, 2016, **Outreach program.**
- A. McLean (PI)**, “Food Court Process and Flow Improvement at Medical Mall,” Erlanger Hospital System, 2016, **Outreach program.**
- A. McLean (PI)**, “Wheel Chairs Retention Project,” Erlanger Hospital System, 2015, **Outreach program.**
- A. McLean (PI)**, “Linen Distribution and Inventory Management,” Erlanger Hospital System, 2014, **Outreach program.**
- A. McLean (Program Leader)**, “Improve your Construction Projects with ArchiCAD BIM applications: Sixteen hours of professional seminar,” 2013, **Outreach program**

A. McLean (PI), “Columbus McKinnon, Material Flow & Inventory Analysis at Columbus McKinnon,” 2013, **Outreach program**.

PROFESSIONAL LEADERSHIP

Certifications

- **Professional Engineer (PE)**, License No. 31132, Commonwealth of Kentucky
- **Certified Professional Engineer Management (CPEM)**, American Society for Engineering Management (ASEM), 2019 – present
- **Certified Six Sigma Green Belt (CSSGB)**, American Society for Quality (ASQ), 2019 - present
- **Certified Manager of Quality/Organizational Excellence (CMQ-OE)**, Cert. No. 14826, American Society for Quality (ASQ), 2011 - present
- OSHA-10 General Industry Safety and Health, 2017
- OSHA-10 Construction Safety and Health, 2013

Societies Affiliation

- Institute of Industrial and Systems Engineering (IISE), 2006 – present
- American Society Engineering Management (ASEM), 2010 – present
- American Society for Quality (ASQ), Senior Member, 2010 – present
- American Production and Inventory Control Society (APICS), 2012 - present
- Institute for Operation Research and Management Science (INFORMS), 2005 – 2015
- Toastmaster International, 2007 – 2011

Community

- **President**, American Society for Quality (ASQ) Chattanooga Section 1101 (2018 - present)
- **Senior Member**, East TN Freight Advisory Committee (FAC), Tennessee DOT 2017 – present)
- **Faculty Mentor**, The Company Lab (CoLab), 2017 - 2018
- **Leader and Coordinator**, UTC’s Process Improvement at Erlanger and Children’s Hospital at Erlanger, 2013 – present
- **Volunteer**, Erlanger Hospital and Children’s Hospital at Erlanger, 2013 – present.
- Enterprise Center – UTC Committee, City of Chattanooga (2013-2015)
- **Coordinator Education Committee**, American Society for Quality (ASQ) Section 1101 (2014-present)
- **UTC Faculty committee member**, Enterprise Center - City of Chattanooga (2013-2016)
- **Technology Chair**, Tri-State APICS (American Production and Inventory Control Society) (2014-2016)
- **Director**, “Student Award” program for Middle Schools, Ricardo Miro Elementary School, Panama City, Panama, 2006 – 2012.
- **Lead faculty**, Secured \$500/year student scholarship fund from APICS from 2016 to 2018

ACADEMIC SERVICE ACTIVITIES

- ASEM Translation Committee, EMBOK translation Project: Translating the EMBOK into Spanish, 2019 – present.

- Lead Coordinator, Performance Evaluation Criteria 2 – performance metrics and Criteria 4 – performance evaluations, ABET-ETAC, 2016-2018.
- Committee member, Faculty Search for Engineering Management & Tech., Construction Management faculty, 2019-2020
- Search Committee member, Faculty Search for Engineering Management & Tech., Engineering Management faculty, 2019-2020
- Faculty Member/Main Contact Global Zone, Center of Goal Education 2018 – present
- Search Committee Chair, 2 faculty for the BAS Mechatronics Engineering Technology, Engineering Management & Tech., 2018-2019
- Search Committee member, Department Head search for Engineering Management & Tech., 2017-2018
- Search Committee member, 2 faculty search for Engineering Management & Tech., 2017-2018
- Main Faculty Contact in Engineering Management & Tech, for Rank & Tenure Committee 2017-2018
- Search Committee member, 2 faculty in Engineering Management & Technology, 2016-2017.
- Faculty Coordinator, E-week participation for Engineering Management & Tech., 2017-2018
- Faculty member, College Level Undergraduate Curriculum Committee, 2017-2018
- Represented the Dept. of Engineering Management & Tech in college level meetings and requirement, 2016-2018
- Faculty Member, THEC New Program External Review Visit - BAS Mechatronics Engineering Technology, 2018
- Faculty Member, Graduate Counsel 2018-2019
- Faculty member, Search Committee for Director of Student Success, 2016-2017
- Faculty member, Search Committee for Accounting Assistant III, 2016-2017
- Member, UTC Parking Task Force, UT Chattanooga (2015-present)
- Rank and Tenure Committee, Civil Engineering Dept. (2017 – 2019)
- Committee Member, ABET Task Force, College of Engineering and Computer Science (2014-present)
- Undergraduate Curriculum Committee, College of Engineering and Computer Science (2014-present)
- Faculty Adviser, Engineering Management Club (EMClub), EM&T (2015-present)
- Enterprise Center – UTC Committee, City of Chattanooga (2013-2016)
- Education Committee Officer, American Society for Quality (ASQ) Section 1101 (2013-present)
- Education Committee Officer (2016-present), Technology Chair (2014-2016), Tri-State APICS (American Production and Inventory Control Society)
- Committee Member, Strategic Planning Steering Committee, UT Chattanooga (2014-2015)
- Committee Member, Accessible Technology Committee, UT Chattanooga (2014-2015)
- Planning Committee Member, Library Grand Opening Committee, UT Chattanooga (2014-2015)
- Senator, Faculty Senate. UT Chattanooga (2012-2014)

- Committee Member, Department Honor (DHON), Adrienne Welch, Economics Department (2014-2015)
- Committee Member, Graduate Council, UT Chattanooga (2011-2013)
- Faculty Advisor, UTC-AGC Student Chapter, UT Chattanooga (2011-2013)
- Faculty Advisor, ASC Construction Student Competition (2012-2013)
- Committee Member, Faculty Research Committee, UT Chattanooga (2012-2014)
- Committee Member, International Studies Committee, UT Chattanooga (2012-2015)
- Committee Member, Faculty Rating of Administration, UT Chattanooga (2011-2012)
- Track Chair, ASEM Annual Meeting (2012, 2014)
- Track Chair, WinterSim Annual Meeting (2009)
- Editorial Review Board, *Engineering Management Journal* (EMJ) (2011-present)
- Editorial Review Board, *Journal of Simulation Modelling Practice and Theory* (2011-present)
- Editorial Review Board, *Journal of Service Operations and Informatics* (IJSOI) (2011-present)

HONORS AND AWARDS

Outstanding Teacher of the Year, April 2017

University of Tennessee at Chattanooga, Dept. of Engineering Management & Tech.

Outstanding Faculty Teacher of the Year, April 2013

University of Tennessee at Chattanooga, Dept. of Engineering Management & Tech.

Award Recipient, Access and Diversity Professional Development Grant. April 2015 (\$1,279)

University of Tennessee at Chattanooga.

Award Recipient, Faculty Development Grant. October 2014 (\$650)

University of Tennessee at Chattanooga.

Outstanding Coach Award, April 2012

University of Tennessee at Chattanooga, Dept. of Engineering Management & Technology

Award Recipient, Faculty Development Grant. October 2011 (\$600)

University of Tennessee at Chattanooga.

Faculty Recipient-Adviser, Opportunity Graduate Assistantship (OGA). 2013. Corey Rorex.

Faculty Recipient-Adviser, Opportunity Graduate Assistantship (OGA). 2011. Caleb Ilesanmi.

Outstanding Faculty Teacher of the Year, April 2011

University of Tennessee at Chattanooga, Department of Engineering Management

American Society for Quality Scholarship Award, April 2009

American Society for Quality (ASQ), Louisville - section 912

Industrial Engineering Graduate Student Award, April 2008

University of Louisville, Department of Industrial Engineering

Scholarship, Institute of Logistic and Distribution (LoDi), July 2005 – July 2007

University of Louisville, Speed School of Engineering

Scholarship, Edward R. Clark Scholarship in Computer Simulation, August 2003 – July 2005

University of Louisville, Department of Industrial Engineering

INTERNATIONAL STUDENTS DIRECTED

Miguel Rodríguez-García, Universidad de Vigo, (2014-2015)

Project Title: Impact of Appointment Cancellations and No-Shows on Patients Waiting Time at a Children’s Hospital.

Sofia Villar Alvarado, Universidad de Vigo, (2013-2014)

Project Title: Evaluating the Potential Development of Container Shipping Services Thought the Northern Sea Route and its Impact on Spanish Ports.

Martin Villar, Universidad Católica del Uruguay ‘Dámaso Antonio Larranaga’, (2012-2013)

Project Title: Programing the Pairwise Method for Facility Improvement at a Midsize Manufacturing Plant.

MASTER CAPSTONE STUDENTS DIRECTED

Eric Meadows	UTC (2019)
Abdulaziz Ghazzawi	UTC (2018)
Avery Sanderfer	UTC (2018)
Sherrod Munday	UTC (2018)
Maryam Gorashi	UTC (2017)
Aaron Rubel	UTC (2017)
Stephen Brook	UTC (2017)
Valentine Mbamalu	UTC (2016)
Samrat Kandukuri	UTC (2016)
Dale Mobley	UTC (2015)
Jason Brotherton	UTC (2015)
Jonathan Howard	UTC (2015)
Corey Rorex	UTC (2014)
Markisha Williams	UTC (2014)
Caleb Ilesanmi	UTC (2013)
Andrew Wiltshire	UTC (2013)
Garrett McBryde	UTC (2013)
Justin Stephens	UTC (2013)
Lionel Locke	UTC (2013)
Tina Ottey	UTC (2013)
Calandra Jones	UTC (2012)
Charlene Jameson	UTC (2012)
Clinton Hendren	UTC (2012)
Dominique Batson	UTC (2012)
J. D. Elder	UTC (2012)
Jody Dunnigan	UTC (2012)
John Haren	UTC (2012)
LaToya Frierson	UTC (2012)
Mehad Ismail	UTC (2012)
Michael Henkel	UTC (2012)
Tim Jackson	UTC (2012)
Tony A. Knight	UTC (2012)
Alex Gomez	UTC (2011)

Candice Jackson UTC (2011)
Rebecca Crowe UTC (2011)

INDUSTRY EXPERIENCE

Consultant – Transportation and Inventory Management, 2015-present

Consultant – Project Manager, Operations and Inventory, 2013 – present.

Erlanger Hospital. Ongoing outreach projects.

Consultant – Project Manager, Operations and Process Improvement, 2013 – present.

Childrens' Hospital at Erlanger. Ongoing outreach projects.

Consultant - Project Manager, Material Flow and Inventory Analysis, , 2013 – 2014.

Columbus McKinnon. Outreach projects.

Communication Systems and Sales Engineer, September 2001 – July 2003

Panasonic Latin America, Panama - Department of Communication Systems and Sales Engineering

- Developed business strategies targeting \$7 million a year
- Designed two standard tests procedures for E1 and ISDN communication systems certifications
- Conducted engineering and telecommunication training in Ecuador, Central America and the Caribbean

Communication Systems Product Manager, September 2000 – September 2001

SIEMENS Panama, Panama - Department of Telecommunication Systems

- Managed 10 distributors/customers' accounts and projects (private and government)
- Sold \$1.1 million in fiber optic cables, cabling products, and passive devices to private and government bids
- Managed prequalification process for \$2.2 million (customer: Grupo Union Fenosa, Spain)

Project Engineer, September 1998 – September 2000

TRT Technologies Inc., Panama - Nippon Electric Corporation (NEC) products

- Managed a successful “product launching program” for NEC (Nippon Electric Corporation) telecommunication products
- Managed a network of 12 commercial sales and engineering accounts
- Configured and sold first private branch exchange (PBX) using ISDN digital service in Panama City

Quality Control Engineer, September 1996 – September 1998

LG Electronics Latin America, Panama - Quality Control Center

- Managed standard quality control, inspection, and prevention programs for LG Electronics Home Appliance Division
- Designed emergency reworks and warranty claims procedures for \$36.750 million in products
- Developed product specification and maintenance programs for the Latin America market

Appliance Product Manager, August 1996 – September 1998

LG Electronics Latin America, Panama - Home appliances and Air Conditioning Systems

- Conducted certification training for distributors, engineers and service technicians

- Developed users and service manuals for A/C systems, washing machines and microwave products
- Analyzed distribution and supply-chain patterns for products sold in Costa Rica, Cuba, Ecuador, Venezuela and Panama

Appendix G. Undergraduate Syllabi Examples

Project Management and Practice

Fall 2019

Department of Engineering Management & Technology

ETEM 3550, CRN 40827, Face-to-Face, 3 credit hours

Instructor: Dr. Seong Dae Kim

Email and Phone Number: SeongDae-Kim@utc.edu; 423-425-5786

Office Hours and Location: M, 10:00 am - 3:00 pm or by Appointment. Office: EMCS 326B

Course Meeting Days, Times, and Location: MW, 3:25-4:40 pm, EMCS 231

Course Catalog Description: Introduction to the identification, selection, and planning of projects. Specific topics include: definition of project and program, project leader selection, project goals, team selection, organizational structure, work breakdown structures (WBS), scheduling, PERT/Gantt charts, critical path method (CPM), budgeting, decision analysis, risk management, and the monitoring and control of projects. MS Project software is applied. Fall semester. Lecture 3 hours.

Course Pre/Co Requisites: Prerequisite: MGT 2110, MATH 2100, or ENGR 2220 with a minimum grade of C or department head approval. Prerequisite or corequisite: ENCE 3520 or department head approval. Differential course fee will be assessed.

Course Student Learning Outcomes: Upon successful completion of this course, learners will be able to

1. Demonstrate understanding of the definition of a project;
2. Demonstrate understanding of project maturity;
3. Explain the role of a project manager;
3. Identify a project life cycle;
4. Demonstrate knowledge of projects in different organization;
5. Create work breakdown structure of a project;
6. Explain how to estimate project budgets;
7. Explain how to schedule tasks in a project;
8. Explain how to allocate resources;
9. Demonstrate understanding of project control and auditing;
10. Explain how to terminate a project.

ABET – ETAC Student Outcomes:

J. RUBRIC: KNOWLEDGE OF CONTEMPORARY ISSUES

- A. Define Contemporary Issues
- B. Identify Strategies
- C. Evaluate Potential Solutions

Course Fees: Differential course fee will be assessed.

Required Course Materials: Project Management *A Strategic Managerial Approach* 10th Edition. Jack R. Meredith; Scott M. Shafer; Samuel J. Mantel, Jr.

Supplemental/Optional Course Materials: Project Management Body of Knowledge (PMBOK) 6th Edition.

Technology Requirements for Course: Web Browser: Internet Explorer or FireFox
Hardware/Software Requirements: Participants need access to a personal computer (Mac or Windows) and the Internet for major amounts of time for this course. Plug-ins Necessary: You should have an updated version of Adobe Acrobat Reader (for pdf documents). Additional software plug ins may be needed. Check the Technical Requirements for the UTC Learn system. Microsoft Word and PowerPoint version 2010 or later.

Technology Skills Required for Course: You are expected to have working knowledge and capability with your computer hardware, networking and a variety of software applications before entering this class. Class participants must know how to and check their e-mail on a daily basis. You will need to know the appropriate user name and password to access the UTC Learn online password-protected system. If you do NOT know your user name and password, please contact the Call Center at (423) 425-4000. You must be able to save word processing files in a .doc/.docx (Microsoft Word) or .pdf (Adobe Acrobat).

Communication: Class announcements are made through UTC Learn and UTC email. UTC email is the official means of communication between instructor and student at UTC. Please check your UTC email and UTC Learn on a regular basis. The instructor will respond to a student's UTC email within 2 days unless there is an emergent situation.

Technology Support: If you have problems with your UTC email account or with UTC Learn, contact IT Solutions Center at 423-425-4000 or email itsolutions@utc.edu.

Course Assessments and Requirements:

- A. Quiz:** There are six online quizzes. Each quiz will be linked on the pre-determined day in the schedule at 9:00 a.m. and must be completed by 11:59 p.m. on the same day. Quiz questions will include multiple-choice, true-false, filling in the blank, and/or essay questions. The length of each quiz will be 30 min. There will be no make-up quizzes. If you have any technical problems during the quiz, you need to contact the instructor ASAP.
- B. Mid-term Exam:** Each student will be given an exam that will be conducted individually. Details of the exam will be given later in class.
- C. Final Exam:** Students will be given an exam that will be conducted individually. Details of the exam will be given later in class.
- D. Discussion Board Participation:** Students are required to participate on the Discussion Board through Blackboard on a regular basis. Minimum requirement for Discussion Board participation is at least one posting and one comment to other person's posting for every chapter.

Course Grading

Course Grading Policy: 90-100 points = A; 80-89 points = B; 70-79 points = C, 60-69 points = D; < 60 points = F. Final grades will be rounded precisely. If you have an 89.4 points final average, this is a B. if you have a 69.5 points, this is a C.

Quizzes	25 points
Mid-term Exam	25 points
Final Exam	30 points
<u>Discussion Board Participation</u>	<u>20 points</u>
Total	100 points

Instructor Grading and Feedback Response Time: The results of quizzes and exams will be posted electronically within a week of the due date. Discussion Board Participation grade will be posted at the end of the last week of class.

Course and Institutional Policies

Late/Missing Work Policy: All assigned work should be submitted by the due date. No late or partial work will be accepted without discussion with the class instructor.

Student Conduct Policy: UTC's Academic Integrity Policy is stated in the [Student Handbook](#).

Honor Code Pledge: I pledge that I will neither give nor receive unauthorized aid on any test or assignment. I understand that plagiarism constitutes a serious instance of unauthorized aid. I further pledge that I exert every effort to ensure that the Honor Code is upheld by others and that I will actively support the establishment and continuance of a campus-wide climate of honor and integrity.

Course Attendance Policy: Online students do not have to attend class but are required to participate online.

Course Participation/Contribution: Active participation in class and responding to questions on discussion boards on Blackboard counts towards 20% credit as part of your final grade. Attendance is not enough to receive full credit for participation.

Course Learning Evaluation: Course evaluations are an important part of our efforts to continuously improve the learning experience at UTC. Toward the end of the semester, you will receive a link to evaluations and are expected to complete them. We value your feedback and appreciate you taking time to complete the anonymous evaluations.

Course Calendar/Schedule:

Date	Lecture	Assignment
8/19	Introduction	No Assignment
8/21, 8/26	Chapter 1 – Projects in Contemporary Organizations	Read Chapter 1
8/28	Chapter 2 – Strategic Management and Project Selection	Read Chapter 2
9/2	NO CLASS (Labor Day)	
9/4	Chapter 2 – Strategic Management and Project Selection	Read Chapter 2
9/9	Chapter 3 – The Project Manager	Quiz 1 - Chapter 1 & 2 Read Chapter 3

9/11	Chapter 4 – Managing Conflict and the Art of Negotiation	Read Chapter 4
9/16, 9/18	Chapter 5 – The Project in the Organization Structure	Read Chapter 5
9/23, 9/25	Chapter 6 – Project Activity and Risk Planning	Read Chapter 6
9/30	Chapter 6 – Project Activity and Risk Planning	Quiz 2 - Chapters 3, 4, 5 Read Chapter 6
10/2, 10/7	Chapter 6 – Project Activity and Risk Planning	Read Chapter 6
10/9	Mid-term	Mid-term Exam
10/14	NO CLASS (Fall Break)	
10/16, 10/21	Chapter 7 – Budgeting: Estimating Costs and Risks	Read Chapter 7
10/23	Chapter 7 – Budgeting: Estimating Costs and Risks Chapter 8 - Scheduling	Read Chapter 8
10/28	Chapter 8 - Scheduling	Quiz 3 - Chapters 6 & 7 Read Chapter 8
10/30	Chapter 8 - Scheduling Chapter 9 – Resource Allocation	Read Chapter 9
11/4	Chapter 9 – Resource Allocation	Quiz 4 - Chapter 8 Read Chapter 9
11/6	Chapter 9 – Resource Allocation	Read Chapter 9
11/11	Chapter 10 – Monitoring and Information Systems	Read Chapter 10
11/13	Chapter 11 – Project Control	Quiz 5 - Chapter 9 Read Chapter 11
11/18	Chapter 11 – Project Control	Read Chapter 11
11/20	NO CLASS (Thanksgiving Holiday Travel Day)	
11/25, 11/27	Chapter 12 – Project Auditing Chapter 13 – Project Termination	Read Chapters 12, 13
12/2 (last day of fall semester)	Review	Quiz 6 - Chapters 10, 11, 12 & 13
12/9 (3:30-5:30 pm)	Final Exam	Final Exam

Schedule subject to change

Quality Improvement

Fall 2019

ETEM 4560, CRN 46351, In-class, 3 credit hours

Instructor: Dr. Aldo McLean, PE, CMQ-OE, CPEM

Email and Phone Number: aldo-mclean@utc.edu (423) 425-4121

Office Hours and Location: Office: EMCS 326D. Hours: Monday: 3:15 pm to 4:15 pm, Tuesdays and Thursdays from 10:00 am to 1:00pm, Wednesdays 8:30 am to 10:30 pm. By appointment; please contact the administrative assistant (Shanae Anderson: Shanaeanderson@utc.edu) to schedule an appointment, a call or online meeting during these hours.

Course Meeting Days, Times, and Location: Mondays and Wednesdays for 2:00 to 3:15 pm at EMCS 231.

Course Catalog Description: Introduction to quality control concepts, control charts, product specifications, process control, acceptance sampling systems, and total quality control management (TQM), which is widely used in industry to improve product and service quality, and reduce costs. Lecture 2 hours and laboratory 1 hour.

Course Pre/Co Requisites: MGT 2110 with a minimum grade of C or department head approval.

Course Student Learning Outcomes: Upon successful completion of this course, students should be able to:

1. Define quality and other concepts for process improvement
2. Design control charts to track the performance of productive systems
3. Apply the concepts of process control and process capability
4. Describe the concept of six-sigma and other quality systems currently in use
5. Explain acceptance sampling and other methods for controlling quality
6. Explain the work and contribution of quality gurus in the field
7. Describe the different of quality assurance, quality control and quality management
8. Apply Root Cause analysis techniques

Required Course Materials: Summers, Donna. C.S, (2016). Quality, 6th ed. Pearson. ISBN-13: 978-013441327-3.

Supplemental/Optional Course Materials: will be provided by the instructor for ETEM 4560. Sources include on-line resources, reference books, textbook or magazines, additional materials, or software.

Technology Requirements for Course: Students need access to a dependable computer with reliable internet connection to conduct this course. This course requires of the use of Excel, Minitab or SPSS (statistical software), MSWords, Adobe Acrobat software to address most assignments and labs. Video lectures are recorded in Mediasite or Canvas Studio by faculty and students might require speakers or headphones to follow along. Student should have access to UTC Learn, Canvas to complete and submit their work. Test your computer set up and browser for compatibility with UTC Learn at <http://www.utc.edu/learn/getting->

help/systemrequirements.php. Video conferencing applications as Zoom and Skype might be required for long distance meeting with faculty.

Technology Skills Required for Course: Students should be able to access the learning management system (UTC Learn), Canvas, use their MocsNet email effectively and to access the course information. Student will be instructed on the basic of using Minitab and/or SPSS and they are required to extend their knowledge of the software independently. Scanning, formatting, coping and pasting, upload/downloading files and installing software are required skills. Students should be able to use Adobe Acrobat to create, format and submit PDF files. Students should also be able to use general purpose software/applications including MSEXcell, MSPowerPoint, MSWords to create files effectively as well as submit files, and communicating with the instructor. Producing and sharing short videos might be required for labs and assignments as well.

Technology Support: If you have problems with your UTC email account or with UTC Learn, contact IT Solutions Center at 423-425-4000 or email itsolutions@utc.edu.

Communication: Class announcements will be made through UTC Learn and Canvas to your Mocs email address. UTC Mocs email is the official means of communication between instructor and student at UTC. Please check your UTC Mocs email and UTC Learn/Canvas on a regular basis. Email the instructor only from your UTC Mocs email to make sure your email reach the instructor for a reply. Add “ETEM4650FA19” to make subject of your email to make sure the instructor can see your email on time.

Video conferencing is available through Zoom if an online appointment is needed outside of office hours. You can also use Zoom to meet with your classmates virtually. You can learn more about Zoom at <http://www.utc.edu/walker-center-teaching-learning/classroomtechnology/zoom.php>.

For communicating via UTC Mocs email with the instructor the student should use the following protocol or format regardless of the device:

“Hi/Hello/Dear Dr. McLean:

--- “Your message here” ---

Regards/Thanks/Sincerely,

Senders Name, Last name, Course No., Senders MocsID”

Course Assessments and Requirements: We are scheduled to 16 weeks of class for Fall 2019. Although your attendance is not factored in your grade your attendance to at least 75% of lectures is required for a grade.

- **Assignments:** are required for most modules to allow students to practice the subject fundamentals and methods. Most calculation in assignments are required to be completed “by hand” (students own handwriting). PDF in the only acceptable file format for assignments submitted by hand. Submitting MSEXcel or MSWords files for calculations are not allowed unless required in a specific assignment.
- **Quizzes:** are administered at the end of most chapters and can’t be taken at a later time. The “Not for Grading” option allow student to tell the instructor not to use that quiz for a

grade. This option can only be used 2 times in the semester. Review the policies regarding quizzes listed on UTC Learn under the “Course Policies” tab for details.

- **Exams:** are available at the end of a module. Students can take the exam once all requirements of the module are satisfied or on the last day of the module as a designated test date. In case of missing an exam period, students can make an appointment to take a makeup test up-to one week after the exam date at the ETM office (EMCS 326). The exception is the exam for Module 4 that must be taken on the designated date, and will be offered on-line only.
- **Labs:** Most labs in the course are a combination of videos and experimental assignment in or outside the classroom. At least one lab will be conducted in class and attendance required (Lego Game). Student attendance and participation is required on this particular lab.
- **Participation Forum/Discussion Board:** are available at the end of most chapter to allow students to participate in the class topic while demonstrating their knowledge on the class subjects. Participation Forums are available in UTC Learn for the required chapters in the course. Review the policies regarding Participation Forums listed on UTC Learn under the “Course Policies” tab for details.
- **Video Lectures:** All lectures are recorded to allow students to review lectures at a later time. A hybrid course gives students the benefit of not being required for their physical presence for daily lectures in-class but only 4 class meetings in the semester. However, a virtual presence is required by reviewing lectures on-line and on-demand over the Mediasite, UTC Learn, Blackboard, and completing assignments, quizzes, exams, labs and project on time.

Conflict resolution policy regarding team work: If your current group is not performing you expect to act fast and change to a different group. Don't wait until the last few weeks before the due date to try getting a new partner or group. Individual complaints on the performance of your team or individuals in your team close to the due date will not change the outcome of the project or grade.

Any policy that is not discussed in this Syllabus the University of Tennessee - Chattanooga's Policy will apply.

Course Grading

Course Grading Policy: Participation 15% (Participation Forums/Discussion Boards), Quizzes 10%, Assignment 10%, Labs 10%, Exam 1 10%, Exam 2 15%, Exam 3 15%, and Exam 4 15%.

The grading scale is the standard scale used in other courses in the school of Engineering Management:

- A:** 90-100% (Excellent, very professional)
- B:** 80-89.9% (Expected professional performance)
- C:** 70-79.9% (Require rework to be acceptable)
- D:** 60-69.9% (Unacceptable)
- F:** < 60 (Undesirable).

Instructor Grading and Feedback Response Time: I will try my best to grade all assignments within one week of the due date and provide written feedback when necessary.

Course and Institutional Policies

Tobacco use statement: UTC is a smoke-free campus. However, the use of tobacco, tobacco products, chewing tobacco, electronic cigarettes, vapors, aerosols, and e-liquids is not allowed in the classroom (before or between classes) or faculty office including second hand smoking.

Late/Missing Work Policy: Late assignment, labs and/or projects would be penalized 15 before grading and 40%-100% after grading unless an official excuse is provided and approved by the instructor. Students are advised to **keep a copy** of all their work until the end of the semester. Missing work should be submitted to the instructor for a grade.

Student Conduct Policy: UTC’s Academic Integrity Policy is stated in the [Student Handbook](#).

Honor Code Pledge: I pledge that I will neither give nor receive unauthorized aid on any test or assignment. I understand that plagiarism constitutes a serious instance of unauthorized aid. I further pledge that I exert every effort to ensure that the Honor Code is upheld by others and that I will actively support the establishment and continuance of a campus-wide climate of honor and integrity. (from the [Student Handbook](#))

Course Attendance Policy: In-class student attendance to class is required for lecture. Student should notify the instructor in advance if not able to attend to one of these meeting times. In that case, students should complete the attendance at another recording time during the same month. Student on-line attendance will be tracked by their on-time completion of assignments, quizzes, exams and their active participation in the Participation Forum/Discussion Boards. Canvas also tracks your review of on-line video lectures and content every time you log in.

Course Participation/Contribution: Student’s participation is evaluated by the number and strength of your contributions in class and to the course topics. “Participation Forum”, “Discussion Board”, and “Collaboration” features on the UTC Learn site for the course are mostly available for on-line student unless specified by the instructor. It is the student’s responsibility to review each and all on-line video lectures available, participate actively and proactively in forums, and attend to activities that requires attendance.

Course Learning Evaluation: Course evaluations are an important part of our efforts to continuously improve the learning experience at UTC. Toward the end of the semester, you will receive a link to evaluations and you are expected to complete them. We value your feedback and appreciate you taking time to complete the anonymous evaluations.

Course Calendar/Schedule:

Week 1	Aug 19/21	Faculty introduction/Syllabus/Class policies Module 1Starts
Week 2	Aug 26/28	Module 1
Week 3	Sep 2/4	Holiday / Module 1
Week 4	Sept 9/11	Module 1Ends

Week 5	Sep 16/18	Module 2 Starts
Week 6	Sep 23/25	Module 2
Week 7	Sep 30/Oct 2	Module 2
Week 8	Oct 7/9	Module 2 Ends
Week 9	Oct 14/16	Fall Break / Module 3 Starts
Week 10	Oct 21/23	Module 3
Week 11	Oct 28/30	Module 3 Ends
Week 12	Nov 4/6	Module 3 Ends / Module 4 Starts
Week 13	Nov 11/13	Module 4
Week 14	Nov 18/20	Module 4
Week 15	Nov 25/27	Module 4 / Thanksgiving
Week 16	Dec 2	Module 4 Ends
Week 17	Dec 9	Final Exam schedule (Monday from 1:00 - 3:00 pm)

Accessibility and Accommodation Statement: Accessibility and any type of accommodations are managed by the Disability Resource Center (DRC). The DRC is accessible at <https://www.utc.edu/disability-resource-center/>, by phone at 425-4006, or come by the office, 102 Frist Hall. For exams accommodations visit <https://www.utc.edu/disability-resourcecenter/guidelinesprocedures/examaccommodations.php#li02>.

Counseling Center Statement: If you find that personal problems, career indecision, student and time management difficulties, etc., are adversely impacting your successful progress at UTC, please contact the Counseling and Career Planning Center at 425-4438 or visit <https://www.utc.edu/counseling-center/index.php> for information.

Veterans Services Statement: The office of Veteran Student Services is committed to serving all the needs of our veterans and assisting them during their transition from military life to that of a student. If you are a student veteran or veteran dependent and need any assistance please refer to <https://www.utc.edu/dean-students/veteran-student-services/>. This site can direct you the necessary resources for academics, educational benefits, adjustment issues, veteran allies, veteran organizations, and all other campus resources serving our veterans. You may also contact the coordinator of Veteran Student Programs and Services directly at 423.425.2277. THANK YOU FOR YOUR SERVICE.

Engineering Economy

Spring 2018

Department of Civil Engineering

ENCE 3520, CRN: 28589, In-Class, 3 credit hours

Instructor: Alexandr M. Sokolov

Email and Phone Number: alexandr-sokolov@utc.edu 423-425-4121

Office Hours and Location: Monday & Tuesday from 9:30 am – 12:30 pm, Thursday from 9:00 am -1:00 pm in EMCS 345

Course Meeting Days, Times, and Location: MWF, 1:00 pm -1:50 pm, EMCS 301

Course Catalog Description: Economic decision making for engineering systems. Choice of alternatives by equivalent annual cost, rate-of-return, present worth, and benefit-cost methods. Tax influences, statistical decision making, replacement policy. Fall, spring and summer semesters. Lecture 3 hours.

Course Pre/Co Requisites: Prerequisite: ENCE 2220 with a minimum grade of C or MGT 2110 and MATH 1910 or MATH 1950 with minimum grades of C or department head approval.

Course Student Learning Outcomes: TBD

Course Fees: Differential Course Fee will be assessed.

Required Course Materials: Engineering Economy Sixteenth Edition. William G. Sullivan; Elin M. Wicks; C. Patrick Koelling.

Technology Requirements for Course: Web Browser: Internet Explorer or FireFox

Hardware/Software Requirements: Participants need access to a personal computer (Mac or Windows) and the Internet for major amounts of time for this course. Plug-ins Necessary: You should have an updated version of Adobe Acrobat Reader (for pdf documents). Additional software plug ins may be needed. Check the Technical Requirements for the UTC Learn system. Microsoft Word and PowerPoint version 2010

Technology Skills Required for Course: You are expected to have working knowledge and capability with your computer hardware, networking and a variety of software applications before entering this class. Class participants must know how to and check their e-mail on a daily basis. You will need to know the appropriate user name and password to access the UTC Learn online password-protected system. If you do NOT know your user name and password, please contact the Call Center at (423) 425-4000. You must be able to save word processing files in a .doc/.docx (Microsoft Word) or .pdf (Adobe Acrobat).

Technology Support: If you have problems with your UTC email account or with UTC Learn, contact IT Solutions Center at 423-425-4000 or email itsolutions@utc.edu.

Course Assessments and Requirements: **A. Quiz:** There are six quizzes. The lowest quiz grade will not be counted. Each quiz will be taken in class on Friday or Wednesday of the pre-determined week according to the schedule. Quizzes will have multiple-choice and/or true-false and/or filling in the blank, and short answer. You will have the entire class to take the quiz. There will be no make-up quizzes. **B. Mid-term Exam:** Each student will be given an exam

that will be conducted individually in class. Details of the exam will be given later in class. **C. Final Exam:** Students will be given an exam that will be conducted individually in class. Details of the exam will be given later in class. **D. Participation:** Students are required to participate in class and attend all lectures.

Course Grading

Course Grading Policy: The grade for this course will be determined by work submitted in the form of: Quizzes 25%, Mid-term Exam 25%, Final Exam 30%, & Participation 20%. The UTC 10 Point Grading scale will be used. 90-100% A, 80-89% B, 70-79% C, 60-69% D, 0-59% F

Instructor Grading and Feedback Response Time: The results of quizzes and exams will be posted electronically within a week of the due date. Participation grade will be posted at the end of the last week of class.

Course and Institutional Policies

Late/Missing Work Policy: All assigned work should be submitted by the due date. No late or partial work will be accepted without discussion from the class instructor. No makeup exams or quizzes will be given without discussion from the class instructor.

Student Conduct Policy: UTC’s Academic Integrity Policy is stated in the [Student Handbook](#).

Honor Code Pledge: I pledge that I will neither give nor receive unauthorized aid on any test or assignment. I understand that plagiarism constitutes a serious instance of unauthorized aid. I further pledge that I exert every effort to ensure that the Honor Code is upheld by others and that I will actively support the establishment and continuance of a campus-wide climate of honor and integrity.

Course Attendance Policy: Class attendance is mandatory, and attendance will be taken during random lectures.

Course Participation/Contribution: Active participation in class and responding to questions, carrying on in discussions will count towards the 20% participation grade. Attendance is not enough to receive full credit for participation.

Course Learning Evaluation: Course evaluations are an important part of our efforts to continuously improve the learning experience at UTC. Toward the end of the semester, you will receive a link to evaluations and are expected to complete them. We value your feedback and appreciate you taking time to complete the anonymous evaluations.

Course Calendar/Schedule:

Week	Date	Lecture	Assignment	Quiz
1	Week of January 8th	Chapter 1 Introduction to Engineering Economy	Read Chapter 1	
2	Week of January 15th	Chapter 2 Cost Concepts and Design Economics	Read Chapter 2	
3	Week of January 22nd	Chapter 3 Cost-Estimation Techniques	Read Chapter 3	Chapter 1 & 2
4	Week of January 29th	Chapter 4 The Time Value of Money	Read Chapter 4	

5	Week of February 5th	Chapter 5 Evaluating a Single Project	Read Chapter 5	Chapter 3 & 4
6	Week of February 12th	Chapter 6 Comparison and Selection among Alternatives	Read Chapter 6	
7	Week of February 19th	Midterms		
8	Week of February 26th	Chapter 7 Depreciation and Income Taxes	Read Chapter 7	Chapter 5 & 6
9	Week of March 5th	Chapter 8 Price Changes and Exchange Rates	Read Chapter 8	
10	Week of March 12th	SPRING BREAK		
11	Week of March 19th	Chapter 9 Replacement Analysis	Read Chapter 9	Chapter 7 & 8
12	Week of March 26th	Chapter 10 Evaluating projects with the Benefit CRM	Read Chapter 10	
13	Week of April 2nd	Chapter 11 Breakeven and Sensitivity Analysis	Read Chapter 11	Chapter 10 & 11
14	Week of April 9th	Chapter 12 Probabilistic Risk Analysis	Read Chapter 12	
15	Week of April 16th	Chapter 13 The Capital Budgeting Process	Read Chapter 13	Chapter 12 & 13
16	Week of April 23rd	Chapter 14 Decision making Considering Multiattributes	Read Chapter 14	
17	Week of April 30th	Final Exams		

Appendix H. Graduate Syllabi Examples

Technical Project Management

Spring 2019

Department of Engineering Management & Technology

ENGM 5540, CRN 22308, Online, 3 credit hours

Instructor: Seong Dae Kim, Ph.D., PMP, aCAP

Email and Phone Number: SeongDae-Kim@utc.edu; 423-425-5786

Office Hours and Location: M, 11:00 am - 2:00 pm, W, 11:00 am – 2:00 pm, or by Appointment. Office: EMCS 326B

Course Meeting Days, Times, and Location: W, 2:00-4:30 pm, EMCS 231

Course Catalog Description: All aspects of project management are covered with emphasis on human and institutional interactions that occur during management of technical projects. Methods of resource identification and allocation, integration of scheduling and cost factors, development of project plans and control are addressed. Project control methods such as PERT and CPM are introduced. A project case study is carried through the semester to illustrate decisions and problems encountered in technical project management. Individual presentations required. Lecture 3 hours.

Course Pre/Co Requisites: Prerequisite: N/A. May be registered as ENGR 5540. Credit not allowed in both ENGM 5540 and ENGR 5540.

Course Student Learning Outcomes: Upon successful completion of this course, learners will be able to

1. Demonstrate understanding of the definition of a project;
2. Demonstrate understanding of key project management concepts;
3. Estimate project budgets;
4. Demonstrate understanding of work breakdown structure;
5. Demonstrate understanding of technical tools and techniques in project management;
6. Apply project management tools and techniques in a small-scale project setting;
7. Use project management software effectively;
8. Communicate effectively as a project manager.

ABET – ETAC Student Outcomes:

J. RUBRIC: KNOWLEDGE OF CONTEMPORARY ISSUES

A. Define Contemporary Issues

B. Identify Strategies

C. Evaluate Potential Solutions

Course Fees: Differential course fee will be assessed.

Required Course Materials: *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* 6th Edition. Project Management Institute

Supplemental/Optional Course Materials: N/A

Technology Requirements for Course: Web Browser: Internet Explorer or FireFox

Hardware/Software Requirements: Participants need access to a personal computer (Mac or PC) and the Internet for major amounts of time for this course. Plug-ins Necessary: You should have an updated version of Adobe Acrobat Reader (for pdf documents). Additional software plug ins may be needed. Check the Technical Requirements for the UTC Learn system. Microsoft Word and PowerPoint version 2010 or later.

Technology Skills Required for Course: You are expected to have working knowledge and capability with your computer hardware, networking and a variety of software applications before entering this class. Class participants must know how to and check their e-mail on a daily basis. You will need to know the appropriate user name and password to access the UTC Learn online password-protected system. If you do NOT know your user name and password, please contact the Call Center at (423) 425-4000. You must be able to save word processing files in a .doc/.docx (Microsoft Word) or .pdf (Adobe Acrobat). You should be able to use a computer during the class to in-class exercise.

Technology Support: If you have problems with your UTC email account or with UTC Learn, contact IT Solutions Center at 423-425-4000 or email itsolutions@utc.edu.

Course Assessments and Requirements:

- A. Quizzes:** There are five online quizzes. Each quiz will be linked on the pre-determined day in the schedule at 9:00 a.m. and must be completed by 11:59 p.m. on the same day. Quiz questions will include multiple-choice, true-false, filling in the blank, and/or essay questions. The length of each quiz will be 30 min. There will be no make-up quizzes. If you have any technical problems during the quiz, you need to contact the instructor ASAP.
- B. Mid-term Exam:** Each student will be given an exam that will be conducted individually. Details of the exam will be given later in class.
- C. Term Project:** Teams of two or three students will apply as many tools and techniques as possible from this course to prepare the project management plan for a project of student's choice. Details of the term project will be given later in class.
- D. Participation:** Students are required to participate on the Discussion Board through Blackboard on a regular basis. Minimum requirement for Discussion Board participation is at least one posting and one comment to another person's posting for every chapter. Students are also required to evaluate other teams' term project presentations.

Course Grading

Course Grading Policy: 90.0-100.0% = A; 80.0-89.9% = B; 70.0-79.9% = C, 60.0-69.9% = D; <60.0% = F.

Quizzes	30%
Mid-term Exam	30%
Term Project	30%
Participation	10%
Total	100%

Instructor Grading and Feedback Response Time: The results of homework and exams will be posted electronically within a week of the due date.

Course and Institutional Policies

Late/Missing Work Policy: All assigned work should be submitted by the due date. No late or partial work will be accepted without discussion with the class instructor.

Student Conduct Policy: UTC's Academic Integrity Policy is stated in the [Student Handbook](#).

Honor Code Pledge: I pledge that I will neither give nor receive unauthorized aid on any test or assignment. I understand that plagiarism constitutes a serious instance of unauthorized aid. I further pledge that I exert every effort to ensure that the Honor Code is upheld by others and that I will actively support the establishment and continuance of a campus-wide climate of honor and integrity.

Course Attendance Policy: Online students do not have to attend class but are required to participate online.

Course Participation/Contribution: Active participation in class, commenting to other students' posting on Blackboard, and evaluation of term project presentation count towards 10% credit as part of your final grade. Attendance is not enough to receive full credit for participation.

Course Learning Evaluation: Course evaluations are an important part of our efforts to continuously improve the learning experience at UTC. Toward the end of the semester, you will receive a link to evaluations and are expected to complete them. We value your feedback and appreciate you taking time to complete the anonymous evaluations.

Course Calendar/Schedule:

Date	Lecture	Assignment
1/9	Syllabus review; Introduction to project management	Chapters 1, 2, 3
1/16	Project scope management; project schedule management	Chapters 5 and 6
1/23	Scheduling using MS Project	MS Project tutorials
1/30	Project cost management	Quiz 1 Chapter 7
2/6	Monte Carlo simulation using Crystal Ball® for budgeting	

2/13	Project resource management	Quiz 2 Chapter 9
2/20	Project risk management	Chapter 11
2/27	Qualitative/quantitative risk analysis	Quiz 3 Chapter 11
3/6	Midterm Exam	
3/13	NO CLASS (Spring Break)	
3/20	Project procurement management; project stakeholder management	Chapters 12 and 13
3/27	Introduction to agile	Quiz 4 Agile chapters 1 and 2
4/3	Implementing agile	Agile chapters 4 and 5
4/10	Special topics in project management	Quiz 5
4/17	Term project presentations	

Course schedule subject to change

Term Project presentation evaluation rubric:

Presenting team: _____

Please rate the ENGM 5540 term project presentation on the following dimensions:

Dimension (multiplier)	1 very poor (very low)	2 poor (low)	3 neutral (medium)	4 good (high)	5 very good (very high)
Explanation of the problem of focus (1)					
Explanation of how the problem is linked to the technique(s) used (1)					
Clearly stated research question(s) (1)					
Level of technique(s) used (1)					
Number of technique(s) used (.5)					
Professional look of presentation slides (.5)					
Visualization of the results (.5)					
Quality of time allocation (.5)					
Total score = _____ (add multiplier*score from the above rows. Total possible points = 30)					

Advanced Quality Control

Fall 2018

Department of Engineering Management and Technology

Course number: ENGM 5570, CRN: 49999, Modality: In Class, Credit hours: 3

Instructor: Wolday D. Abrha

Email and Phone Number: Wolday-Abrha@utc.edu; 423-425-5678

Office Hours and Location: W 12:15 – 2:15 PM or by appointment. Office: EMCS 328

Course Meeting Days, Times, and Location: Tuesday/Thursday 03:05 – 4:20 PM, EMCS 231

Course Catalog Description: The design and analysis of quality systems. Fundamental coverage of statistical process control, quality control concepts, control charts, product specifications, process control, acceptance sampling systems, and other means of assurance widely used in many industries to improve product and service quality and to reduce costs. Background in undergraduate statistics or equivalent. Knowledge of probability and statistical methods, numerical analysis, design of experiments, and hypothesis testing.

Course Pre/Co Requisites: Department head approval. May be registered in ENGR 5570. Credit not allowed in both ENGM 5570 and ENGR 5570.

Course Student Learning Outcomes: Upon completion of this course, the successful student will be able to:

- 1) Describe the specific characteristics, techniques, and insights that are necessary to apply and interpret different types of control charts appropriately.
- 2) Clarify how to diagnose and analyze problems that cause variation in manufacturing and service industries.
- 3) Develop, utilize, and interpret a variety of control charts for effective process machine and product control.
- 4) Explain the concept of process capability as it relates to statistical process control.
- 5) Apply selected problem-solving tools and techniques to resolve quality assurance issues of various case studies.
- 6) Illustrate how to present information clearly and unambiguously, validate decisions based on the information, and clearly communicate conclusions.
- 7) Recognize the basic philosophies surrounding quality management.

Required Course Materials: Introduction to Statistical Quality Control, 7th Edition. Montgomery, D. C. Wiley, ISBN-13: 978-1118146811; ISBN-10: 1118146816

Supplemental/Optional Course Materials:

- 1) Foster, S. T. (2016). *Managing quality: Integrating the supply chain*. Pearson.
- 2) Westcott, R. T. (Ed.). (2013). *The certified manager of quality/organizational excellence handbook*. ASQ Quality Press.
- 3) Pyzdek, T. (2001). *The Six Sigma handbook: a complete guide for greenbelts, blackbelts, and managers at all levels*. New York: McGraw-Hill. Use latest edition, if possible.
- 4) Additional materials such as case studies, journal articles, and notes will be posted in blackboard as needed.

Technology Requirements for Course: Your electronic device should be compatible to allow access to UTC Learn (also known as Blackboard), to read announcements and course materials, and to submit assignments and examinations. Grades will also be posted on Blackboard. If you are unfamiliar with Blackboard, you may use the Center for Student Success, enroll in an on-line training, or contact the Walker Center for Teaching and Learning to register for a classroom course. Minimum requirements: Microsoft – Excel, Word, and PowerPoint (versions 2010 or latest), and Adobe Acrobat Pro.

Technology Skills Required for Course: Blackboard will serve as a key platform in the conduction of this class. Student are expected to be skilled enough to access Blackboard and be familiar to Microsoft office products (Excel, Word, and PowerPoint), Adobe Acrobat, and Adobe Connect. The *Solver* add-on Excel, *JMP*, and/or *Minitab* software may be used.

Technology Support: If you have problems with your UTC email account or with UTC Learn, contact IT Solutions Center at 423-425-4000 or email itsolutions@utc.edu.

Course Assessments and Requirements: Course assessments will be based on total points earned from quizzes, exams, project, and participation.

- 1) All assessments, individual and team project reports, and PowerPoint presentation should be typed and uploaded to UTC Learn. Instructor may provide report writing and presentation guidelines as needed and can ask a hardcopy of any of these submissions.
- 2) The electronic file naming convention for any of your submissions is:
LastName_FirstInitial_CourseNumber_Assignment#_due date_dot file extension.
Example 1: John_A_ENGM5570_Assignment #1_August 15.doc. Also use this file naming in the header of your report.
- 3) Only pdf or word documents are the acceptable file formats.
- 4) All sources other than textbook and lecture materials should be properly cited (APA is a preferred format). **Any form of plagiarism will not be tolerated and will result in a zero grade for the specific work, and it can be reported for violating honor code.**
- 5) While some justifiable circumstances may be considered at the discretion of instructor (on case by case bases), late submissions will be penalized (see late/missing work policy for details).
- 6) The general evaluation criteria for written works is based on:

- a. Instructions (refers to the ability to follow instructions correctly and submit by due date),
 - b. Mastery of concepts (refers to learning/student outcomes),
 - c. Flow (refers to the logical flow of written report which includes correct grammar and spelling),
 - d. Source (this refers to citation of information taken from books, journal articles, websites, etc.), and
 - e. Rubrics assigned for each assessment and question.
- 7) As a graduate student, all your works are expected to be submitted only after a thorough analysis of a problem. Hence, discussions using real-life case studies, work experiences, scenario analysis, etc. are expected.

Course Grading

Course Grading Policy:

- 1) **Quizzes (25%):** There will be at least two quizzes. You may be asked to attach worksheets. Details will be announced by instructor.
- 2) **Midterm Exam (15%):** The midterm exam will be available on October 4. You may be asked to attach worksheets. Details will be announced by instructor.
- 3) **Final Exam (20%):** The final exam is currently scheduled to be available on December 11, 3:30 – 5:30 PM. The final exam may be required to be proctored. Details will be announced by instructor. You may be asked to attach worksheets.
- 4) **Project/Research Paper (30%):** There will be a team of two students per project. Each team will cover an application of principles learned. A typical project is one that is applicable to your workplace or an organization you are affiliated with. Evaluation will be based on a written report and oral presentation. Project progress may be submitted in phases. Details will be announced on Blackboard.
- 5) **Participation (10%):** Active participation in responding to questions and topics in class counts towards your final grade. Additional discussions may be available on Blackboard.

Instructor Grading and Feedback Response Time:

- The results of quizzes, exams, and other submitted works will be posted electronically within a week of the due date. Participation grade will be posted at the end of the last week of class.
- Instructor will respond to all other inquiries within **24 hours**. Any communication received on weekends will have to be responded by the next Monday.
- You are expected to adhere to a formal e-mail writing style, when sending emails. **Remember, e-mail is not a text message!** Example: include course code and CRN in the subject, start your message with greetings, and close it professionally.

Letter grading:

90 – 100	A
80 - 89	B
70 - 79	C
60 - 69	D
Below 60	F

Course and Institutional Policies

Late/Missing Work Policy: All assigned works should be submitted by the due date to UTC Learn. Late works are strongly discouraged and will be penalized. There will be a 10% penalty for each day a work is submitted late. If you know you are going to submit late, you should let me know in advance. **No work will be accepted after solutions are provided.**

Student Conduct Policy: UTC’s Academic Integrity Policy is stated in the [Student Handbook](#).

Honor Code Pledge: I pledge that I will neither give nor receive unauthorized aid on any test or assignment. I understand that plagiarism constitutes a serious instance of unauthorized aid. I further pledge that I exert every effort to ensure that the Honor Code is upheld by others and that I will actively support the establishment and continuance of a campus-wide climate of honor and integrity.

Course Attendance Policy: While attendance will not be taken during every lecture, everyone is assumed to be an adult and will attend class if possible. If you are not present or do not utilize the discussion boards on Blackboard, you will not get credit for participation. It is the student’s responsibility to keep up with coursework, materials, review any missed work, and assignments.

Course Participation/Contribution: Active participation by responding to questions on discussion boards on Blackboard and in class counts towards **10%** credit as part of your final grade.

Course Learning Evaluation: Course evaluations are an important part of our efforts to continuously improve the learning experience at UTC. Toward the end of the semester, you will receive a link to evaluations and are expected to complete them. We value your feedback and appreciate you taking time to complete the anonymous evaluations.

Course Calendar/Schedule: This is a *tentative course calendar/schedule*. Additional information, updates, and announcements will be provided via UTC Learn, as needed.

Week #	Chapter & Topic	Assessments Due	Additional Notice
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1	Introduction & Overview Ch 1: Quality Improvement in Modern Business Env't Ch 2: The DMAIC Process	Learning assessment (August 21 – 23)	
2	Ch 3: Modeling Process Quality	Introductory profile, group preference (August 28)	
3	Ch 4: Inferences About Process Quality		Labor Day (September 3)
4	Ch 4 (cont'd) Ch 5: Methods/Philosophy of SPC	Quiz 1, phase 1 of project (September 13)	Chapters for quiz: TBD
5	Ch 6: Control Charts for Variables Ch 7: Control Charts for Attributes		
6	Ch 8: Process/Measurement Capability Analysis	Midterm exam (October 4)	
7	Ch 9: CUMSUM & EWMA Ch 10: Univariate SPC techniques	Phase 2 of project (October 11)	Midterm grade announcement, if needed
8	Ch 10 (cont'd) Ch 11: Multivariate SPC		
9	Ch 12: Engineering Process Control & SPC	Quiz 2 (October 18)	Chapters for quiz: TBD Fall Break (October 16)
10	Ch 13: DOE		
11	Ch 13 (cont'd) Ch 14: Optimization with DOE	Phase 3 of project (November 8)	
12	Ch 15: Acceptance Sampling for Attributes		
13	Ch 16: Acceptance Sampling – others	Quiz 3 (November 20)	
14	Review	Phase 4 of project (November 29)	Last day of Class (November 29)
15	No Class (Study day & final exam week)		
16	Final Exam	Final Exam (December 11)	Exam time: 3:30 – 5:30 pm

Appendix I. Oral and Written Communication Rubrics

**UTC COLLEGE OF ENGINEERING AND COMPUTER SCIENCE
ORAL COMMUNICATION RUBRIC FOR GRADUATE STUDENTS**

Name of Student: _____ Major: _____ Date: _____

Instructions: Please mark your score in the last column for each category as described below, and put your total score in the last row.

	1	2	3	4	Score
Organization	Unclear focus, no background information, no outline	Clear focus but no background information, little or no outline	Development is clear with a well-defined outline, but transitions need refinement	Development is clear through use of specific and appropriate examples; transitions are clear and create a succinct and even flow	
Content	Topic is unclear, information appears randomly chosen, poor application of fundamentals	Topic is clear, but supporting information is disconnected and shows poor application of fundamentals	Topic is clear and contains many relevant points and appropriate application of fundamentals, but somewhat unstructured	Exceptional use of material that clearly relates to the focus; abundance of various supported materials	
Presentation Length	Greatly exceeding or falling short of allotted time	Exceeding or falling short of allotted time	Remained close to the allotted time	Presented within the allotted time	
Visual Aids	Poor selection and use of visual aids technology, and not readable images	Appropriate selection and use of visual aids, but use of poorly resolved images	Appropriate selection and use of visual aids, well-focused images	Very good selection and use of visual aids with clearly readable images that complimented talk	
Attention to Audience	No attempt to engage audience	Little attempt to engage audience	Engaged audience and held their attention most of the time	Engaged audience and held their attention throughout with creative articulation, enthusiasm, and clearly focused presentation	
Speaking Skills	Monotone; speaker seemed uninterested in material	Little eye contact; fast speaking rate, little expression, mumbled	Clear articulation of ideas, but some lack of confidence with material	Exceptional confidence with material displayed through poise, clear articulation, eye contact, and enthusiasm	
Comments:					TOTAL SCORE

Name of Reviewer: _____ Signature of Reviewer: _____

WRITTEN COMMUNICATION RUBRIC FOR GRADUATE STUDENTS

Name of Student: _____ Major: _____ Date: _____

Instructions: Please mark your score in the last column for each category as described below, and put your total score in the last row.

	1	2	3	4	Score
Drafting	Requires excessive guidance and prompting from teacher. Is unable to write independently.	Requires occasional guidance and prompting from teacher to write independently. Written work is inconsistent.	An independent writer who requires little guidance or prompting from teacher to write. Written work is usually detailed and creative.	Requires no guidance or prompting from teacher to write independently. Written work is creative and detailed. Student enjoys writing.	
Editing	Student often ignores peer and teacher edits, turning in final products with grammatical and spelling errors. Student does not edit his or her own work at all.	Student accepts peer and teacher edits, but does not edit his or her own work.	Student accepts peer and teacher edits. Student usually edits his or her own work, catching accidental grammatical and spelling errors.	Student accepts peer and teacher edits. Student is also exceptionally meticulous about editing his or her own work, catching most grammatical and spelling errors.	
Revision	Student resists the revision process, making few or no changes from first to final draft.	Student makes minor revisions when necessary. Accepts some constructive criticism from teacher.	Student accepts constructive criticism well from peers and teachers and often comes up with creative and appropriate revision ideas of his or her own.	Student makes full use of the revision process, soliciting and accepting constructive criticism from peers and teachers and implementing his or her own ideas for revision.	
Final Draft	Final draft shows little evidence of editing and revision.	Final draft shows some evidence of editing and revision.	Final draft shows clear evidence of editing and revision.	Final draft shows clear evidence of thoughtful editing and revision.	
Attitude	Shows no enthusiasm for or commitment to the writing process.	Shows some enthusiasm for and commitment to the writing process.	Usually shows enthusiasm for and commitment to the writing process.	Shows exceptional enthusiasm for and commitment to the writing process.	
Timing	Student does not submit any written work on time.	Student submits the work on time with minimum changes.	Student submits the work on time with required changes.	Student submits the work on time with required changes and by providing additional writing materials.	
Comments:					
TOTAL					

Name of Reviewer: _____

Signature of Reviewer: _____