PURDUE UNIVERSITY BOARD OF TRUSTEES
EXECUTIVE SUMMARY DEGREE PROPOSAL TEMPLATE

When this form is complete, please save with tables as separate attachment.

DATE: **October 20, 2024**
TO: Board of Trustees
FROM: Terri Swim, Primary Contact, (260) 481-6442; swimt@pfw.edu
CC: Gang Wang, Secondary Contact, (260) 481-6154; wangg@pfw.edu
SUBJECT: Master of Science in Applied Physics (MSAP)

CAMPUS OFFERING DEGREE: Purdue University Fort Wayne

ANTICIPATED START DATE: August, 2025

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?

As northeast Indiana's comprehensive metropolitan public university, Purdue Fort Wayne has a strong track record to serve and partner with local industry. The number of PFW Physics majors grew more than 300% over the last two decades and we conferred approximately 7% of Physics BS in Indiana last year. A Master of Science in Applied Physics (MSAP), with opportunities for research or coursework in opto-electronics, materials science, or acoustics, further strengthens the regional physics education and fills a niche valuable to industry not currently addressed by other PFW MS programs. The need for regional acoustic and materials science industries is unmet with the current PFW's electrical and mechanical engineering programs. Instead, we have many alumni from our Bachelor of Science in Physics program employed in all these industries, so adding the MSAP would meet the demand of advanced degrees from these local industries and equip individuals in the area to advance in their careers. Students who complete the program will possess experimental, computational, and analytical skills that allow them to apply their physics content knowledge to solve industry problems.

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

Rapidly growing technology industries in Northeast Indiana require a workforce with specialized training beyond a bachelor's degree, especially in the development sectors. PFW's physics department is positioned as an important component of the Purdue system to move students from a bachelor's degree to the MSAP where graduates are prepared to meet regional needs for industrial development sectors and then to Purdue West Lafayette where Ph.Ds. are prepared to meet the research needs of the state and nation. The proposed MSAP focuses on preparation of students for the applications of materials science and quantum theories in associated fields, such as opto-electronics, materials manufacturing, or acoustics. The regional job market demands are clearly documented by many of our PFW Physics BS graduates having gone on to work in the industries that were identified by both the Northeast Indiana Regional Partnership and Greater Fort Wayne Inc Metro Chamber Alliance as target industries for growing investments. Beyond these target industries, we have graduates working as engineers at Shambaugh and Sons, Kautex, Convey Technology, and Regal Beloit, which all have a local presence, in the interrelated quantum science, materials science, and semiconductor sectors. Many of them indicate the need for advanced degrees, like the MSAP, to solve industry problems.

Data from Indiana's Department of Workforce Development (IN DWD) shows that, for Allen County, raw demand is significantly higher for engineering, but projected growth for 2018 to 2028 is significantly higher for the physical sciences (with a simple average of 20%) than for engineering (with a simple average of negative 8%). Looking at the state level, the projected growths are more similar, averaging 8% for the physical sciences and 6% for engineering. Turning to data from the U.S. Bureau of Labor Statistics, Physicist is on a

list of “Bright Outlook” occupations because of having a projected growth rate of 8% for the nation. For every occupation listed, the state projected growth rate is at least 5% annually.

4. COSTS

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

Resident graduate students: $380.34 per credit hour
Ohio Reciprocity degree-seeking graduate students: $380.34 per credit hour
Nonresident graduate students: $860.93 per credit hour
International graduate students: $894.94 per credit hour

B. Financial Projection Table
Enrollment and Budget Tables spreadsheet (attached)

C. Profit-Loss summary
Enrollment and Budget Tables spreadsheet (attached)

D. Enrollment Projection
Enrollment and Budget Tables spreadsheet (attached)

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

Our Master of Science in Applied Physics program would be unique to the Purdue University System. However, Purdue West Lafayette offers the following degrees:

- Materials Engineering Professional Master’s Program
- Interdisciplinary Master of Science in Engineering, with a major in Microelectronics and Semiconductors
- MS in Physics, where most students do it on the way to a PhD, rather than as a final degree
- PhD in Physics including research opportunities in Applied Physics; Atomic, Molecular, and Optical Physics; Condensed Matter Physics; and
- Quantum Information Science

6. COMPETITIVE DEGREES – BRIEF SUMMARY

There are no MS in Applied Physics programs in Indiana (not including graduate physics programs focused on education, or on health or medical physics). There are 5 institutions offering graduate programs in physics with some overlapping areas of interest described below.

Institution	Related Graduate Programs
Ball State University, Muncie, IN	• MS or MA in Physics with opportunities for research in condensed matter physics, electronic structure of materials & devices, fabrication & characterization of nano-scale devices, medical physics, and more

Indiana University, Bloomington, IN	• MS in Physics • MS in Beam Physics & Technology • PhD in Physics • PhD in Astrophysics • PhD in Chemical Physics • PhD in Mathematical Physics • PhD minor in Scientific Computing
Indiana University Indianapolis, Indianapolis, IN	• MS or PhD in Physics with opportunities for research in biological physics; atomic, molecular, and optical physics; condensed matter physics; and interdisciplinary collaborations with other science and engineering departments, as well as the School of Medicine, and the School of Informatics
Purdue University, West Lafayette, IN	• See section 5 above
University of Notre Dame, Notre Dame, IN	• PhD in Physics including research opportunities in condensed matter physics • PhD in Physics: Materials Science and Engineering. An interdisciplinary degree in Materials Science and Engineering is offered through any of seven home departments, including the Department of Physics

While there are multiple Physics programs in Ohio, Michigan, and Illinois, only three have a Master of Science in Applied Physics:

- Illinois Institute of Technology, Chicago, IL (~3 hours away)
- University of Michigan, Ann Arbor, MI (~2.5 hours away; program is only for students admitted to the PhD in Applied Physics program, received when they pass the candidacy stage of the PhD process)
- Michigan Technological University, Houghton, MI (~9.5 hours away)

Recommended Approval:

11/15/2024

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:

11.18.24

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 FW Campus
Master of Science in Applied Physics

	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	48	120	162	194	246
b. New Courses				36	90
Total	**48**	**120**	**162**	**230**	**336**
2. Full-Time Equivalents (FTE)					
a. Full-Time FTEs	2	3	5	7	10
b. Part-Time FTEs		1	2	3	4
Total Full/Part-Time FTE	**2**	**4**	**7**	**10**	**14**
c. On-Campus Transfer FTEs					
d. New-to-Campus FTEs	2	4	7	10	14
Total On/New-to-Campus FTE	**2**	**4**	**7**	**10**	**14**
3. Program Majors - Headcount					
a. Full-Time Students	2	3	5	7	10
b. Part-Time Students		2	3	5	6
Total Full/Part-Time HC	**2**	**5**	**8**	**12**	**16**
c. In-State	2	4	6	10	13
d. Out-of-State		1	2	2	3
Total In/Out of State HC	**2**	**5**	**8**	**12**	**16**

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 FW Campus
Master of Science in Applied Physics

	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]	2	4	7	10	14
2. General Tuition & Fees [2][3]					
a. General Service					
b. Technology Fee					
c. Repair & Rehabilitation Fee					
d. Student Fitness & Wellness Fee					
e. Student Activity Fee	8,862	11,260	11,181	11,181	11,181
Total General Service T&F	**$ 8,862**	**$ 11,260**	**$ 11,181**	**$ 11,181**	**$ 11,181**
2. Additional Fees - *if applicable* [4]					
a. Differential Fees					
b. Course Fees					
c. Other Fees					
Total Additional Fees	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Total Incremental Revenue	**$ 17,724**	**$ 45,041**	**$ 78,268**	**$ 111,811**	**$ 156,536**

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) This data assists in answering (Q3bi): Nature of Support.

(4) 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.pfw.edu/offices/bursar-office/tuition-fees/

^ 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 FW Campus
Master of Science in Applied Physics

	Year #1 FY 2025		Year #2 FY 2026		Year #3 FY 2027		Year #4 FY 2028		Year #5 FY 2029	
III. EXPENDITURES (Question #3A)										
1. Salary and Wages	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**
a. Faculty	0.18	10,000	0.25	15,300	0.75	46,818	0.75	47,754	0.75	48,709
b. Limited Term Lecturers										
c. Graduate Students										
d. Other (Post Doc/Staff)										
Total S&W	**0.18**	**$ 10,000**	**0.25**	**$ 15,300**	**0.75**	**$ 46,818**	**0.75**	**$ 47,754**	**0.75**	**$ 48,709**
2. Fringes and Fee Remissions										
a. Fringe Benefits		3,500		5,355		16,386		16,714		17,048
b. Fee Remissions										
Total FB & FR		**$ 3,500**		**$ 5,355**		**$ 16,386**		**$ 16,714**		**$ 17,048**
3. Supplies and Expenses										
a. General Supplies & Expenses										
b. Minor Equipment										
c. Recruiting & Marketing				3,000						
d. Travel & Entertainment										
e. Other (Library, subscriptions, IT)				15,000		10,000				
Total Supplies and Expense		**$ -**		**$ 18,000**		**$ 10,000**		**$ -**		**$ -**
4. Capital										
a. Capitalized Equipment										
b. Repair & Replacement										15,000
Total Equipment		**$ -**		**$ -**		**$ -**		**$ -**		**$ 15,000**
Total Expenditures		**$ 13,500**		**$ 38,655**		**$ 73,204**		**$ 64,468**		**$ 80,757**
Projected Program Surplus/(Deficit)*		**$ 4,224**		**$ 6,386**		**$ 5,064**		**$ 47,343**		**$ 75,779**

***** 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

Table 1
Program Financial Projection

Financial Office Table
Purdue FW Campus
Master of Science in Applied Physics

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 FW Campus
Master of Science in Applied Physics

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

3. Additional Fees - if applicable

III. Expenditure Details

1. Salary and Wages

2. Fringes and Fee Remissions — In/Out state tuition difference is included in the fee remission calculation. Calculated based on fee remission defined by GTA offer

3. Supplies and Expenses — The department received an equipment donation of >300K on 09/29/2023. The equipment will be used to satisfy the starting needs for the MS p

4. Capital — Year 5: One time equipment investment of 150K-200K, which should be amortized to 10 years after.
Year 6: Lab space renovations will be needed to welcome a full robust class of 25 students. A total estimate of 250K will be amortized to 10 years

Table 3
Projected Headcount and FTE Enrollment and Degrees Conferred (Questions #6)

Board of Trustees & ICHE Table
Purdue FW Campus
Master of Science in Applied Physics

	Year #1 FY 2025	Year # 2 FY 2026	Year # 3 FY 2027	Year # 4 FY 2028	Year # 5 FY 2029
Enrollment Projections (Headcount)*	2	5	8	12	16
Enrollment Projections (FTE)	2	4	7	10	14
Degree Completions Projection		2	3	7	10

Table 2
Program Revenue and Expenditure Summary

Board of Trustees Table
Purdue FW Campus
Master of Science in Applied Physics

	Year #1 FY 2025	Year #2 FY 2026	Year #3 FY 2027	Year #4 FY 2028	Year #5 FY 2029
Total Incremental Revenue*	$ 17,724	$ 45,041	$ 78,268	$ 111,811	$ 156,536
Total Expenditures	$ 13,500	$ 38,655	$ 73,204	$ 64,468	$ 80,757
Projected Program Surplus/(Deficit)**	**$ 4,224**	**$ 6,386**	**$ 5,064**	**$ 47,343**	**$ 75,779**

*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:
Year 6 and subsequent years, are expected to be stable - $150K surplus annually - with ~16 students.
To move to a full robust class of 25 students would
require an additional laboratory renovation costing approximately $250,000.