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 attachments.

DATE: May 08, 2024
TO: Board of Trustees
FROM: Keyuan Jiang kjiang@pnw.edu; Ge Jin jin9@pw.edu
CC: Mohammad Zahraee zahraee@pnw.edu; Mary Rose Sicinski msicinsk@pnw.edu
SUBJECT: MS in Applied Artificial Intelligence

CAMPUS OFFERING DEGREE: Purdue University Northwest (PNW)

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.

This proposed Master of Science degree will be offered in-person (residentially) through the Purdue University Northwest Hammond campus and will be supported administratively by PNW College of Technology graduate studies office.

Proposed Degree: MS in Applied Artificial Intelligence

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

For the last few decades, we have witnessed rapid technological advancements, improved computational power, reduced hardware costs, and the fast growth of digital data generated. Thanks to this exponential growth of data, artificial intelligence (AI), machine-learning, and data science are gaining prime attention through a wide spectrum of applications in private industries and public sectors. The National Artificial Intelligence Initiative Act of 2020 (NAIIA), a bill passed by the US Congress, directs the President through the National Artificial Intelligence Initiative Office (NAIIO) to support AI education and workforce training programs and support interdisciplinary AI research and education programs.

The MS in Applied AI program prepares students for high-demand careers in the field of artificial intelligence, which aligns with the state's goal of enhancing economic opportunities for Hoosiers. AI professionals are in high demand across various industries, contributing to job growth and economic development. The program emphasizes the completion of a high-quality graduate degree in applied AI. Graduates earn a quality credential that positions them for success in the workforce, aligning with another of the state's goals to increase the percentage of Hoosiers with advanced credentials. Graduates with an MS in Applied AI degree earn higher salaries, enjoy accelerated career trajectories, and contribute more to local and regional economic development and prosperity.

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

The rapid advancements in artificial intelligence (AI) technologies have catapulted them into the forefront of global innovation and economic competitiveness. As the US strives to harness the potential of AI for societal, economic, and strategic advantages, the importance of cultivating a skilled and diverse AI workforce has become a critical national imperative.

The 2018 Occupation Snapshot of Indiana Economic Growth Region 1 (EGR 1), which includes Lake, Porter, LaPorte, Newton, Jasper, Starke, and Pulaski counties, indicated that there were 503 jobs in Software Developers and Computer and Information Research Scientists occupations, with a total of 43 annual

openings. These occupations were expected to grow by 7.9%-19.4% from 2018 to 2028, with a 4-star INDemand ranking.

The 2022 US Bureau of Labor Statistics (BLS) data shows that in the state of Indiana, there were 16,140 jobs in Computer and Information Research Scientists, Computer Programmers, Software Developers, and Data Scientists occupations. The BLS data also shows there were 47,810 jobs in the AI-related occupations in the Chicago metropolitan area. The Hoosier data from the Indiana Department of Workforce Development illustrates that from 2018 to 2022, the number of jobs in Professional, Scientific, and Technical Occupations increased from 18,831 to 24,868, with an average annual increase rate of 4.46%.

The 2022 US Bureau of Labor Statistics data shows that there were 1,594,000 Software Developer jobs at the time, and they were expected to grow by 26% from 2022 to 2032 by adding 410,400 jobs. The BLS data shows that there were also 36,500 Computer and Information Research Scientists jobs at the time, expected to grow by 23% from 2022 to 2032 with an additional 8,300 jobs. The BLS data also shows that there were 168,900 Data Scientist jobs at the time, expected to increase by 35% from 2022 to 2032, adding 59,400 jobs. These AI-related occupations were included in the "20 Fastest Growing Occupations" from 2022 to 2032, with Data Scientists ranked 3rd, Software Developers ranked 10th, and Computer and Information Research Scientists ranked 13th. (https://www.bls.gov/ooh/fastest-growing.htm)

An October 2023 Lightcast report based on the 11.0102 Classification of Instructional Programs (CIP) code (Artificial Intelligence and Robotocs) was used to assess the regional and national labor market demand. At the regional level (Indiana, Illinois, Michigan), AI-related jobs have grown by 18.4% over the past three years. There were 45,391 unique postings from 4,865 employers, with a median posting duration of 26 days. At the national level, AI-related jobs have grown by 43.7% over the past two years. There were 170,879 unique postings from 11,779 employers, with a median posting duration of 27 days. The target occupations studied were Software Developers, Computer and Information Research Scientists, and Computer Programmers.

4.   COSTS

The annual (academic year) tuition and fees for the graduate program at PNW (at the 2023-24 rate) for full-time graduate students (9 credit hours per semester) pursuing a Master of Science in Technology degree (30 credit hours) is as follows.

Annual Costs:
Indiana Resident Tuition, Composite and Differential Fees = $ 6,668.50
Non-Resident Tuition, Composite and Differential Fees = $ 9,552.10
International Tuition, Composite, and Differential Fees = $ 13,624.60

Completion in two academic years, total costs, at the 2023-24 rate:
Indiana Resident Tuition, Composite and Differential Fees = $ 11,291.60
Non-Resident Tuition, Composite and Differential Fees = $ 16,097.60
International Tuition, Composite, and Differential Fees = $ 22,885.10

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

Purdue University West Lafayette, through the Graduate School in partnership with the Colleges of Agriculture, the Daniels School of Business, Education, Engineering, Health and Human Sciences, Liberal Arts, Libraries, Pharmacy, the Polytechnic Institute, and Science, has proposed an online Master of Science degree in Artificial Intelligence.

The proposed PNW MS in Applied AI degree program is a residential program that is targeted to meet regional needs in northwest Indiana and the PNW service area, while the Purdue University West Lafayette MS in AI program is a fully online program which targets a national market.

6.   COMPETITIVE DEGREES – BRIEF SUMMARY

Indiana University – Bloomington, through the College of Art and Science offers a residential Master of Science in Computational Linguistics program with CIP code 11.0102. No other Indiana universities are currently offering Master's degree programs using the 11.0102 CIP code. However, there are some related Master's programs in the State with CIP code 30.3001 (Computational Science) and 11.0104 (Informatics) as noted in the table below.

Institution	Academic unit	CIP	Degree name	Delivery	Credits
University of Notre Dame	College of Science	30.3001	MS in Data Science	Online	30
Indiana University-Bloomington	Luddy School of Informatics, Computing, and Engineering	30.3001	MS in Data Science	Residential and Online	30
Indiana University-Purdue University-Indianapolis	Luddy School of Informatics, Computing, and Engineering	11.0104	MS in Applied Data Science	Residential	30
Indiana University-Purdue University-Indianapolis	School of Science	30.3001	MS in Computational Data Science	Residential	30
Ball State University	College of Science and Humanities	30.3001	MS in Data Science	Online	33

Nationwide, there are two institutions, the University of San Diego and Stevens Institute of Technology, which are offering a Master of Science in Applied Artificial Intelligence degree program. Higher education institutions in the surrounding states (Illinois, Michigan, and Wisconsin) offer similar degree programs; a list of these degree programs is presented in the table below:

Institutions Outside Indiana	Program options or specializations	Institutional or programmatic accreditation	Preparation for licensure or certification
University of San Diego	MS in Applied AI (online)	Western Association of Schools and Colleges (WASC)	No
Stevens Institute of Technology	MS in Applied AI (online or residential)	Middle States Commission on Higher Education (MSCHE)	No
DePaul University	MS in AI (online or residential)	The Higher Learning Commission (HLC)	No
Northwestern University	MS in AI (MSAI) (Residential)	The Higher Learning Commission (HLC)	No
Illinois Institute of Technology	MAS in AI (online or residential)	The Higher Learning Commission (HLC)	No
University of Michigan-Dearborn	MS in AI (online, residential or hybrid)	The Higher Learning Commission (HLC)	No
Wayne State University	MS in AI (Residential)	The Higher Learning Commission (HLC)	No

Lawrence Technological University	MS in AI (Residential)	The Higher Learning Commission (HLC)	No
Milwaukee School of Engineering	MS in Machine Learning (online)	The Higher Learning Commission (HLC)	No

Based on the October 2023 Lightcast study, there are 22 institutions offering Master's degrees in Artificial Intelligence with 175% growth from 2017 to 2021. The number of degree completions in 2021 was 397, with a 116% growth from 2017 to 2021.
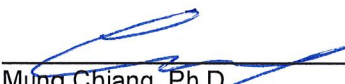
Recommended Approval:

_____   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 Northwest Campus
MS Degree in Applied Artificial Intelligence

	Year #1 FY 2024	Year #2 FY 2025	Year #3 FY 2026	Year #4 FY 2027	Year #5 FY 2028
I. ENROLLMENT					
1. Program Credit Hours Generated (FTE * 30 for BS & FTE * 24 for masters/graduate)					
a. Existing Courses	180	360	540	720	720
b. New Courses					
Total	**180**	**360**	**540**	**720**	**720**
2. Full-Time Equivalents (FTE)					
a. Full-Time FTEs	8	16	24	32	32
b. Part-Time FTEs	2	4	6	8	8
Total Full/Part-Time FTE	**10**	**20**	**30**	**40**	**40**
c. On-Campus Transfer FTEs	0	0	0	0	0
d. New-to-Campus FTEs	10	20	30	40	40
Total On/New-to-Campus FTE	**10**	**20**	**30**	**40**	**40**
3. Program Majors - Headcount					
a. Full-Time Students	8	16	24	32	32
b. Part-Time Students	4	8	12	16	16
Total Full/Part-Time HC	**12**	**24**	**36**	**48**	**48**
c. In-State	6	12	16	24	24
d. Out-of-State	5	12	16	24	24
Total In/Out of State HC	**11**	**24**	**32**	**48**	**48**

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 Northwest Campus
MS Degree in Applied Artificial Intelligence

	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]	10	20	30	40	40
2. General Tuition & Fees [2]					
a. General Service	5,766	5,766	5,766	5,766	5,766
b. Technology Fee					
c. Repair & Rehabilitation Fee					
d. Student Fitness & Wellness Fee	370	370	370	370	370
e. Student Activity Fee					
Total General Service T&F	$ 6,136	$ 6,136	$ 6,136	$ 6,136	$ 6,136
2. Additional Fees - *if applicable* [3]					
a. Differential Fees	663	663	663	663	663
b. Course Fees					
c. Other Fees					
Total Additional Fees	$ 663	$ 663	$ 663	$ 663	$ 663
Total Incremental Revenue	$ 67,995	$ 135,990	$ 203,986	$ 271,981	$ 271,981

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 Northwest Campus
MS Degree in Applied Artificial Intelligence

	Year #1 FY 2024 FTE	Year #1 FY 2024 Cost	Year #2 FY 2025 FTE	Year #2 FY 2025 Cost	Year #3 FY 2026 FTE	Year #3 FY 2026 Cost	Year #4 FY 2027 FTE	Year #4 FY 2027 Cost	Year #5 FY 2028 FTE	Year #5 FY 2028 Cost
III. EXPENDITURES										
1. Salary and Wages										
a. Faculty	1.00	120,000		120,000		120,000		120,000		120,000
b. Limited Term Lecturers	2.00	30,000		30,000		30,000		30,000		30,000
c. Graduate Students										
d. Other (Post Doc/Staff)										
Total S&W	3.00	$ 150,000	0.00	$ 150,000	0.00	$ 150,000	0.00	$ 150,000	0.00	$ 150,000
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		2,000		2,000		2,000		2,000		2,000
d. Travel & Entertainment										
e. Other (Library, subscriptions, IT)		500		500		500		500		500
Total Supplies and Expense		$ 2,500		$ 2,500		$ 2,500		$ 2,500		$ 2,500
4. Capital										
a. Capitalized Equipment										
b. Repair & Replacement										
Total Equipment		$ -		$ -		$ -		$ -		$ -
Total Expenditures		$ 152,500		$ 152,500		$ 152,500		$ 152,500		$ 152,500
Projected Program Surplus/(Deficit)*		$ (84,505)		$ (16,510)		$ 51,486		$ 119,481		$ 119,481

* 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 Northwest Campus
MS Degree in Applied Artificial Intelligence

FOOTNOTES

I. Enrollment Details

1. Program Credit Hours Generated   18 avg./year
   It was assumed that a full-time graduate student registers for an average of 9 credit hours per semester
2. Full-Time Equivalents (FTE)
   It is anticipated that for the first 4 years, each year 8 new full-time and 2 new part-time students will enroll and this number will stabilize at 32 full time and 16 part time
3. Program Majors - Headcount
   All stuents belong to the major program.

II. Incremental Revenue Details

1. Projected # of New Students
   It is projected that after 4 years, this program will have 32 full-time and 16 part-time students, all of them are new students.
2. General Tuition & Fees
   All numbers extracted based on 2023-2024 tuition and fee from PNW website.
3. Additional Fees - if applicable
   College of Technology charges additional fees (Differential fee) which is $281.50 for full-time and $266.15 for part-time students.
   Therefore average Diff. fee per FTE will be ((8*265.55)+(4*251.09))/10*2

III. Expenditure Details

1. Salary and Wages
   One new faculty will be hired. It is assumed that full-time faculty will teach at graduate level and LTLs will be hired to cover their undergraduate courses
2. Fringes and Fee Remissions
   Fringes are included in the faculty salary
3. Supplies and Expenses
   Non-expected.
4. Capital
   None needed.

Table 2
Program Revenue and Expenditure Summary
Board of Trustees Table
Purdue Northwest Campus
MS Degree in Applied Artificial Intelligence

	Year #1 FY 2024	Year #2 FY 2025	Year #3 FY 2026	Year #4 FY 2027	Year #5 FY 2028
Total Incremental Revenue*	$ 67,995	$ 135,990	$ 203,986	$ 271,981	$ 271,981
Total Expenditures	$ 152,500	$ 152,500	$ 152,500	$ 152,500	$ 152,500
Projected Program Surplus/(Deficit)**	$ (84,505)	$ (16,510)	$ 51,486	$ 119,481	$ 119,481

*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 Northwest Campus
MS Degree in Applied Artificial Intelligence

	Year #1 FY 2024	Year # 2 FY 2025	Year # 3 FY 2026	Year # 4 FY 2027	Year # 5 FY 2028
Enrollment Projections (Headcount)	12	24	36	48	48
Enrollment Projections (FTE)	10	20	30	40	40
Degree Completions Projection	0	0	8	18	28