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: **14 Feb 2024**
TO: Board of Trustees
FROM: Richard Voyles, Primary Contact, (765) 494-3733; rvoyles@purdue.edu
CC: Mo Rastgaar, Secondary Contact, (765) 494-8634; rastgaar@purdue.edu
SUBJECT: SoET Robotics Technology PhD Degree

CAMPUS OFFERING DEGREE:

ANTICIPATED START DATE: Fall 2024

1. IS THE DEGREE RESIDENTIAL, HYBRID, OR ONLINE?

IF ONLINE, RATIONALE FOR GOING THROUGH SPECIFIC PURDUE CAMPUS—PWL, PFW, PNW, PG

Residential

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

Robotics is a highly interdisciplinary field of study that relies on three foundational pillars: sensing, computing and actuating. Traditionally, these three pillars have been studied in depth in isolation and under separate degrees. Sensors and signal conditioning have been the purview of electrical engineering or electrical engineering technology, computing the purview of computer science, computer engineering, or computer engineering technology, and actuating the purview of mechanical engineering or mechanical engineering technology. As scientific knowledge has advanced, many disciplines have become more specialized. However, the School of Engineering Technology at Purdue has become more transdisciplinary, consolidating computer engineering technology, electrical engineering technology, industrial engineering technology and mechanical engineering technology into one combined school. Robotics is an important field of study that reflects the nature of SoET's faculty and transdisciplinary substance of its curricula.

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

There were 265 unique job postings at the PhD level for CIP code 14.4201 in Indiana from Sept 2021 to Sept 2023. This compares to 28,102 such postings in the United States during the same period. The projected job growth in this area with the United States is 11.7%. However, job growth in this same area for the State of Indiana is projected to be higher at 12.2%. Furthermore, for every 4 PhDs hired in this technical area in the State of Indiana, there are, on average, 22 M.S. employees and 72 B.S. employees hired by the business community to support the PhD-level employees. SoET intends to graduate from 8 to 12 students per year after 5 years – only about 10% of the demand from Indiana, alone, and we plan to continue growing to reach equilibrium in ten years at around 80 total M.S. and Ph.D. students. We have letters of support from Eli Lilly and Cummins, which are both in the top four of job posters for Ph.Ds. in this field and Cummins is also in the top four for M.S. job postings in this field.

4. COSTS

A. Tuition and Fees—In-state and out-of-state

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

None. No other PhD listed with CIP code 14.4201. It is important to note that SoET already has B.S. programs in robotics, mechatronics, and smart manufacturing and the Ph.D. in Robotics Technology includes concentrations in both Mechatronics and Smart Manufacturing. This builds on clear strengths in the department and also encourages existing B.S. students to consider continuing on to graduate degrees. This degree will enable the creation of minors and certificates for students outside of the Polytech, as well. For example, a "Cyber-Animal Systems" certificate is already under development with faculty from Agriculture.

6. COMPETITIVE DEGREES – BRIEF SUMMARY

Many of Purdue's peer institutions already have such degrees, including, Michigan, Minnesota, and Northwestern in the Big Ten and other top-ten national universities including Carnegie Mellon, Penn, and Georgia Tech. Even lesser-ranked institutions such as Oregon State and Northeastern are creating such degree programs, which is increasing their visibility and ability to compete with Purdue for top students and faculty. Adding this program will help get us back on track with peers in the Big Ten and other national top-ten universities. It also represents a perfect complement to the Institute for Physical AI at Purdue and builds on existing strengths in robotics. Finally, the proposed plan of study was developed by an interdisciplinary, university-wide group of faculty from the Polytechnic, Engineering, Science, Agriculture and Health and Human Sciences and represents the inaugural launch of what could become a university-wide commitment to robotics education.

Recommended Approval:

Patrick J. Wolfe, Ph.D. — Date: 05/15/2024
Provost and Executive Vice President for Academic Affairs and Diversity
Miller Family Professor of Statistics and Computer Science

Approved:

Mung Chiang, Ph.D. — Date: 5.16.24
President
Roscoe H. George Distinguished Professor of Electrical and Computer Engineering

Table 1
Program Financial Projection
Financial Office Table
Purdue WL Campus
Robotics Technology Ph.D. Degree in SoET/Polytechnic

	Year #1 FY 2024	Year #2 FY 2025	Year #3 FY 2026	Year #4 FY 2027	Year #5 FY 2028
I. ENROLLMENT	10	18	22	25	28
1. Program Credit Hours Generated (FTE * 30 for BS & FTE * 24 for masters/graduate)					
a. Existing Courses	210	378	462	525	588
b. New Courses	30	54	66	75	84
Total	**240**	**432**	**528**	**600**	**672**
2. Full-Time Equivalents (FTE)					
a. Full-Time FTEs	10	18	22	25	28
b. Part-Time FTEs	0	0	0	0	0
Total Full/Part-Time FTE	**10**	**18**	**22**	**25**	**28**
c. On-Campus Transfer FTEs	5	1	1	0	1
d. New-to-Campus FTEs	5	17	21	25	27
Total On/New-to-Campus FTE	**10**	**18**	**22**	**25**	**28**
3. Program Majors - Headcount					
a. Full-Time Students	10	28	47	68	90
b. Part-Time Students					
Total Full/Part-Time HC	**10**	**28**	**47**	**68**	**90**
c. In-State	1	2	2	3	3
d. Out-of-State	9	26	45	65	87
Total In/Out of State HC	**10**	**28**	**47**	**68**	**90**

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 WL Campus
Robotics Technology Ph.D. Degree in SoET/Polytechnic

		Year #1 FY 2024	Year #2 FY 2025	Year #3 FY 2026	Year #4 FY 2027	Year #5 FY 2028
II. INCREMENTAL REVENUE						
1. Projected # of *New* Students [1]		5	17	21	25	27
2. General Tuition & Fees [2]						
a. General Service		9,718	9,718	9,718	9,718	9,718
b. Technology Fee						
c. Repair & Rehabilitation Fee						
d. Student Fitness & Wellness Fee		234	234	234	234	234
e. Student Activity Fee		40	40	40	40	40
Total General Service T&F		**$ 9,992**	**$ 9,992**	**$ 9,992**	**$ 9,992**	**$ 9,992**
2. Additional Fees - *if applicable* [3]						
a. Differential Fees		572	572.00	572.00	572.00	572.00
b. Course Fees						
c. Other Fees (90% of non-res)	0.9	18,802	18,802	18,802	18,802	18,802
Total Additional Fees		**$ 19,374**	**$ 19,374**	**$ 19,374**	**$ 19,374**	**$ 19,374**
Total Incremental Revenue		**$ 146,830.00**	**$ 499,222**	**$ 616,686**	**$ 734,150**	**$ 792,882**
		$ 29,366				

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

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Table 1
Program Financial Projection
Financial Office Table
Purdue WL Campus
Robotics Technology Ph.D. Degree in SoET/Polytechnic

	Year #1 FY 2024		Year #2 FY 2025		Year #3 FY 2026		Year #4 FY 2027		Year #5 FY 2028	
III. EXPENDITURES										
1. Salary and Wages	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**
a. Faculty [(1)]	0.50	50,000	1.00	103,000	1.00	106,090	1.00	109,273	1.00	112,551
b. Limited Term Lecturers										
c. Graduate Students					0.25	10,171	0.25	10,476	0.50	20,969
d. Other (Post Doc/Staff)										
Total S&W	**0.50**	**$ 50,000**	**1.00**	**$ 103,000**	**1.25**	**$ 116,261**	**1.25**	**$ 119,749**	**1.50**	**$ 133,520**
2. Fringes and Fee Remissions										
a. Fringe Benefits		14,500		29,870		32,549		33,525		36,316
b. Fee Remissions								8,400		16,800
Total FB & FR		**$ 14,500**		**$ 29,870**		**$ 32,549**		**$ 41,925**		**$ 53,116**
3. Supplies and Expenses										
a. General Supplies & Expenses		4,000		3,000		3,000		3,000		3,000
b. Minor Equipment										
c. Recruiting & Marketing										
d. Travel & Entertainment		5,000		4,000		3,500		3,500		3,500
e. Other (Library, subscriptions, IT)										
Total Supplies and Expense		**$ 9,000**		**$ 7,000**		**$ 6,500**		**$ 6,500**		**$ 6,500**
4. Capital										
a. Capitalized Equipment										
b. Repair & Replacement										
Total Equipment		**$ -**		**$ -**		**$ -**		**$ -**		**$ -**
Total Expenditures		**$ 73,500**		**$ 139,870**		**$ 155,310**		**$ 168,174**		**$ 193,135**
Projected Program Surplus/(Deficit)*		**$ 73,330**		**$ 359,352**		**$ 461,376**		**$ 565,976**		**$ 599,747**

***** 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.

Table 1
Program Financial Projection
Financial Office Table
Purdue WL Campus
Robotics Technology Ph.D. Degree in SoET/Polytechnic

^ 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 WL Campus
Robotics Technology Ph.D. Degree in SoET/Polytechnic

FOOTNOTES

I. Enrollment Details

1. Program Credit Hours Generated
2. Full-Time Equivalents (FTE)
3. Program Majors - Headcount

II. Incremental Revenue Details

1. Projected # of New Students
2. General Tuition & Fees — Assumed no increase
3. Additional Fees - if applicable

III. Expenditure Details

1. Salary and Wages — Existing faculty will teach this program; no new hires are planned at this time.
2. Fringes and Fee Remissions — 29% was used for faculty and 17.53% for Grad students. The remits are calculated using the current approved rates for an AY graduate
3. Supplies and Expenses — Estimates
4. Capital — None needed at this time

Table 2
Program Revenue and Expenditure Summary
Board of Trustees Table
Purdue WL Campus
Robotics Technology Ph.D. Degree in SoET/Polytechnic

	Year #1 FY 2024	Year #2 FY 2025	Year #3 FY 2026	Year #4 FY 2027	Year #5 FY 2028
Total Incremental Revenue*	$ 146,830	$ 499,222	$ 616,686	$ 734,150	$ 792,882
Total Expenditures	$ 73,500	$ 139,870	$ 155,310	$ 168,174	$ 193,135
Projected Program Surplus/(Deficit)**	**$ 73,330**	**$ 359,352**	**$ 461,376**	**$ 565,976**	**$ 599,747**

*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 WL Campus
Robotics Technology Ph.D. Degree in SoET/Polytechnic

	Year #1 FY 2024	Year # 2 FY 2025	Year # 3 FY 2026	Year # 4 FY 2027	Year # 5 FY 2028
Enrollment Projections (Headcount)	10	28	47	68	90
Enrollment Projections (FTE)	10	18	22	25	28
Degree Completions Projection	0	0	3	4	6