BOARD APPROVED
FEBRUARY 7, 2025
Cindy Ream
Corporate Secretary

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: **October 28, 2024**
TO: Board of Trustees
FROM: Kara Weatherman, Primary Contact, (765) 596-1815; kdwman@purdue.edu
CC:
SUBJECT: MS in Radiopharmaceutical Manufacturing

CAMPUS OFFERING DEGREE: Indianapolis

ANTICIPATED START DATE: Fall 2025

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

Hybrid. The didactic component of this program will be offered as online courses with virtual/augmented/extended reality interactive exercises instead of hands-on laboratory courses. Students will be required to complete an in-person capstone course in a manufacturing facility at the conclusion of their didactic experience for successful completion of the degree. Students will also have the opportunity to take an elective work experiential earlier in the curriculum if additional in-person experience is desired. Given the increasing number of radiopharmaceutical manufacturers in the Indianapolis area, we wanted to base our program in Indianapolis to help support the workforce needs and to increase visibility of the Purdue program to our constituents in this space. Locating the program in Indianapolis also fits in with other training initiatives being developed by our group. We are currently constructing a dedicated Radiopharmaceutical Manufacturing Training Facility located in Zionsville, IN (not part of this master's proposal) which we will use for several of our non-credit certificate and hands-on programs currently in development. As part of this master's program, we have included an elective course opportunity for students in the program who wish to gain specific hands-on equipment training which will be hosted in that facility.

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

In the last 2 years, there have been significant expansions in the radiopharmaceutical manufacturing space, due primarily to the rapid growth and expansion of radiopharmaceutical theranostics, the pairing of targeted drug molecules radiolabeled with either diagnostic or therapeutic isotopes. Theranostics is a rapidly growing market, and Indianapolis has become the home to 15 radiopharmaceutical manufacturers in various stages of growth and development. Given the unique needs of using radioactivity in the manufacturing process and the lack of existing programs specifically focused in this area, we plan to initially develop this master's pathway, followed by a variety of other training programs to create a pipeline of employees for this growing field in Indiana, across the US and worldwide. As best we can tell, there are no focused educational programs dedicated to the growing radiopharmaceutical manufacturing space. Purdue appears to be the only academic entity at the time of this submission that is planning on developing a multi-stage approach to supporting the theranostics market, which specifically includes a focus on supporting radiopharmaceutical manufacturing.

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

The theranostics market is a rapidly growing market, with a projected growth from $3 billion to more than $12 billion over the next 10 years. With this rapid expansion comes the need for employees from a wide variety of academic backgrounds (high school graduate through advanced professional degrees). Working with radioactive materials brings a unique level of training that to date has not been met in a

formalized training initiative. Currently, we have identified more than 100 companies that have established a presence in the radiopharmaceutical development / manufacturing space in the United States, with almost 40 of them actively involved at some point in the drug approval process. As of late 2024, we have two FDA approved radiopharmaceuticals (both manufactured in Indianapolis) with an additional eight products in late Phase III clinical trials or FDA review (realistically expected to be released to market within the next 2-5 years) and another 9 agents in late Phase II, early Phase III trials (market entry within the next 10 years). Several of these companies have formed partnerships with or have been acquired by what are traditionally considered "big pharma" companies (Eli Lilly, Bristol Myers Squibb, Novartis), giving a strong indication of the future potential of radiopharmaceutical therapy agents. In Indianapolis alone, there are approximately 15 companies in various stages of growth, development and manufacturing facility build out, making our state a major center for radiopharmaceutical growth. Novartis, who currently has an operational production facility in Indianapolis recently announced they have broken ground on a second facility expansion at their Indianapolis campus, along with a third facility in California. The employment pipeline issues are also a major issue in other markets, most notably the European market, which opens additional opportunities for Purdue involvement in training internationally as well.

The need for structured academic programs in radiopharmaceutical manufacturing has been identified as a critical need, both nationally and statewide as the field of radiopharmaceutical theranostics continues is rapid expansion. Through discussions at the state and national level with radiopharmaceutical manufacturing organizations, as well as various professional organizations related to the use of radiopharmaceuticals, there is an identified shortage of workers across all aspects of radiopharmaceutical manufacturing employment categories. There have been several publications in the last few years which highlight the concerning workforce and training challenges and several major medical organizations, including the Society of Nuclear Medicine and Molecular Imaging (SNMMI), have supported the need for expanding training initiatives. While the exact number of workers required in each facility is difficult to predict, we can estimate that small start-up companies would likely have <50 employees, while larger, fully FDA approved operational manufacturing facilities will likely have more than 200+ employees. The rapid growth and advancement of these facilities and increasing workforce needs further strengthen the importance of a well-trained workforce to continue to staff these locations.

4. COSTS

A. Tuition and Fees—In-state and out-of-state
See financial projection table which accompanies this submission.

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

6. COMPETITIVE DEGREES – BRIEF SUMMARY

To date, there are no degrees (undergraduate or graduate) with specific emphasis on the manufacturing of radiopharmaceuticals – specifically theranostic radiopharmaceuticals. We believe that we are the first to establish dedicated training in this space.

Recommended Approval:

Patrick J. Wolfe, Ph.D. — Date: 01/23/2025
Provost and Executive Vice President for Academic Affairs and Diversity
Miller Family Professor of Statistics and Computer Science

Approved:

Mung Chiang, Ph.D. — Date: 1.23.2025
President
Roscoe H. George Distinguished Professor of Electrical and Computer Engineering

Table 1
Program Financial Projection
Financial Office Table
Purdue West Lafayette
MS in Radiopharmaceutical Manufacturing

	Year #1 FY 2026	Year #2 FY 2027	Year #3 FY 2028	Year #4 FY 2029	Year #5 FY 2030
I. ENROLLMENT					
1. Program Credit Hours Generated (FTE * 30 for BS & FTE * 24 for masters/graduate)					
a. Existing Courses	0	0	0	0	0
b. New Courses	120	374	534	608	608
Total	**120**	**374**	**534**	**608**	**608**
2. Full-Time Equivalents (FTE)					
a. Full-Time FTEs	0	0	0	0	0
b. Part-Time FTEs	6	15	20	23	23
Total Full/Part-Time FTE	**6**	**15**	**20**	**23**	**23**
c. On-Campus Transfer FTEs	0	0	0	0	0
d. New-to-Campus FTEs	6	15	20	23	23
Total On/New-to-Campus FTE	**6**	**15**	**20**	**23**	**23**
3. Program Majors - Headcount					
a. Full-Time Students	0	0	0	0	0
b. Part-Time Students	8	20	26	30	30
Total Full/Part-Time HC	**8**	**20**	**26**	**30**	**30**
c. In-State	2	5	7	8	8
d. Out-of-State	6	15	19	22	22
Total In/Out of State HC	**8**	**20**	**26**	**30**	**30**

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 in Radiopharmaceutical Manufacturing

	Year #1 FY 2026	Year #2 FY 2027	Year #3 FY 2028	Year #4 FY 2029	Year #5 FY 2030
II. INCREMENTAL REVENUE					
1. Projected # of *New* Students [(1)]	6	15	20	23	23
2. General Tuition & Fees [(2)]					
a. General Service	973.08	973.08	973.08	973.08	973.08
b. DE Fee	50.00	50.00	50.00	50.00	50.00
c. PUO Infrastructure Fee	18.80	18.80	18.80	18.80	18.80
d. Facilities and Administration	108.12	108.12	108.12	108.12	108.12
e. Student Activity Fee					
Total General Service T&F	**$ 1,150.00**	**$ 1,150.00**	**$ 1,150.00**	**$ 1,150.00**	**$ 1,150.00**
2. Additional Fees - *if applicable* [(3)]	NA	NA	NA	NA	NA
a. Differential Fees					
b. Course Fees					
c. Other Fees					
Total Additional Fees	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Total Incremental Revenue	**$ 138,000**	**$ 430,100**	**$ 614,100**	**$ 699,200**	**$ 699,200**

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 in Radiopharmaceutical Manufacturing

	Year #1 FY 2026		Year #2 FY 2027		Year #3 FY 2028		Year #4 FY 2029		Year #5 FY 2030	
III. EXPENDITURES										
1. Salary and Wages	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**	**FTE**	**Cost**
a. Faculty		195,000		362,000		268,425		245,000		245,000
b. Limited Term Lecturers										
c. Graduate Students										
d. Other (Post Doc/Staff)										
Total S&W	**0.00**	**$ 195,000**	**0.00**	**$ 362,000**	**0.00**	**$ 268,425**	**0.00**	**$ 245,000**	**0.00**	**$ 245,000**
2. Fringes and Fee Remissions										
a. Fringe Benefits										
b. Fee Remissions										
Total FB & FR		**$ -**		**$ -**		**$ -**		**$ -**		**$ -**
3. Supplies and Expenses										
a. Course Production		32,768		18,326		18,651		18,651		18,651
b. Student Support		35,970		24,750		28,710		28,710		28,710
c. Recruiting & Marketing		124,800		69,690		71,315		71,640		71,640
d. Travel & Entertainment										
e. Other (Library, subscriptions, IT)										
Total Supplies and Expense		**$ 193,538**		**$ 112,766**		**$ 118,676**		**$ 119,001**		**$ 119,001**
4. Capital										
a. Capitalized Equipment										
b. Repair & Replacement										
Total Equipment		**$ -**		**$ -**		**$ -**		**$ -**		**$ -**
Total Expenditures		**$ 388,538**		**$ 474,766**		**$ 387,101**		**$ 364,001**		**$ 364,001**
Projected Program Surplus/(Deficit)*		**$ (250,538)**		**$ (44,666)**		**$ 226,999**		**$ 335,199**		**$ 335,199**

***** 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 in Radiopharmaceutical Manufacturing

Table 1
Program Financial Projection
Financial Office Table
Purdue West Lafayette
MS in Radiopharmaceutical Manufacturing

FOOTNOTES

I. Enrollment Details

1. Program Credit Hours Generated
   All of the courses in the program are new.
2. Full-Time Equivalents (FTE)
   All online students are expected to be part-time.
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
   Course development is $4,000 per credit hour for the first three years of the program. Steady state instructional expenses are projected at ~35% of tuition revenue.
2. Fringes and Fee Remissions
   Fringes are included in III.1.
3. Supplies and Expenses
   No additional supplies are needed.
4. Capital
   No capital investment is needed.

Table 2
Program Revenue and Expenditure Summary
Board of Trustees Table
Purdue West Lafayette
MS in Radiopharmaceutical Manufacturing

	Year #1 FY 2026	Year #2 FY 2027	Year #3 FY 2028	Year #4 FY 2029	Year #5 FY 2030
Total Incremental Revenue*	$ 138,000	$ 430,100	$ 614,100	$ 699,200	$ 699,200
Total Expenditures	$ 388,538	$ 474,766	$ 387,101	$ 364,001	$ 364,001
Projected Program Surplus/(Deficit)**	**$ (250,538)**	**$ (44,666)**	**$ 226,999**	**$ 335,199**	**$ 335,199**

*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 in Radiopharmaceutical Manufacturing

	Year #1 FY 2026	Year # 2 FY 2027	Year # 3 FY 2028	Year # 4 FY 2029	Year # 5 FY 2030
Enrollment Projections (Headcount)	**8**	**20**	**26**	**30**	**30**
Enrollment Projections (FTE)	**6**	**15**	**20**	**23**	**23**
Degree Completions Projection	**0**	**8**	**20**	**26**	**30**