

Letter of Intent for New Academic Program

- Program Name: [Construction Operations](#)
- Degree Designation: [undergraduate certificate](#)
- Contact Person: [Zhihui Sun](#)
- Department: [Civil and Environmental Engineering](#)
- School/College: [Speed School of Engineering](#)
- Implementation date (Date program is projected to begin): [Fall 2023](#)
- Accreditation or licensure requirements (if applicable): [Not applicable](#)
- Lead Fiscal Officer's Confirmation and Signature: [I, Todd Hoffmann, has reviewed budget calculations for the creation of an undergraduate certificate program in Construction Operation](#)
- Dean's Confirmation and Signature: [I, Emmanuel Collins, approve this Letter of Intent for the creation of an undergraduate certificate program in Construction Operation](#)

Commented [HA1]: The LOI must include a statement to confirm that the unit's lead fiscal officer has reviewed the budget calculations in the letter of intent.

I. Program Abstract

This LOI aims to develop an undergraduate certificate program in the Civil and Environmental Engineering Department within the JB Speed School of Engineering. With the passing of the Bipartisan Infrastructure Law (Infrastructure Investment and Jobs Act), there is a tremendous demand in civil engineers, who help to design and build our infrastructure and to assure the competitiveness of the United States. Traditional civil engineering program content covers sub-disciplines of structural engineering, geotechnical engineering, transportation engineering, water resources/environmental, and construction. The civil engineering degree program provided by our department covers the first four areas, while “construction” is the only missing element. Considering one-third to one-half of our undergraduate students complete their required co-ops with construction companies and receive permanent job offers in construction upon their graduation, offering a certificate program in construction operations will not only provide these students with needed skillset and knowledge to be better prepared for future challenges, but also a proof of sound education to show their qualification to the potential employers. Currently, none of the Kentucky universities (UK, UofL, and WKU) provides such a certificate program for students in civil engineering. Some universities (EKU, NKU, WKU, Murray State, and Morehead U) provide degree in Construction Management Technology, which is not an engineering degree and would not allow graduates to achieve Professional Engineering licensure. Providing a certificate in construction operations for civil engineering students will help to expand their professional engineering career paths and provide more/better opportunities to be in leadership roles in construction companies.

II. Educational Program Objectives

- The objectives of the proposed program

The educational objective of this proposed undergraduate certificate program is to provide students with training to gain the needed skillsets for construction related duties, such as land surveying, material testing, construction equipment, and construction management.

- Admissions requirements

Any student enrolled in our BSCE program is admissible to this certificate program. Students meet the prerequisites requirement of ENGR101, PHYS298, and CEE254 or equivalency are also admissible.

- Graduation requirements

This certificate program requires 12 credit hours with a GPA of 2.25 or higher to graduate.

- Curriculum

To complete this certificate, students are required to take the following courses:

- CEE 260 Field Measurement (2 credits)
- CEE 261 Field Measurement Lab (1 credit)
- CEE 530 Construction Materials (3 credits)
- CEE 540 Construction Management (3 credits)
- CEE 541 Construction Equipment and Practice (3 credits)

Among these courses, CEE 260/261 (sophomore year) and CEE 530 (senior year) are already in the current BSCE curriculum. CEE 540 Construction Management and CEE 541 Construction Equipment and Practice are two relatively new graduate courses that were already developed and taught within the department. Speed School policy allows senior students take up to 6 credit hours of graduate courses without the permission from the department chair. With Construction Management being offered in the fall semester, and the Construction Equipment and Practice being offered in the spring semester, and both are offered online, senior CEE students can take these two additional courses at any reasonable

pace in order to get the certificate. These additional course credits can also transfer to their graduate program if they choose to continue.

- Potential for collaboration with other units at UofL and/or articulation with other institutions

The Civil and Environmental Engineering Department will work closely with construction industry to decide/adjust the course contents to meet the industrial needs.

III. Linkage with the Mission and Strategic Plan

The mission of the Department of Civil and Environmental Engineering is to serve the university, the Commonwealth of Kentucky, and the engineering profession by providing high quality educational programs to all students; engaging in research and scholarship that will extend knowledge; and assisting the economic development of the regional, state, and national economies through technology transfer.

This mission statement of the Department was developed by the CEE faculty with extensive input from the practitioner and student advisory councils, and is consistent with the missions of the University and Speed School of Engineering.

The proposed undergraduate certificate in Construction Operations will better serve the mission of the department by expanding students' engineering professional path, extending students' needed knowledge in Civil Engineering, and also meeting the regional, state, and national job market demands.

IV. Diversity and Inclusion

While any student is welcome to enroll, this certificate program is specifically designed to accommodate three types of students: students enrolled in the BSCE, students enrolled in the BSCE with an intention to continue to MEng program; students enrolled in similar degree or associate degree programs that meet the admission requirements for the certificate program.

For students enrolled in our BSCE programs, this certificate can be used as a proof of their chosen focused area and will be helpful to those who want to make construction management his/her career. Three of the required courses are already covered in the BSCE curriculum, while the other two courses are both provided online to accommodate the busy schedule of their junior/senior years.

For external or visiting students, our online courses are highly assessable and students can study the course contents on their own paces.

V. Student Demand

Because this certificate program seeks to recruit from students who are enrolled in the BSCE program, we estimate that one fifth of our BSCE students will be interested in this certificate program. This is based on their co-op experience and the demand of their employers. This estimates 8 BSCE students (full-time), and 2 visiting students (part-time) to be enrolled in this certificate program each year. Although most BSCE students enrolled in this program will not pay addition tuition (assuming they are already pay full-tuition), this program will generate tuition revenue (\$331/hour) with the enrollment of students who would stay for the MEng program and visiting students from taking CEE 540 Construction Management (3 credits, Fall) and CEE 541 Construction Equipment and Practice (3 credits, Spring).

	Year 1	Year 2	Year 3	Year 4	Year 5
Full-Time	8	8	8	8	8
Part-Time	2	2	2	2	2

Projected new tuition revenue (\$\$)	\$23,832	\$23,832	\$23,832	\$23,832	\$23,832
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VI. Market Demand

As populations in US continue to grow, our infrastructure demands also grow. Critical areas in this sector include the maintenance and construction of new roadways, the management of water supply, waste filtration and residential real estate development in urban spaces. One of the key benefits of civil engineering is that it is 'recession-proof'. In a healthy economy, civil engineers design and build new infrastructure; in a recessed economy, civil engineers repair/retrofit existing ones. According to US Bureau of Labor Statistics, employment of civil engineers is projected to grow 8 percent from 2020 to 2030. About 25,000 openings for civil engineers are projected over the decade. In Kentucky alone, there were 1,580-3,070 employment opportunities of civil engineers in May 2021. There are currently hundreds of active new job openings each month in Kentucky, and this number keeps growing. With the passing of the Infrastructure Investment and Job Acts, there will be new construction jobs related to new infrastructure and maintaining of existed infrastructure.

VII. Employer Demand

Type of Job	Regional Avg Wage	Regional # of openings	Regional Growth Projections (%)	State Avg Wage	State # of openings	State Growth Projections (%)	National Avg Wage	National # of openings	National Growth Projections (%)
Construction Manager	\$94,310	190 (annually)		\$96,800	367 (annually)	7% (10-yr)	\$98,890	51,400	11% (10-yr)
Civil Engineer	\$91,280	101 (annually)		\$87,220	206 (annually)	9% (10-yr)	\$88,050	25,300	8% (10-yr)

*All data were collected from Bureau of Labor Statistics' Occupational Outlook Handbook and Kentucky Center for Statistics.

VIII. Academic Demand

Students graduating from this program will be prepared to enter the workforce immediately.

This program does not replace any existing program, track, concentration, or specializations that exist within the University of Louisville. Instead, it strengthens the current BSCE and MEng programs by increasing the construction related elements in the current BSCE curriculum.

The feedback we collected through the 2018 CEE alumni survey reflects the opinion of CEE graduates that having knowledge of construction engineering would not only better prepare them to take the challenges in their daily job, but also enhance their competitiveness in the job market. A round table discussion between the CEE department chair and local employers also suggests the addition of construction related topics to the BSCE curriculum.

There are three schools in Kentucky that provide BS degrees in Civil Engineering (UK, UofL, and WKU). None of the schools offers an undergraduate degree program in construction engineering. NKY provides an associate degree program in Construction Technology. ECU, WKU, Murray State, and Morehead all provide degrees in Construction Management Technology. While a technology program focuses on training technicians and technologists, it does not provide benefits to civil engineers and will not help to meet the high market demand on civil engineers or construction managers. Therefore, providing an undergraduate certificate program in construction operations will provide the needed training to our future civil engineers. This will be a **unique** program in the Commonwealth of Kentucky.

IX. Funding Sources

No new full-time tenure track or term faculty need to be hired for this program. An adjunct will be hired

to teach the planed courses.

Faculty workload. Three of the listed courses (CEE 260, CEE 261, and CEE 530) under this certificate program are currently within the BSCE curriculum, thus covered by CEE faculty as part of the regular teaching loads. CEE 540 Construction Management is taught by a CEE term faculty as part of the regular teaching load. CEE 541 Construction Equipment and Practice will need to be taught by an adjunct, who will be hired by the CEE department. Thus, the certificate program will not create additional teaching load to CEE faculty.

Budgetary Rationale. CEE is currently paying \$6,000/3 credit hour course to adjuncts. This will be the only expenditure to the program. Since we mainly target at BSCE students, we will work with Speed School advising and marketing office, as well as the advising and co-op office to promote the program. There is no additional cost to this effort.

Please provide a reasonable estimate of program expenditures related to marketing and outreach, as well as expenditures incurred by additional personnel needed to provide faculty training and/or assistance with instructional design.

The marketing and outreach expenditures of this program will be minimum. The CEE department chair will work closely with the Speed School advising office to promote this certificate program to our BSCE and rising MEng students. This effort will be included in the regular work load of the department chair and the advisors, therefore, no additional cost is needed. The CEE chair also plans to reach out to the chairs group under ASCE to recruit potential students from other schools. This will be done through emails and annual ASCE chairs' meetings, which does not require additional expenditure. The CEE chair and faculty will also reach out to local ASCE chapter through monthly chapter meetings that they attend regularly. No additional expenditure is expected through this effort either.

Financial Resources and Program Impact. Revenues of the program will be tuition.

Projected Revenues	Year 1	Year 2	Year 3	Year 4	Year 5	Five-year Total
General Funds (internal reallocation)						
Grants or Gifts, list each one						
Other revenues, Tuition	\$23,832	\$23,832	\$23,832	\$23,832	\$23,832	\$119,160
Total Projected Revenues	\$23,832	\$23,832	\$23,832	\$23,832	\$23,832	\$119,160

New Resource Requirements. No additional cost other than the only one adjunct to be hired.

Projected Expenses	Year 1		Year 2		Year 3		Year 4		Year 5		Five-year Total	
	#	Cost \$	#	Cost \$	#	Cost \$	#	Cost \$	#	Cost \$	#	Costs \$
Faculty Lines (full-time, adjunct or part-time faculty)	1	\$6,000	1	\$6,000	1	\$6,000	1	\$6,000	1	\$6,000	5	\$30,000

Graduate Assistant Positions											
Library Support	■		■		■		■		■		■
Facilities, technology or equipment	■		■		■		■		■		■
Other (please describe below the table)*											
Total Projected Expenses		\$6,000		\$6,000		\$6,000		\$6,000		\$6,000	\$30,000

X. Online Delivery

The certificate program will be a mixture of in-person and online. The three classes (CEE 260, CEE 261, and CEE 530) that are within the BSCE curriculum will be in-person. These classes have important lab components to train our students on field measurement and field testing. These lab components cannot be replaced in a virtual format. CEE 540 and CEE 541 do not have lab components, they both will be delivered online. Both courses will be semester-long courses to better accommodate the workload and course schedules of our BSCE and rising MEng students.

Yes	No	Online Program Best Practice
	x	8-week courses <i>For undergraduate programs, this would be major classes at a minimum although also recommended for general education classes</i>
x		Allow part-time enrollment
x		Admit students at least two times/year
x	x	Asynchronous classes (no regular required meeting times)
	x	100% online (in-person experiences that can be done off-site do not affect this factor, meaning it would still be considered 100% online even if the student has to do in-person assignments where they live)
x		Graduate-level programs will not require the GRE, GMAT or other standardized tests for admission

The CEE department will design this proposed certificate program in accordance with the following best practices for online programs.

Yes	No	Quality Program Practice
x		Require all faculty who will develop and/or teach in the program to go through Delphi U or have gone through an equivalent training
x		Require all faculty developing online courses to partner with an instructional designer in the Delphi Center and adhere to established deadlines for course creation