PURDUE UNIVERSITY BOARD OF TRUSTEES
EXECUTIVE SUMMARY DEGREE PROPOSAL TEMPLATE

PLEASE NOTE THAT THE FULL ACADEMIC DEGREE PROGRAM SUBMISSION DOCUMENT WILL NEED TO BE COMPLETED FOR THE INDIANA COMMISSION ON HIGHER EDUCATION (see https://www.in.gov/che/academic-affairs/academic-degree-programs/). Both this template and the Academic Degree Program Submission are submitted to the Purdue Board of Trustees. When this form is complete, please save and return to sdunk@purdue.edu with tables as separate attachment.

DATE: **April 5, 2024**
TO: Board of Trustees
FROM: Tamara Kinzer-Ursem, tursem@purdue.edu
CC: Ernest Blatchley, blatch@purdue.edu; Milind Kulkarni, milind@purdue.edu; Aaron Lottes, lottes@purdue.edu; Karen Marais, kmarais@purdue.edu; Jason McKinney, mckinnjd@purdue.edu; Satish Ukkusuri, sukkusur@purdue.edu; John Fassnacht, johnf@purdue.edu; Bryan DeWitt, bdewitt@purdue.edu
SUBJECT: Doctor of Engineering (D. Eng.)

CAMPUS OFFERING DEGREE: PWL

ANTICIPATED START DATE: Spring 2025

1. IS THE DEGREE RESIDENTIAL, HYBRID, OR ONLINE? Online
IF ONLINE, RATIONALE FOR GOING THROUGH SPECIFIC PURDUE CAMPUS—PWL, PFW, PNW, PG

PWL has strong residential Engineering programs at the Bachelor's, Master's, and Doctoral levels and highly ranked online graduate Engineering programs. PWL's online Engineering program is ranked second overall and has top-ranked programs in Electrical Engineering, Industrial Engineering, Engineering Management, and Mechanical Engineering. The online Doctor of Engineering (D. Eng) degree allows the College to expand its reach by creating a pipeline for the existing online Master's students and allowing working professionals to earn a doctoral degree while maintaining their personal and work commitments. The online program allows the University to fulfill its land-grant mission by expanding access to the doctoral curriculum for Indiana residents and qualified students throughout the United States and abroad.

2. BRIEF OVERVIEW OF DEGREE/WHY IS THE DEGREE NEEDED?
The online D. Eng degree is an interdisciplinary program designed to meet the needs of working professionals. The 90-credit-hour program features research methodology coursework, advanced mathematics and statistics, a wide variety of engineering courses, and a culminating research project. There is a significant market need for engineers with a doctoral degree. The residential Ph.D. engineering programs at Purdue University have robust research requirements that require students to live near West Lafayette, limiting the total addressable market. The research requirements in the online D. Eng. program will allow students to complete their projects remotely without the need to relocate. D. Eng. students are more likely to engage in research related to their unique context, which may be related to on-the-job process improvements, scalability, new designs, or many other possible outcomes; projects are expected to typically have a stronger focus on engineering practice or application compared to a stronger focus on theory for PhD students. Purdue University is the second largest conferring institution in the United States for Engineering PhDs, with only two fewer graduates than the largest program, Georgia Tech, in 2022 (Lightcast, 2024).

3. BRIEF EVIDENCE OF FEDERAL, STATE, AND REGIONAL LABOR MARKET NEED

According to Lightcast (2024) in 2023 there were 5,686 unique U.S. job postings requiring a doctoral engineering degree. Examples of jobs requiring a D.Eng. or Ph.D. in Engineering include post-secondary teachers (faculty/researchers), post-doctoral levels, and advanced engineering and research positions in the private and public sectors. Those who have achieved a doctoral-level degree in Engineering earned approximately $25,000 more per year in 2023 compared with individuals who have attained a Master's degree in Engineering, and the average salary for engineers with a doctoral degree is $125,300 per year. Wages have also increased by 10.7% over the past two years (Lightcast, 2024). The largest employers are Boeing, Northrup Grumman, and Intel; the College has corporate partnerships with each of these companies. The number of online doctoral conferrals has increased by 46% over the last decade while the residential programs have increased by 38% during the same period (Lightcast, 2024). In the United States, 12,127

doctoral engineering degrees were conferred in 2022 (Lightcast, 2024). And, 361 doctoral engineering degrees were conferred in 2022 for Purdue University.

Because many doctoral-qualified engineers work in either the aerospace industry or with military contractors, it is unsurprising that the states with the largest need are Washington (state), California, and Texas (Lightcast, 2024). The Midwest does have an above-average labor market need for doctoral-qualified engineers, especially in Illinois, Ohio, Michigan, Missouri, and Pennsylvania (see Figure 1). While Indiana's job postings for doctoral-qualified engineers are lower than average compared with the rest of the United States, the online nature of the program and the regional brand strength will create opportunities for both Hoosiers and our neighbors in surrounding states, as well as employees who work in organizations with whom we have corporate partnerships.

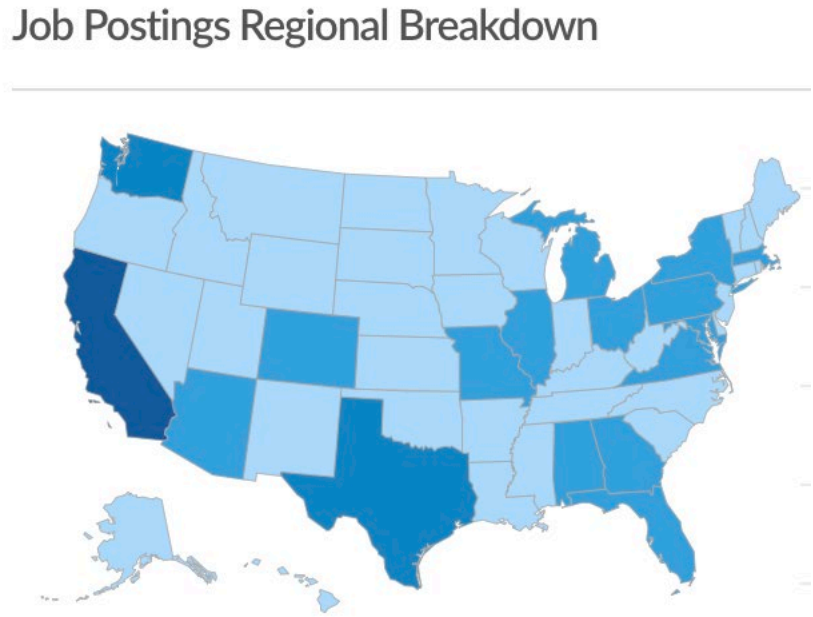

Figure 1. Job postings for doctoral-qualified engineers in the United States. Darker-shaded areas indicate areas of higher need. California had nearly 32,000 job postings compared with 1,500 in Indiana between September 2021 and September 2023.

4. COSTS

A. Tuition and Fees—In-state and out-of-state
   a. In-state: $1,139 per credit hour
   b. Out-of-state: $1,459 per credit hour

B. Financial Projection Table
https://www.purdue.edu/provost/policies/iche.html (Tab 1)

C. Program Review and Expenditure Summary
https://www.purdue.edu/provost/policies/iche.html (Tab 2)

D. Enrollment Projection
https://www.purdue.edu/provost/policies/iche.html (Tab 3)

5. LIST OF SIMILAR DEGREES IN THE PURDUE SYSTEM AND DISTINCTIVE ELEMENTS FOR THIS DEGREE

The Purdue University College of Engineering offers residential Ph.D. programs in the following fields:

- Aeronautics and Astronautics
- Agricultural and Biological Engineering
- Biomedical Engineering
- Chemical Engineering
- Civil Engineering
- Electrical and Computer Engineering
- Engineering Education
- Environmental and Ecological Engineering
- Industrial Engineering
- Materials Engineering
- Mechanical Engineering

- Nuclear Engineering

The online Doctor of Technology program in the Polytechnic Institute is similarly structured but it is designed to reach a different target audience. Nearly one-third (27 credit hours) of the required coursework in the proposed D. Eng. program relies on specialized engineering curriculum, which is distinct from the application coursework focus in the Polytechnic Institute. PNW has a residential Doctor of Technology program.

Additionally, the College of Engineering offers online M.S. programs in the following fields:

- Interdisciplinary Engineering
- Aeronautics and Astronautics
- Biomedical Engineering
- Civil Engineering
- Electrical and Computer Engineering
- Industrial Engineering
- Mechanical Engineering
- Microelectronics and Semiconductors
- Nuclear Engineering

The online D. Eng. program requires students to have earned a Master's degree in Engineering, which builds on the success of existing online and residential programs and will create a pipeline of applicants. The research project in the D. Eng. program will be a unique feature compared with the residential Ph.D. offerings. Students in the D. Eng. program will have an advisor and a faculty committee, and like Ph.D. students, they will engage in rigorous research. The major differences relate to the research site and research type. D. Eng. students are more likely to engage in research related to their unique context, which may be related to on-the-job process improvements, scalability, new designs, or many other possible outcomes; projects are expected to typically have a stronger focus on engineering practice, upgrading their skills in a specific area or application compared to a stronger focus on theory for PhD students. The interdisciplinary nature of the program, and the breadth of participating faculty will allow students to work with an advisor who will help them construct individually tailored research projects that will not only satisfy D. Eng. requirements, but also improve the organizations to which the students belong. These types of research projects allow Purdue University to contribute to cutting-edge research in sites that improve workforce development for Hoosiers and Americans.

6. COMPETITIVE DEGREES – BRIEF SUMMARY

The following institutions offer professional doctorate (D. Eng.) programs:

Institutions	Conferrals (2021)	Online Status
Massachusetts Institute of Technology	244	No
University of California-Berkeley	168	Yes
Texas A&M	257	Yes
Johns Hopkins University	95	Yes
Missouri University of Science and Technology	87	No

Recommended Approval:

05/15/2024

Patrick J. Wolfe, Ph.D. — Date
Provost and Executive Vice President for Academic Affairs and Diversity
Miller Family Professor of Statistics and Computer Science

Approved:

5.16.24

Mung Chiang, Ph.D. — Date
President
Roscoe H. George Distinguished Professor of Electrical and Computer Engineering

Table 1
Program Financial Projection
Financial Office Table
Purdue West Lafayette
Doctor of Engineering

	Year #1 FY 2025	Year #2 FY 2026	Year #3 FY 2027	Year #4 FY 2028	Year #5 FY 2029
I. ENROLLMENT					
1. Program Credit Hours Generated (FTE * 30 for BS & FTE * 24 for masters/graduate)					
a. Existing Courses	72	268	504	776	1126
b. New Courses	18	67	126	194	282
Total	**90**	**335**	**630**	**970**	**1408**
2. Full-Time Equivalents (FTE)					
a. Full-Time FTEs	0	0	0	0	0
b. Part-Time FTEs	11	30	56	86	109
Total Full/Part-Time FTE	**11**	**30**	**56**	**86**	**109**
c. On-Campus Transfer FTEs	0	0	0	0	0
d. New-to-Campus FTEs	11	30	56	86	109
Total On/New-to-Campus FTE	**11**	**30**	**56**	**86**	**109**
3. Program Majors - Headcount					
a. Full-Time Students	0	0	0	0	0
b. Part-Time Students	15	40	75	115	145
Total Full/Part-Time HC	**15**	**40**	**75**	**115**	**145**
c. In-State	3	8	15	23	29
d. Out-of-State	12	32	60	92	116
Total In/Out of State HC	**15**	**40**	**75**	**115**	**145**

Notes

For both undergraduate and graduate degree enrollment projections, please carefully consider competitive degree enrollments and how the Purdue program will be marketed in the calculation of enrollment and degree completion projections.

^ Enter footnotes in the last section of this table for to provide additional details (required for 'other' categories) and projection and/or calculation logic.

Table 1
Program Financial Projection
Financial Office Table
Purdue West Lafayette
Doctor of Engineering

		Year #1 FY 2025	Year #2 FY 2026	Year #3 FY 2027	Year #4 FY 2028	Year #5 FY 2029
II. INCREMENTAL REVENUE						
1. Projected # of *New* Students [1]		11	30	56	86	109
2. General Tuition & Fees [2]						
a. General Service	$ 1,279.37	$ 115,143	$ 428,589	$ 806,003	$ 1,240,989	$ 1,801,353
b. PUO Infrastructure Fee	$ 18.80	$ 1,692	$ 6,298	$ 11,844	$ 18,236	$ 26,470
c. Digital Education Fee	$ 50.00	$ 4,500	$ 16,750	$ 31,500	$ 48,500	$ 70,400
d. Student Fitness & Wellness Fee		-	-	-	-	-
e. Student Activity Fee		-	-	-	-	-
Total General Service T&F		**$ 121,335**	**$ 451,637**	**$ 849,347**	**$ 1,307,725**	**$ 1,898,223**
2. Additional Fees - *if applicable* [3]						
a. Differential Fees	$ 46.83	$ 4,215	$ 15,688	$ 29,503	$ 45,425	$ 65,937
b. Course Fees		-	-	-	-	-
c. Other Fees		-	-	-	-	-
Total Additional Fees		**$ 4,215**	**$ 15,688**	**$ 29,503**	**$ 45,425**	**$ 65,937**
Total Incremental Revenue	$ 1,395.00	**$ 125,550**	**$ 467,325**	**$ 878,850**	**$ 1,353,150**	**$ 1,964,160**

Notes

(1) New Students represents the anticipated number of *new* students to campus; transfers or existing students are ***not*** to be included. The Total is set equal to the 'New-to-Campus FTEs' completed in the Enrollment section (I2d).

(2) T&F must match approved Bursar rates (refer to Bursar website). The calculation should be based on the ***Full-Time/ Resident*** Student T&F. If the new degree program is primarily Part-Time students, then the T&F needs to be adjusted appropriately for this type of expected enrollment.

(3) If additional fees are applicable, then each fee must be individually listed above and match approved Bursar rates (refer to Bursar website).

Bursar T&F Website: https://www.purdue.edu/bursar/tuition/index.html

^ Enter footnotes in the last section of this table for to provide additional details (required for 'other' categories) and projection and/or calculation logic.

Table 1
Program Financial Projection
Financial Office Table
Purdue West Lafayette
Doctor of Engineering

	Year #1 FY 2025		Year #2 FY 2026		Year #3 FY 2027		Year #4 FY 2028		Year #5 FY 2029	
III. EXPENDITURES										
1. Salary and Wages	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**
a. Faculty	1.00	$ 153,168	1.00	$ 175,401	1.00	$ 202,173	1.00	$ 232,995	1.00	$ 272,731
b. Limited Term Lecturers		-		-		-		-		-
c. Graduate Students		$ 9,450		$ 35,175		$ 66,150		$ 101,813		$ 147,788
d. Other (Post Doc/Staff)		-		-		-		-		-
Total S&W	**1.00**	**$ 162,618**	**1.00**	**$ 210,576**	**1.00**	**$ 268,323**	**1.00**	**$ 334,808**	**1.00**	**$ 420,519**
2. Fringes and Fee Remissions										
a. Fringe Benefits		-		-		-		-		-
b. Fee Remissions		-		-		-		-		-
Total FB & FR		**$ -**		**$ -**		**$ -**		**$ -**		**$ -**
3. Supplies and Expenses										
a. General Supplies & Expenses		-		-		-		-		-
b. Minor Equipment		-		-		-		-		-
c. Recruiting & Marketing		$ 220,000		$ 231,000		$ 241,600		$ 252,500		$ 253,400
d. Travel & Entertainment		-		-		-		-		-
e. Other (Library, subscriptions, IT)		$ 210,000		$ 195,750		$ 215,000		$ 240,000		$ 250,000
Total Supplies and Expense		**$ 430,000**		**$ 426,750**		**$ 456,600**		**$ 492,500**		**$ 503,400**
4. Capital										
a. Capitalized Equipment		-		-		-		-		-
b. Repair & Replacement		-		-		-		-		-
Total Equipment		**$ -**		**$ -**		**$ -**		**$ -**		**$ -**
Total Expenditures		**$ 592,618**		**$ 637,326**		**$ 724,923**		**$ 827,308**		**$ 923,919**
Projected Program Surplus/(Deficit)*		**$ (467,068)**		**$ (170,001)**		**$ 153,927**		**$ 525,842**		**$ 1,040,241**

***** For the CHE proposal, only identify the nature of the support. It is not necessary to note dollars in the report; however, it should be stated that there is sufficient revenue to cover expenses. Projected surplus/deficit is an aid to identify potential new University revenue, anticipated program costs, and degree substantiality. This does not represent any type of funding request.

^ Enter footnotes in the last section of this table for to provide additional details (required for 'other' categories) and projection and/or calculation logic.

Table 1
Program Financial Projection
Financial Office Table
Purdue West Lafayette
Doctor of Engineering

FOOTNOTES

I. Enrollment Details

1. Program Credit Hours Generated
   An estimate of the total credit hours generated from the financial model.
2. Full-Time Equivalents (FTE)
   Multiplied the total number of students by 0.75 since all will likely be part time.
3. Program Majors - Headcount
   All students will be program majors.

II. Incremental Revenue Details

1. Projected # of New Students
   These numbers were derived from competitive benchmarking utilizing Lightcast (2024) for doctoral-level online engineering programs as well as the existing online Doctor of Technology program.
2. General Tuition & Fees
   Total average tuition is $1,395 per credit hour inclusive of all fees ($1,139/$1,459 IS/OOS; 20%/80% split).
3. Additional Fees - if applicable
   Included the Engineering differential fee of $46.83/CR.

III. Expenditure Details

1. Salary and Wages
   The interdisciplinary engineering rate of $275/3CR course includes fringe. The TA rate is $105/CR and includes remission and fringe. One net new faculty member will be needed for this program.
2. Fringes and Fee Remissions
3. Supplies and Expenses
   Other expenses include student support (advising, student success coaching, and admissions as well as course production expenses).
4. Capital
   No new capital is needed.

Table 2
Program Revenue and Expenditure Summary
Board of Trustees Table
Purdue West Lafayette
Doctor of Engineering

	Year #1 FY 2025	Year #2 FY 2026	Year #3 FY 2027	Year #4 FY 2028	Year #5 FY 2029
Total Incremental Revenue*	$ 125,550	$ 467,325	$ 878,850	$ 1,353,150	$ 1,964,160
Total Expenditures	$ 592,618	$ 637,326	$ 724,923	$ 827,308	$ 923,919
Projected Program Surplus/(Deficit)**	**$ (467,068)**	**$ (170,001)**	**$ 153,927**	**$ 525,842**	**$ 1,040,241**

*Based on the anticipated number of ***new*** students to campus; transfers or existing students are not included. Projected incremental revenue is based on the current ***full-time, resident*** tuition and fees approved by the Bursar.

**Projected surplus/deficit is an aid to identify potential new University revenue, anticipated program costs, and degree substantiality. This does not represent any type of funding request.

Additional Departmental Footnotes:

Table 3
Projected Headcount and FTE Enrollment and Degrees Conferred
Board of Trustees & ICHE Table
Purdue West Lafayette
Doctor of Engineering

	Year #1 FY 2025	Year # 2 FY 2026	Year # 3 FY 2027	Year # 4 FY 2028	Year # 5 FY 2029
Enrollment Projections (Headcount)	15	40	75	115	145
Enrollment Projections (FTE)	11	30	56	86	109
Degree Completions Projection	0	0	0	15	40