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 4, 2024
TO: Board of Trustees
FROM: Mithuna Thottethodi, (765) 496-6787; mithuna@purdue.edu
CC: Milind Kulkarni, milind@purdue.edu; Ninghui Li, ninghui@purdue.edu; Deepam Patel, patel471@purdue.edu
SUBJECT: MS (E) Software Engineering

CAMPUS OFFERING DEGREE: Purdue West Lafayette

ANTICIPATED START DATE: Spring 2025

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

The rationale for utilizing the Purdue West Lafayette campus for the online MS (E) Software Engineering program is because there will be an identical residential program on the West Lafayette campus.

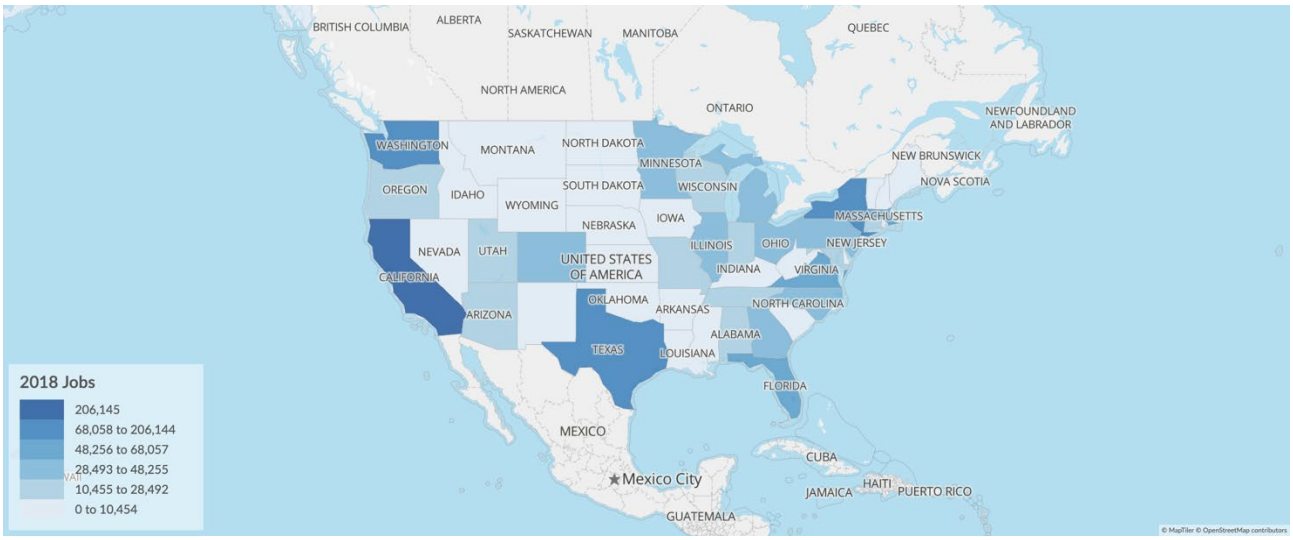
2. BRIEF OVERVIEW OF DEGREE/WHY IS THE DEGREE NEEDED?

The demand for individuals with a Master's degree in Software Engineering is robust. Purdue University is well-equipped to lead in the Software Engineering domain given its top-five engineering programs ranking by US News and World Report. Software engineering builds off of the successful, existing online master's degree in electrical and computer engineering by utilizing coursework from the department of Computer Science and the Elmore Family School of Electrical and Computer Engineering. This interdisciplinary, collaborative degree program allows students to benefit from two successful, highly ranked programs and allows them to tailor their degree to meet their unique personal and professional goals.

- Complex Software Systems: As technology advances, software systems become more intricate. Organizations need experts who can design, develop, and maintain these systems efficiently.
- Innovation and Research: Graduates contribute to cutting-edge projects, improving existing technologies, and creating new solutions.
- Career Advancement: Many leadership roles, such as software architects, technical managers, and project leads, require advanced degrees. A master's opens doors to higher-paying positions.
- Specialization: Software engineering encompasses various domains (e.g., embedded systems, machine learning, cybersecurity).
- Global Market: Software engineers are in demand worldwide, with many jobs going unfilled. There are over 80,000 annual openings for software engineers (Lightcast, 2024).

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

There are over 800,000 software engineering positions in the United States and demand has grown by over 50% since 2013 (Lightcast, 2024). Median earnings are $125,000 and the greatest need is for software development, which has grown by over 75% over the last decade. There are over 34,000 employers competing for software engineers and jobs are filled quickly, with the median job posting duration taking four days less than the regional average. There were 1,731 online MS conferrals for software engineers in 2022, and only 26% of those graduates were in online programs.



The above figure represents software development jobs in the United States from 2018-2023 (Lightcast, 2024). As the shade darkens, job posting demand increases. While Indiana is currently ranked 25th out of the 50 states with software development postings, neighboring states (Illinois, Michigan, and Ohio) are all ranked in the top 15, suggesting that the Midwest has high need for software engineers. None of the top 10-conferring institutions are located in the Midwest, allowing Purdue University to reach an emerging audience of people who need graduate-level education to upskill in the software engineering field.

4. COSTS

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

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

- BS Computer Engineering, Concentration in Software Engineering
- BS Computer Science
- MS(E) Electrical and Computer Engineering
- MS Computer Science

This program combines elements of the MS(E) Electrical and Computer Engineering and MS Computer Science degrees that emphasize software engineering. Further, this program incorporates professional skills to equip learners for career advancement.

6. COMPETITIVE DEGREES – BRIEF SUMMARY

Institutions	Master's Degree Completions (2022)	Growth % YOY (2022)	Market Share (2022)
Northeastern University	583	-5.80%	33.70%
San Jose State University	256	-34.70%	14.80%
Carnegie Mellon University	117	-16.40%	6.80%
California State University-Fullerton	69	16.90%	4.00%
Harvard University	57	0.00%	3.30%
University of California-Irvine	47	-2.10%	2.70%
Kennesaw State University	46	35.30%	2.70%
University of Houston-Clear Lake	43	115.00%	2.50%
The University of Texas at Dallas	41	86.40%	2.40%
Arizona State University Campus Immersion	40	-61.90%	2.30%

Recommended Approval:

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

05/15/2024
Date

Approved:

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

5.16.24
Date

Table 1
Program Financial Projection
Financial Office Table
Purdue West Lafayette
MS(E) Software 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). For this calculation, we utilized 9 CR per student per year based on current online engineering student data. Credit hour totals include year-over-year matriculation as students continue throughout the program.					
a. Existing Courses	225	945	1800	2742	3239
b. New Courses	0	0	0	0	0
Total	**225**	**945**	**1800**	**2742**	**3239**
2. Full-Time Equivalents (FTE)					
a. Full-Time FTEs	0	0	0	0	0
b. Part-Time FTEs	19	60	109	125	140
Total Full/Part-Time FTE	**19**	**60**	**109**	**125**	**140**
c. On-Campus Transfer FTEs	0	0	0	0	0
d. New-to-Campus FTEs	19	60	109	125	140
Total On/New-to-Campus FTE	**19**	**60**	**109**	**125**	**140**
3. Program Majors - Headcount					
a. Full-Time Students	0	0	0	0	0
b. Part-Time Students	25	80	145	166	186
Total Full/Part-Time HC	**25**	**80**	**145**	**166**	**186**
c. In-State	5	16	29	33	37
d. Out-of-State	20	64	116	133	149
Total In/Out of State HC	**25**	**80**	**145**	**166**	**186**

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
MS(E) Software 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)]		19	60	109	125	140
2. General Tuition & Fees [(2)]						
a. General Service	$ 1,279.37	$ 287,858	$ 1,209,005	$ 2,302,866	$ 3,508,033	$ 4,143,879
b. PUO Infrastructure Fee	$ 18.80	$ 4,230	$ 17,766	$ 33,840	$ 51,550	$ 60,893
c. Digital Education Fee	$ 50.00	$ 11,250	$ 47,250	$ 90,000	$ 137,100	$ 161,950
d. Student Fitness & Wellness Fee		-	-	-	-	-
e. Student Activity Fee		-	-	-	-	-
Total General Service T&F		**$ 303,338**	**$ 1,274,021**	**$ 2,426,706**	**$ 3,696,682**	**$ 4,366,723**
2. Additional Fees - *if applicable* [(3)]						
a. Differential Fees	$ 46.83	$ 10,537	$ 44,254	$ 84,294	$ 128,408	$ 151,682
b. Course Fees		-	-	-	-	-
c. Other Fees		-	-	-	-	-
Total Additional Fees		**$ 10,537**	**$ 44,254**	**$ 84,294**	**$ 128,408**	**$ 151,682**
Total Incremental Revenue	$ 1,395.00	**$ 313,875**	**$ 1,318,275**	**$ 2,511,000**	**$ 3,825,090**	**$ 4,518,405**

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
MS(E) Software 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		$ 20,419		$ 85,759		$ 163,350		$ 248,804		$ 293,900
b. Limited Term Lecturers		-		-		-		-		-
c. Graduate Students		$ 23,625		$ 99,225		$ 189,000		$ 287,873		$ 340,050
d. Other (Post Doc/Staff)		-		-		-		-		-
Total S&W	**0.00**	**$ 44,044**	**0.00**	**$ 184,984**	**0.00**	**$ 352,350**	**0.00**	**$ 536,677**	**0.00**	**$ 633,950**
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		$ 370,000		$ 396,000		$ 421,600		$ 447,500		$ 448,400
d. Travel & Entertainment		-		-		-		-		-
e. Other (Library, subscriptions, IT)		$ 187,127		$ 211,991		$ 254,271		$ 291,275		$ 305,311
Total Supplies and Expense		**$ 557,127**		**$ 607,991**		**$ 675,871**		**$ 738,775**		**$ 753,711**
4. Capital										
a. Capitalized Equipment		-		-		-		-		-
b. Repair & Replacement		-		-		-		-		-
Total Equipment		**$ -**		**$ -**		**$ -**		**$ -**		**$ -**
Total Expenditures		**$ 601,171**		**$ 792,975**		**$ 1,028,221**		**$ 1,275,452**		**$ 1,387,661**
Projected Program Surplus/(Deficit)*		**$ (287,296)**		**$ 525,300**		**$ 1,482,779**		**$ 2,549,638**		**$ 3,130,744**

***** 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
MS(E) Software 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
   New student data was based on the performance of the existing online MS in Electrical and Computer Engineering as well as competitive benchmarking from Lightcast (2024).

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.
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
MS(E) Software Engineering

	Year #1 FY 2025	Year #2 FY 2026	Year #3 FY 2027	Year #4 FY 2028	Year #5 FY 2029
Total Incremental Revenue*	$ 313,875	$ 1,318,275	$ 2,511,000	$ 3,825,090	$ 4,518,405
Total Expenditures	$ 601,171	$ 792,975	$ 1,028,221	$ 1,275,452	$ 1,387,661
Projected Program Surplus/(Deficit)**	**$ (287,296)**	**$ 525,300**	**$ 1,482,779**	**$ 2,549,638**	**$ 3,130,744**

*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
MS(E) Software Engineering

	Year #1 FY 2025	Year # 2 FY 2026	Year # 3 FY 2027	Year # 4 FY 2028	Year # 5 FY 2029
Enrollment Projections (Headcount)	25	80	145	166	186
Enrollment Projections (FTE)	19	60	109	125	140
Degree Completions Projection	0	0	25	60	145