

University of Louisville
New Academic Program Proposal Template

Undergraduate, Graduate, and Professional Programs

After approval of the Letter of Intent, undergraduate, graduate, and professional programs are to complete this New Academic Program Proposal template. There is a separate template for certificate credentials.

All templates and forms are available at:

<http://louisville.edu/oapa/new-academic-program-approval-page/new-academic-program-approval>

To avoid unnecessary delays, please ensure that all questions are addressed clearly and completely and that all necessary forms are completed and submitted.

Some questions may seem repetitive, but they reflect CPE questions and must be answered exactly in the format requested. CPE readers won't have access to previous information submitted. Responses to the questions in this template are needed exactly in the format requested in each question.

If the question asks for a description, you must provide a description rather than referencing information provided elsewhere in a different format (such as a table). As well, if you decide to provide additional information in tables (such as assessment rubrics, data, etc.) you must also describe the material. We are unable to copy tables into the CPE online portal.

Questions about the template and process can be directed to the Office of Academic Planning and Accountability through the Program Approval Service Account (PROGAPPR@louisville.edu).

NOTE: All unit approval processes must be completed and documented before submitting this proposal.

Send the following materials, as well as any questions or concerns, to the **Program Approval Service Account (PROGAPPR@louisville.edu).** The program approval process will not begin until all of the above documents are received. Please submit all materials listed below at the same time.

1. This Completed Proposal Template
2. Proposed Program Curriculum
3. Course syllabi for any new course offerings
4. SACSCOC Faculty Roster Form
5. Gray Associates Program Evaluation System Regional Scorecard
6. CV for Program Director/Coordinator
7. Course Template Form

8. Proposal Budget Form
9. Letter of Support from the UofL Libraries
10. Letter of Support from the unit Dean
11. Letter(s) of Support from any units, departments, or internal or external entities that have indicated their support for the program

General Program Information	
Program Name:	Applied Engineering
Degree Level:	Bachelors
Date:	TBD
Department and Department Chair:	Department of Applied Engineering (new department)
School/College:	Speed School of Engineering
Program Director and Contact (if different); (please also include title):	Dr. Thomas Rockaway rockaway@louisville.edu
CIP Code:	15.0000
Program Type (collaborative, joint, or single institution):	Single Institution
Is this program an advanced practice doctorate?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Number of Credit Hours required:	120
Method of Delivery (online, face-to-face):	Face-to-face (lab-based courses), and online/hybrid
Is an approval letter from the Education Professional Standards Board (EPSB) required for this program? If so, attach a copy to this proposal.	No
(Tentative) Institutional Board Approval Date:	
Proposed Implementation Date (semester and year):	Fall 2024
Anticipated Date for Granting First Degree:	May 2028
Have all unit approval processes been completed?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Please provide a list of unit approval processes with approval dates:	Proposal Approvals: UEC – Friday, 11.11.2023 AP&P – Tuesday, 11.14.2023

A. Overview

1. Provide a brief description of the program with its estimated date of implementation.

(250 words or less; program’s purpose/focus, primary areas of study, intended audience, academic level—undergraduate, graduate, or professional, length of the program, goals/objectives, rationale for program, skills or knowledge that students will acquire, relationship of program to general field). This description will be used for external reporting and should provide a concise programmatic overview.

CPE Instructions: The succinct program description should be readily understandable to a constituent who is not familiar with the proposed discipline.

We are proposing to develop a **Bachelors of Science in Applied Engineering** degree program within the J.B. Speed School of Engineering, to begin enrolling students in Fall 2024. The industrial base within Kentucky is rapidly expanding and this degree program can help meet the increasing workforce demand. Applied Engineering graduates generally fill the gap between traditional four-year engineering and two-year technician programs. The proposed four-year Applied Engineering degree program can develop a skillset focused between these two areas and emphasize applied math and science skills directly relatable to industry. Some common job titles for Applied Engineering graduates include: product development, manufacturing, product testing, technical sales, and field service. **These positions would appeal to many students whose career development aspirations align with the hands-on application of engineering solutions.** The University of Louisville currently does not offer Applied Engineering degrees but is uniquely positioned to leverage existing resources to develop a viable program. The J.B. Speed School of Engineering is recognized as generating “industry-ready engineers”. Through the co-op program and Board of Advisors, the school has established and maintained mutually beneficial relationships with an extensive employer list. These industry relationships are essential as the Applied Engineering curriculum and focus areas are developed.

2. Describe how the new program is consistent with the mission and goals of the institution.

CPE Instructions: Describe how the program will address the institution’s mission and strategic goals. Highlight which areas of the institutional plan will be furthered through implementation of this program.

This program supports a variety of components from the University’s strategic plan, as discussed below. We have organized each paragraph by first listing the relevant strategy, followed by discussion of how the AE program supports that particular strategy.

L1.A1: Attract and enroll a capable, diverse, and engaged student body responsive to the demographic and workforce needs of the future.

This program fills a gap in Speed School’s curriculum: while traditional engineering students are drawn to theory and design, Applied Engineering focuses on teaching those students who are

similarly interested in a hands-on practical applications. Conversations with employers support the notion that both career interests are necessary to their future growth.

L1.A2: Improve retention and persistence to graduation and ensure progress toward equal outcomes for underrepresented, underprepared, low income student sub populations.

This program will create more experiential learning opportunities for students studying Applied Engineering, and in particular, for students who would otherwise likely not participate in such an opportunity due to transferring out of Speed School.

L2.A1: Establish the components of structured experiential learning opportunities in every unit.

This program is designed around career development, including job preparation within the curriculum through experiential learning opportunities, and has articulated goals related to job placement upon matriculation. These curricular design features and goals demonstrate a link between this proposed program and the University's mission.

L2.A2: Create a high quality, industry focused core skills certification that students can use as an employment tool alongside their academic credential when they graduate.

This program will result in new contracts and funding opportunities from industry and employers, including sponsorship of faculty lines, funding of lab space and materials, and contracting for industry-specific professional development opportunities.

I2.A3: Develop value added partnerships with business and industry partners.

This proposal includes both a base degree program coupled with options for industry-specific tracks. This design will allow the development of future tracks identified by conversations with industry partners to develop more quickly and more simply.

I3.A2: Increase number of programmatic offerings and off campus spaces which foster local and global community engagement with the university.

Once students have completed their Cardinal Core and program foundation courses, they will then focus on completing industry-specific track courses. These courses may be eight-week terms and offered more frequently than a traditional semester, allowing multiple entry points for students. When appropriate, this will also allow these courses to be taught off-campus and on-site with employers, providing students both experiential learning as well as learning directly from employer partners. In this way, we will bring the campus to people, a hallmark of I3.A2.

3. Is there a specialized accrediting agency related to this program? Yes No

a. If yes, please identify the agency.

b. If yes, will the program seek accreditation?

a. There are two options for specialized accreditation, if we elect to seek it: ABET (Accreditation Board for Engineering and Technology) or ATMAE (Association of Technology, Management, and Applied Engineering).

b. We are not currently planning on seeking specialized accreditation: it would create an immediate increased cost to the program to attain and maintain specialized accreditation, and this status is neither required nor requested by the employer partners we have been collaborating with. However, if in the future industry partners recommend this move and provide the assistance to do it, we are open to getting specialized accreditation. Because Applied Engineering students would not be eligible to take the examinations needed to earn a Professional Engineer (PE) license, the decision to accredit through ABET or ATMAE would be moot in terms of professional engineering certification.

4. Does this program have a clinical component? Yes No

If yes, discuss the nature, appropriateness, and availability of clinical sites.

5. Identify where the program will be offered.

- a. Indicate the projected life of the program. (Is the institution intending to offer it for a limited timeframe, or will it be ongoing?)
- b. Describe the primary target audience.
- c. Describe the instructional delivery methods to be used.
- d. Describe the strength of the institution to undertake this new program.

- a. Ongoing. We anticipate enrolling our first students in Fall 2024, and graduating our first class in Spring 2028.
- b. The Applied Engineering degree program seeks to specifically recruit students who are interested in engineering (i.e., enroll in Speed School) but are more focused on application as opposed to theory. For these students, calculus is a common point of drop-out or transfer (i.e., those who enroll in but do not pass introductory math courses). The number of students meeting these criteria in 2019-2020 was 128; we have conservatively estimated that 60 (or less than half) of these students would alternatively enroll in Applied Engineering. In terms of student populations, we anticipate this program will be particularly utilized by adult learners, underfinanced students, and transfer students.
- c. The Cardinal Core classes and Speed courses that already exist can be taken either in-person or online, at the student's discretion. As the curriculum is developed, we anticipate that the lab-based courses will be offered in-person, and all other courses will provide online or in-person options as available.
- d. The Speed School, in collaboration with UofL Central, has the resources needed to successfully implement and scale this new program. The financial vision for this program is that it is revenue-positive through a combination of revenue from enrollment and industry-sponsored gifts. Industry partners, including those at the Speed School's Industrial Board of Advisors, have expressed intensive interest in the successful delivery of this program. This interest gives us confidence that we will meet the revenue milestones.

6. Describe the rationale and need for the program to include how the institution determined need.

What problem are we solving?

The greatest threat to emerging technologies and industries in Kentucky is the gap between talent demand and talent pipelines: Kentucky's [Center of Postsecondary Education](#) projects that over the next 10 years, there will be 1600 annual job openings in engineering for bachelor's-level engineers, despite Kentucky universities graduating fewer than 1400 each year. This 200-job gap will only get wider, as the demand for these jobs grows by 28% and enrollment in engineering programs declines [1.3%](#). As CPE concludes, "If degrees are completed at the average pace from the past 10 years, then degree completion will never match demand."

Why is it important to solve this problem?

The emerging markets in Kentucky represent thousands of jobs and billions in market value and tax revenue. As more countries make advances in emerging industries like the Internet of Things, electric vehicles, energy trading, and blockchain (Zhao, et al., 2018)¹, the ability to develop pipelines to meet the growing talent demand will determine which economies remain viable and competitive.

What is the cause of this problem?

The primary cause of the widening supply-demand gap in emerging technology industries is misalignment between program and student expectations. Out of any discipline, enrollment and success in mathematics courses is the strongest predictor of student attrition in engineering (Woolcott, et al., 2019)². Mathematics achievement is largely a function of one's personal self-efficacy (Loo & Choy, 2013)³ and engagement (Burton & Dowling, 2009)⁴: believing one belongs in the course, and feeling comfortable in that belonging, affects achievement in that course. Students who feel they belong and are supported are more likely to succeed; students who feel they do not belong and do not feel supported are less likely to succeed (Grossman & Porche, 2014)⁵. Historical barriers based on race and gender can further exacerbate these feelings, inhibiting their performance further and increasing the likelihood of attrition (Fink, Frey, & Solomon, 2020)⁶. In addition to contributing to the gap between engineering and technology talent and demand, students enrolling in a workforce-ready program but not completing increases their risk of loan default (McKinney, et al., 2021)⁷, a further strain on an already fragile economy. Programs can mitigate these barriers to success and the risks of student attrition by providing orientation programs, creating student learning communities and adopting cohort models, fund professional development for faculty, engage in outreach programs, and both require and foster experiential education opportunities (Sithole, et al.,

¹ DOI: <https://doi.org/10.1016/j.egypro.2019.02.039>

² DOI: <https://doi.org/10.1080/0020739X.2018.1520932>

³ DOI: <https://doi.org/10.12691/education-1-3-4>

⁴ http://rees2009.pbworks.com/f/rees2009_submission_10.pdf

⁵ DOI: <https://doi.org/10.1177/0042085913481364>

⁶ DOI: <https://doi.org/10.1039/D0RP00053A>

⁷ DOI: <https://doi.org/10.1177/00915521211001467>

2017⁸; Azimzadeh, Rodchua, & Brown, 2021⁹; Foster, Shahhosseini, & Maughan, 2016¹⁰; Slaven & Cheney, 2016¹¹).

Responding to this particular population of students and their needs, this program is designed for students seeking to develop and apply, but not necessarily design, engineering solutions. As an educational institution, we are losing these students because our current offerings are not aligned with their career development aspirations.

What will solve this problem?

Whereas traditional engineering curricula focuses on theoretical and mathematical competencies, this gap invites a program that emphasizes an intersection between and synthesis of professional skills (e.g., critical thinking and effective communication) and technical skills (e.g., mechatronics). Employer partners like GE Appliances, FORTNA, and BlueOval SK have all communicated their need to hire for positions that sit at this intersection.

In order to address workforce supply-and-demand challenges within emerging technologies, an investment must be made where higher education institutions, industry employers, and other stakeholders collaborate to build and foster new talent pipelines in applied engineering. This investment must respond to the barriers to student success, from academic obstacles like mathematics, to professional barriers like lack of applied experience. Such an investment will both produce a larger skilled workforce (as measured by the number of graduates, the number of industry-recognized certificates awarded), and produce new knowledge and research opportunities. Further, rather than being concerned with what non-engineering students lack, this solution would instead emphasize how different programs interact in the workforce to design, build, and test solutions in industry.

B. Program Quality and Student Success

The curriculum should be structured to meet the stated objectives and student learning outcomes of the program.

7. Provide specific programming goals (objectives) and specific student learning outcomes for the program in the areas that are required for SACSCOC.

For UNDERGRADUATE programs, that would be:

- Competency Related to Major
- Competency which Builds upon the Cardinal Core Curriculum
(Choose either Cultural Diversity or Effective Communication)
- Competency Related to the Culminating Undergraduate Experience (CUE)

⁸ <http://dx.doi.org/10.5539/hes.v7n1p46>

⁹ Link: <https://www.iastatedigitalpress.com/jtmae/article/id/14099/>

¹⁰ Link: <https://eric.ed.gov/?id=EJ1139472>

¹¹ Link: https://thekeep.eiu.edu/tech_fac/59/

- Competency Related to Critical Thinking

For GRADUATE programs, that would be:

- Competency Related to Content Knowledge
- Competency Related to Engagement in Research -OR-
- Competency Related to Professional Practice and Training Experiences

Competency Related to Major

- **Goal 1** Produce graduates who have the appropriate academic training and industry experience to be successful in the professional practice of applied engineering
 - **SLO 1** Students will be able to demonstrate proficiency in their ability to identify applied engineering problems, determine appropriate methodologies to address them, and effectively communicate findings through their coursework and industry-based cooperative education (co-op) placements.

Competency which Builds upon the Cardinal Core Curriculum

- **Goal 2** Produce graduates who have the broad education necessary to understand, apply, and demonstrate the competencies needed to solve problems in an applied engineering capacity, including consideration of relevant professional, technical, legal, and economic factors.
 - **SLO 2** Students will be able to demonstrate an ability to identify, define, and analyze applied engineering problems and to develop, demonstrate, and troubleshoot solutions to these problems with consideration for relevant professional, technical, legal, and economic factors.

Competency Related to the Culminating Undergraduate Experience (CUE)

- **Goal 3** Produce graduates who can manage projects and collaborate within a team when applying their technical and professional competencies to solve applied engineering problems.
 - **SLO 3** Students will be able to define, identify, evaluate, and solve problems related to managing projects and teams, and demonstrate their capacity to collaborate in the course of these tasks.

8. Describe how each program-level student learning outcome will be assessed.

If you wish to attach any SLO documents you may do so, but you still need to provide a narrative response to this question.

- **SLO 1** Students will be able to demonstrate proficiency in their ability to identify applied engineering problems, determine appropriate methodologies to address them, and effectively communicate findings through their coursework and industry-based cooperative education (co-op) placements.

- **Measure 1** Co-op employers complete a co-op student performance appraisal form following each rotation. Using a 5-point scale, the survey form asks co-op employers to indicate student competencies for the program outcomes.
 - **Criterion 1** 90% of students should be rated ≥ 3.0 out of 5.0 on all outcomes.
- **SLO 2** Students will be able to demonstrate an ability to identify, define, and analyze applied engineering problems and to develop, demonstrate, and troubleshoot solutions to these problems with consideration for relevant professional, technical, legal, and economic factors.
 - **Measure 2** Faculty members and industry sponsors who attend the capstone project presentations complete an evaluation form for each team following their oral presentations. Using a 5-point scale, the form asks faculty and industry sponsors to rate the students' ability to identify, define, and analyze applied engineering problems and to develop, demonstrate, and troubleshoot solutions to these problems with consideration for relevant professional, technical, legal, and economic factors.
 - **Criterion 2** 90% of teams should be rated an overall composite score ≥ 3.0 out of 5.0.
- **SLO 3** Students will be able to define, identify, evaluate, and solve problems related to managing projects and teams, and demonstrate their capacity to communicate and collaborate in the course of these tasks.
 - **Measure 3** Faculty members and industry sponsors who attend the capstone project presentations complete an evaluation form for each team following their oral presentations. Using a 5-point scale, the form asks faculty and industry sponsors to rate the students' ability to define, identify, evaluate, and solve problems related to managing projects and teams, and demonstrate their capacity to communicate and collaborate in the course of these tasks.
 - **Criterion 3** 90% of teams should be rated an overall composite score ≥ 3.0 out of 5.0.

9. Highlight any distinctive qualities of the proposed program.

We are proposing a four-year Applied Engineering degree program that will develop the skills and experiences employers need to fuel their growing demand. Four features will distinguish this program:

Coursework

Students will complete 120 credits hours to earn a Bachelor's of Science in Applied Engineering. Included in this will be credits that satisfy the Cardinal Core requirements, a Speed School Applied Engineering core curriculum, and the management and mechatronics pathway curriculum.

Experiential Education

In addition to the above courses, students must complete 2000 hours of work experience (i.e., one year of full-time work), including a traditional co-op rotation (which counts towards the total 2000

hours). This hybrid approach accommodates the needs of different student groups while also providing enough structure for students to graduate with full-time work experience. In order to allow students time to complete work hours and also graduate in 4-years, we have limited several semesters to minimum requirements for full-time enrollment and utilized summers. As with other co-op programs in Speed School students will be able to maintain Full Time status while enrolled in the co-op course in Spring 3, allowing students to still meet requirements for full-time status.

We will leverage the Speed Schools existing Career Services department to provide students with advising services to facilitate job placement. However, we cannot guarantee placement, and successful placement and completion of the work requirement is ultimately the responsibility of the individual student.

Accommodating Transfer and Adult Learners

We have designated a particular transfer point after Year 2 to create a seamless transfer experience for technical college students. Adult learners will be allowed to use their prior work experience to count towards work/co-op requirements, either in part or in full.

Industry Board of Advisors

Because this program is being created in response to industry demand, an Industry Board of Advisors (IBA) will provide resources to ensure the success of the program. These resources include curriculum feedback, such as insights for new and emerging technologies; social capital, in the form of industry connections to place current students and new and recent graduates; and cultural capital, in the form of guest lecturing and participating in external assessments of student presentations. (For more specifics on IBA roles and tasks, see Question 12 below.)

10. Describe the admission and graduation requirements for the program.

This information will be viewed by an external audience, so please be clear and specific.

CPE Instructions: Be as detailed as possible and address all three components – admission, retention, and completion.

Admissions Requirements

The admissions requirements for the BS in Applied Engineering have been adopted from the same requirements for the BA in Computer Science, since it will recruit for a similar type of student. They are:

Incoming, First-time, Full-time Freshman

- Students with ACT/SAT Scores
 - ACT Composite and Math scores of 25 or higher, HS GPA of 3.0+
OR
 - ACT Composite and Math scores of 24 or higher, HS GPA of 3.5+
- Students with no ACT scores
 - HS GPA of 3.0 or better
 - Comprehensive transcript review
 - Review of student resume

Transfer Students

- Fewer than 12 credit hours
 - Minimum College GPA of 2.8 or better
 - Evaluated on same metrics as First Time students (see above)
- Between 12 – 23 credit hours
 - Minimum College GPA of 2.8 or better
 - ACT Reading 20+ OR Accuplacer Reading score of 244 OR credit for ENGL 101
 - B- or better in College Algebra (MATH 111 or equivalent)
- 24 or more credit hours
 - Minimum College GPA of 2.8 or better
 - B- or better in College Algebra (MATH 111 or equivalent)

Graduation Requirements

- 120 credit hours, 52 at 300+ level
- 2000 hours of work experience
- Completion of degree flight plan
- Completion of University-wide General Education Program
- Cumulative GPA of 2.25 or better for all courses used to satisfy degree requirements

Retention Efforts

In order to support student progress from admissions to graduation, the Speed School employs many retention strategies. The majority of student retention effort at Speed are run out of the Office of Student Success, which includes Academic Counselors as well as Student Success Coordinators. Students receive frequent outreach from their Academic Counselor, who is assigned when the student starts the program. Students keep their same Academic Counselor throughout their degree program. First Year Seminars, First Year Cohort groups (such as BFEA and Speed Connectors Network), as well as a Living Learning Community are all available for incoming students. Continued Student Success programming, such as both Peer Mentoring and Career Mentoring programs are also available.

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11. Provide the following information for the program and for each track, concentration, or specialization (some categories may not apply to all programs).

CPE Instructions: A guided elective is any elective that is part of a major. A free elective is an elective from any academic area not required for a major or minor.

Program/Track, Concentration, or Specialization	Total number of hours required for degree	Number of hours in degree program core	Number of hours in track	Number of hours in guided electives	Number of hours in free electives
Mechatronics & Management	120	90	30	0	0

12. Describe administrative oversight to ensure the quality of the program.

Who will oversee the program and how do their credentials/qualifications align with that role?
 How does program oversight include curriculum review and approval to ensure program integrity and rigor?

The program will initially be overseen by Dr. Thomas Rockaway, Associate Dean in the Speed School of Engineering. As a credentialed engineer with years of industry, teaching, research, and administrative experience, Dr. Rockaway has the knowledge, skills, and abilities necessary to manage the start-up of this program. One of the first milestones for the program after initial implementation, is to hire a full-time department chair who also has the credentials, qualifications, and experience to manage and scale an Applied Engineering program.

In addition to this internal oversight, an Industry Board of Advisors (IBA) will support the program through curricular, social, and cultural resources (see Question 9 for more on these resources). Specifically, IBA members will be asked to commit to:

- Attend bi-monthly board meetings and an annual strategy review
- Mentor and advise program leadership
- Help to identify and recruit qualified program instructors
- Support, create, and/or expand co-op and work-based learning experiences for students
- Contribute to and regularly review reporting on the program’s status, progress, and needs
- Identify and support employees providing talent services to the program’s delivery

13. For a program offered in a compressed timeframe (e.g., with 8-week courses), describe the methodology for determining that levels of knowledge and competencies comparable to those required in traditional formats have been achieved. (You must provide an entry.)

While we intend to offer the track courses in 8-week sessions that allow for greater entry-points for new students, we do not intend for the curriculum for these courses to differ from what they would be if offered as a traditional 16-week offering. Only the higher 300- and 400-level Applied Engineering courses will be offered in 8-week segments. This is designed to provide more flexibility during the subsequent years when students are likely to have more job/school conflicts. This can be done through either doubling the contact hours per week, or splitting 16-week courses into two 8-week components.

14. Please answer the following:

a) Will this be a 100% distance learning program? Yes No

CPE Instructions: This is defined as an academic program in which all of the required courses in a program occur when students and instructors are not in the same place. Instruction may be synchronous or asynchronous.

b) Will this program utilize alternative learning formats (e.g. distance learning, technology-enhanced instruction, evening/weekend classes, accelerated courses)? Yes No

If yes, please check all that apply below.

NOTE: If you check "yes" to this question, you must check at least one of the items listed below.

- Distance Learning
- Courses that combine various modes of interaction, such as face-to-face, videoconferencing, audio-conferencing, mail, telephone, fax, e-mail, interactive television, or World Wide Web
- Technology-enhanced instruction
- Evening/weekend/early morning classes
- Accelerated courses
- Instruction at nontraditional locations, such as employer worksite
- Courses with multiple entry, exit, and reentry points
- Courses with "rolling" entrance and completion times, based on self-pacing
- Modularized courses

15. Will this program replace or enhance any existing program(s) or tracks, concentrations, or specializations within an existing program? Yes No

16. How will the program support or be supported by other programs and/or units within the institution? Please also describe potential for collaboration with other programs within the institution.

In addition to collaborating with industry, this program includes the potential for collaboration with our two-year college partners. The primary goal is to provide a seamless transfer pathway for students to enroll in the program after Spring 2, in order to be ready for a co-op rotation and the track courses in Year 3. The strategy towards this goal will be to develop articulation agreements (that begin as memoranda of agreement) to accept transfer credits and to create this a pathway that is seamless for students.

17. Are new or additional faculty needed? Yes No

- a) If yes, please explain, indicating the number and role of each new faculty member and whether they will be part-time or full-time. Specify if part-time faculty or graduate assistants are included in the additional faculty resources needed.
- b) If yes, please provide a plan to ensure that appropriate faculty resources are available, either within the institution or externally, to support the program.

- a. We anticipate hiring 1 full-time tenure-track faculty member to serve as the department chair, 2 full-time non-tenure-track faculty members, 3 graduate assistants, and a fund for hiring adjunct faculty to fill remaining course responsibilities.
- b. All hired persons, including the pool of adjunct faculty, will be supported by tuition revenue raised by the program.

18. a. Describe the library resources available to support this program.

Please also submit a letter of support from the UofL Libraries.

Access to the qualitative and quantitative library resources must be appropriate for the proposed program and should meet recognized standards for study at a particular level or in a particular field where such standards are available. Adequacy of electronic access, library facilities, and human resources to service the proposed program in terms of students and faculty will be

considered.
(See attachment, Item #9)
<p>b. Describe the physical facilities and instructional equipment available to support this program.</p> <p>Physical facilities and instructional equipment must be adequate to support a high quality program. The proposal must address the availability of classroom, laboratory, and office space as well as any equipment needs.</p> <p>We anticipate building additional lab space and purchasing additional equipment for teaching courses. The full scope and cost of these is available in the full budget. We are planning for additional lab space square footage per student and available equipment per student based on current engineering offerings (e.g., each site surveying lab will provide one tool per 4 students in that lab). Based on feedback from industry partners, we anticipate that a portion of these start-up costs will be covered by industry sponsorships, a revenue source articulated in the full budget.</p>

C. Demand

<p>Student Demand</p> <p>19.a. Provide evidence of student demand.</p> <p>Evidence of student demand is typically in the form of surveys of potential students or enrollments in related programs at the institution, but other methods of gauging student demand are acceptable. Please use the PES+ platform from Gray Associates in your response.</p> <p><i>CPE Instructions: Explain how faculty and staff systematically gathered data, studied the data and estimated student demand for the program. Anecdotal evidence is not sufficient. If student surveys have been collected, provide information regarding <u>sample size, sampling methodology, and response rate.</u></i></p> <p>Because the Applied Engineering degree program seeks to specifically recruit students who are interested in engineering (i.e., enroll in Speed School) but are more focused on application as opposed to theory, we estimate that a large portion of our pool of potential students will be drawn from the students already enrolled in other SSoE programs. For these students, calculus is a common point of drop-out or transfer: in 2019-2020, 128 students enrolled in but did not pass introductory math courses in Speed School. We have conservatively estimated that 60 (or less than half) of these students would alternatively enroll in Applied Engineering. In terms of new student populations, we anticipate this program will be particularly utilized by adult learners, underfinanced students, and transfer students.</p> <p>The table below projects enrollment and revenue based on this starting number of 60 students in Year 1, and includes additional assumptions.</p>
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b. Project estimated student enrollment and degrees conferred for the first five years of the program.		
Academic Year	Degrees Conferred	Majors (Headcount) Fall Semester
2024-2025	0	60
2025-2026	0	111
2026-2027	0	157
2027-2028	39	204
2028-2029	41	214

Employer Demand

20. If the program is designed for students to enter the workforce immediately, please complete Appendix A.

Academic Disciplinary Needs

21. If the program proposal is in response to changes in academic disciplinary need, as opposed to employer demand, please outline those changes. Explain why these changes to the discipline necessitate development of a new program.

n/a (this program is in response to employer demand)

D. Cost and Funding

The resource requirements and planned sources of funding of the proposed program must be detailed in order to assess the adequacy of the resources to support a quality program. This assessment is to ensure that the program will be efficient in its resource utilization and to assess the impact of this proposed program on the institution's overall need for funds.

22. Will this program require additional resources? Yes No

If so, please provide a brief summary of new or additional resources that will be needed to implement this program over the next five years.

Below are the anticipated expenditures needed for this program to be successful, which will serve as resources for the program:

Additional Faculty Hires

See Question 17

Faculty Workload

Most of the courses will be taught by new faculty and all will be paid for by new enrollment.

Marketing & Recruitment

Additional funding will be provided to admissions in order to market and recruit new students, towards a yield goal of 60 (i.e., 60 students actually enrolled) in Fall 2024. This funding will be used towards a portion of a full-time staff member in Speed admissions, at the determination of the admissions director and the Applied Engineering program director.

Academic Advisors

An academic advisor line has been included in the budget, with a goal of adding an advisor for every 100 enrolled students: one advisor in Year 1 and a second advisor in Year 3. The budget also provides funds for hiring a part-time advisor or a graduate assistant in Year 2, who will serve as a bridge between the two years: this person will offset the additional advising burdens as enrollment grows towards 100 students, while keeping costs low and delaying the liability of hiring an additional academic advisor until we are more certain that Year 3 enrollment targets are achieved. The pace of enrollment and retention will determine when a second advisor is hired.

23. Will this program impact existing programs and/or organizational units within your institution? Yes No

If so, please describe the impact. (Examples: reallocation of resources, faculty or staff reassigned, changes to other programs and/or course offerings or other programs, reduction or increase in students served, any other possible impact.)

We anticipate three areas of impact for the first few years:

1. On administrative workload: We anticipate the initial implementation of this program will require a significant portion of worktime from one administrator (Dr. Rockaway) and one staff member (Alex Williams). Their time commitment will be mitigated when new hires are completed, which we anticipate to occur in the first 6 months of the program (or prior, depending on approval processes).
2. On student enrollment: We anticipate that overall enrollment in Speed School will increase, both new enrollment as well as reduction in attrition. There may be an initial reduction in enrollment in a few existing engineering departments as students may switch to an academic career path more in line with their interests. However, as demonstrated by the introduction of the BACS to the CSE department, we anticipate this effect to be short-term.
3. On current teaching capacity: We anticipate there may be added load to other departments due to the program utilizing existing Speed courses. However, we believe Speed School can mitigate this due to (1) there is capacity to handle the initial increase, and (2) those

departments will be able to use the increased student credit hours to support their own requests for additional faculty lines as needed.

24. Provide adequate documentation to demonstrate sufficient return on investment to the state to offset new costs and justify approval for the proposed program.

CPE Instructions: Note whether the program is predicted to increase retention rates, and, therefore, generate tuition dollars; increase revenue by attracting a new pool of students; meet employment needs in the state; feed into graduate that have been shown to be beneficial to the economic needs of the state, etc. If no new costs are anticipated, please explain.

The financial vision for this program is for it to be revenue-positive by Year 4. During the initial years, we have attempted to staggered hiring, renovations, and laboratory equipment purchases such that any annual deficits would be offset by preceding years of budget surpluses. .

To achieve revenue-positive projections, revenue will be drawn from two sources: student credit hours and external donations. The student credit hours will fund the sustaining costs of the program, including costs associated with programming (e.g., recruitment) and faculty and staff lines. The external donations will fund one-time costs, such as buying equipment and building lab space for delivering courses. We have met with companies like Fortna, GE Appliances, and Ford Motor Company, among others, who have expressed support towards meeting these resource needs. Based on their interest and feedback from employer meetings, we expect to raise \$1 million over the first 5 years. This revenue-positive status will allow for future program growth by diversifying and specializing into different industry-recognized pathways; a portion of leftover funds will be used to support the start-up costs associated with adding these new pathways.

25.a. Complete the New Program Budget Spreadsheet.

Found at: <http://louisville.edu/oapa/new-academic-program-approval-page/new-academic-program-approval>

Notes for completing the Budget Spreadsheet:

- Provide an estimate of the level of new and existing resources that will be required to implement and sustain the program.
- Any existing resources reallocated to support this new offering should be estimated as an “internal reallocation” in both the Funding Sources and Expenses sections of the budget.
- Any new resources for which the unit/department plans to allocate funding should be listed as an internal “allocation” in the Funding Sources section of the budget.
- The program proposal is to be developed without the expectation of tuition-sharing or recovery agreements with the Provost. This approach ensures that the “cost” of operating the program is somewhat reflective of reality.

- For every place you add numbers (in both the Funding Sources and Expenses spreadsheet) provide a written explanation for the numbers, including how they were calculated. The CPE system won't let us submit the proposal without explanations for the budget numbers.
- The budget for the proposed program is to be in alignment with the latest budget assumptions (provided below as of 10/7/19) from the Budget Model Workgroup.

Undergraduate*

70% (net of mandatory student fees) of resident per credit hour tuition rate (i.e., the listed rate on the bursar's website) charged to undergraduate students is allocated to the academic unit where the instruction takes place. Every credit hour is treated the same under the model.

Graduate/Professional*

Graduate: 75% (net of mandatory student fees) of tuition revenue allocated according to a student's home academic program.

Professional: 85% of tuition revenues generated from professional degree (law, dentistry, medicine) programs allocated to the student's home academic program.

Note: The new budget model will allocate resources to the academic unit based on where the credit hour is instructed. The unit dean will decide how to distribute funds within the college.

*These definitions of the Budget Model are as of 10/7/19 and are subject to change.

- Note that there are three tabs to the Budget spreadsheet.

Funding Sources tab:

- Indicate funding to be supplied by the unit (include direct funding & In-kind support):
- Internal allocation and reallocation are those estimated dollars needed to fund the start-up and support the new academic program – typically defined as faculty, administrative/staff, and operational expenses.
- When calculating funding, consider the impact on current faculty workloads.
- Include the expected tuition revenue generated by anticipated student enrollment.
- If the program will use existing faculty or other existing resources, the amount of funding represented by those resources are to be listed in the Funding Sources table as reallocation of funds.
- If reallocation of “existing” funds are included in the Funding spreadsheet, the numbers should also be reflected in the Expenses spreadsheet.
- If the unit has allocated funds for any new expenses in the Funding Sources spreadsheet, the numbers should also be added to the Expenses spreadsheet.

Expenses tab:

- You do not have to estimate classroom space unless you believe that existing space is not sufficient to support the academic program.

- Any expenses identified as “existing” funds in the expenses spreadsheet should also be added to the Funding Sources spreadsheet as either internal reallocation or internal allocation.

Funding Source/Expenses Combined tab:

- This spreadsheet will pre-populate based upon the numbers entered into the Funding Sources and Expenses spreadsheets. The program must have more funding than expenses.

25.b. Please provide contingency plans in the event that required resources do not materialize.

The costs of the program are related to the enrollment numbers for the program: If enrollment numbers are dramatically lower than projected, we can accommodate by hiring fewer instructors, funding a smaller adjunct pool, and maintaining fewer pieces of equipment as provided by industry. In the unlikely event student enrollments are not realized, new faculty and staff would have the skillset to be absorbed within our existing Mechanical Engineering department, or our AMIST and LARRI research centers.

E. Program Review and Assessment

Describe program evaluation procedures for the proposed program. These procedures may include evaluation of courses and faculty by students, administrators, and departmental personnel as appropriate. Program review procedures shall include standards and guidelines for the assessment of student outcomes implied by the program objectives and consistent with the institutional mission.

26. Provide a brief description of institutional assessment processes.

The Office of Institutional Effectiveness has prepared an institutional response to this CPE question. Please review the response and edit as needed.

UofL is committed to institutional effectiveness and continuous quality improvement of all academic programs. The university’s mission and strategic planning processes are supported by regular, annual outcomes assessment reporting for academic programs in the form of Student Learning Outcomes (SLO) reports. These reports document that UofL is engaged in evaluative processes that (1) result in continuing improvement in institutional quality and (2) demonstrate the institution is effectively accomplishing its mission. In their SLO reports, programs identify student learning outcomes, measures and targets for the outcomes. Academic programs review data surrounding their student learning outcomes to determine if their set targets were met and then use this assessment to plan for future improvement in student learning.

The SLO process begins in May when templates and instructions for completing SLO reports are sent to department chairs/heads. The SLO process lags behind by one academic year to enable programs to utilize and report assessment results from the previous academic year. Academic programs submit their completed reports by early November. The provost’s office reviews all SLO

reports and returns feedback to assist programs with further development and assessment of their learning outcomes. The feedback suggests changes needed to the SLO process and areas for improvement. The expectation is that these revisions be fully incorporated into the SLO reporting process for the next data collection reporting cycle.

Training, workshops, and resources on student learning outcome development are provided to faculty and staff to support their efforts and to assist them in continuous improvement of their SLO reports and assessment process.

27. Describe how the institution will incorporate the change (program, site, distance education, or other change) into the institution-wide review and assessment processes.

The Office of Institutional Effectiveness has prepared an institutional response to this CPE question. Please review the response and edit as needed.

When a new program is created, an “Academic Alert” is sent to responsible parties. This alert is used by the Office of Institutional Effectiveness (IE) to add the new program to the SLO reporting process. With the creation of the new program, IE reaches out to the department head with information about the annual SLO reporting process and to set up an orientation session to familiarize them with the reporting requirements and provide whatever support is needed.

28. What are the plans to evaluate students’ post-graduate success?

New Academic programs undergo an interim program review after five years for undergraduate programs, four years for masters programs, and three years for doctoral programs. After the interim review, all programs are placed on the university’s regular program review schedule.

The program review template requires that programs provide feedback from graduates, alumni, and employers. In your response to this question consider how you will collect satisfaction feedback from these groups.

CPE Instructions: Explain how the program will identify graduate schools and employers and what questions will be asked in order to assess graduate school and/or workforce success.

The goal of the program is to place students into full-time, good paying, relevant occupations immediately following graduation. Two methods inform our achievement of this goal:

1. Employer feedback: Ongoing qualitative and quantitative surveying of employer partners with high-growth, high-need occupations relevant to our proposed tracks (i.e., Mechatronics and Management). This surveying will inform the learning outcomes and experiential education designs to ensure that graduates have the technical and professional knowledge,

skills, and abilities needed for employment. Surveying occurs periodically, including at the end of co-op rotations and during semesterly Career Fairs.

2. Student feedback: Ongoing qualitative and quantitative surveying of students to understand (a) whether and to what degree they are attaining jobs that are relevant and full-time, and (b) what their experiences and processes have been in transitioning from the program into full-time employment. Both of these will be used to continuously improve the program, as well as develop a robust alumni network that can bring hiring benefits to current, prospective, and former students. As the Speed School's Co-op and Career Services office already does this work, we would leverage their existing tools and expand them to include Applied Engineering.

NOTE: All actions in the approval of new programs for public institutions are subject to a stipulation regarding the program's ability to attain specified goals that have been established by the institution and approved by the Council on Postsecondary Education (the Council). At the conclusion of an appropriate period of time, the program's performance shall be reviewed by Council staff following criteria established in the Council's Academic Programs Policy. For more information on the program review process see <http://louisville.edu/oapa/academic-program-review-process>.

Appendix A. Employer Demand.

1. If the program is designed for students to enter the workforce immediately, please complete the following table (see resources below the table)

2. Please provide source of employer demand information and time frame for the projections:

Regional and state data: Kentucky Center for Statistics

National date: DOL's BLS

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 (%)
Land Surveyor				\$58,014	48	0.15% (10-yr)	\$65,590	4,000	2% (10-yr)
Construction Engineering Inspection				\$55,083	113	3.15% (10-yr)	\$62,860	14,300	-3% (10-yr)
Engineering Design				\$46,944	191 (annual)	2.25% (10-yr)	\$54,080	6,500	2% (10-yr)
Construction Management Technology	\$63,573	61	0.35%	\$57,951	225	0.47%	\$67,221	38,900	0.8%
Electric & Electronic Engineering Technologist	\$60,961	23	0.22%	\$63,278	74	0.09%	\$67,550	11,000	0.2%

Employer Demand Resources:

Most of the current Bureau of Labor Statistics projections are for 2016-2026. If additional sources are used, please note the time frame for the projections. Other sources include:

- [PES+](#) Platform from Gray Associates
- [Bureau of Labor Statistics' Occupational Outlook Handbook](#)
- [Kentucky Center for Statistics](#)
- Kentucky, Bridging the Talent Gap
Document - <https://www.bridgingthetalentgap.org/wp-content/uploads/2017/05/KY-Statewide.pdf>
Interactive website: <https://bridgingthetalentgap.org/dashboards/>