

**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: September 12, 2023
TO: Board of Trustees
FROM: Carrie Berger, carrieb@purdue.edu; Dimitros Peroulis, dperouli@purdue.edu
CC: Ankita Raturi, ankita@purdue.edu; Mohammad Rahman, mrahman@purdue.edu; Hua Hua Chang, chang606@purdue.edu; Milind Kulkarni, milind@purdue.edu; Stephen Leitch, sleitch@purdue.edu; Cherie Maestas, cmaestas@purdue.edu; Gang Shao, gshao@purdue.edu; Kyle Hultgren, khultgre@purdue.edu; Sabine Brunswicker, sbrunswi@purdue.edu; Petros Drineas, drineas@purdue.edu; Eric Barker, barkerl@purdue.edu; Bryan DeWitt, bdewitt@purdue.edu
SUBJECT: MS Artificial Intelligence

CAMPUS OFFERING DEGREE: Purdue West Lafayette

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

This proposed interdisciplinary degree will be offered fully online through the PWL campus and will be supported administratively by Purdue University Online.

Proposed Degree: MS in Artificial Intelligence

Proposed Majors: AI Management and Policy; AI and Machine Learning

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

Artificial intelligence (AI) is a large, emerging market that has grown by over 400% since 2012 (Lightcast, 2023). There were over 3 million jobs in 2022 with \$124K in annual earnings, and the labor market is expected to continue to grow (Lightcast, 2023). As of 2021, 92% of degree conferrals for the AI CIP code (11.0102) are offered residentially, and only 6 institutions offer online degrees reporting under this CIP. Given the large labor market demand and few fully online competitors, there is a need for additional training in artificial intelligence.

Deloitte (2023) segments the AI market into AI builders (scientists) and AI translators (business leaders). AI builders require technical training to build and support AI infrastructure. AI translators are business leaders who need foundational AI knowledge to make informed decisions and successfully implement change management principles in their organizations. Our proposed program meets the needs of both market segments by allowing for a shared curriculum for both segments and opportunities for learners to specialize in their desired fields.

Purdue University is a recognized leader in STEM-related research and academic programs. The interdisciplinary MS in Artificial Intelligence program will leverage these strengths and will align with President Chiang's strategic initiative, Purdue Computes. This first-of-its-kind program also provides the educational backbone for the Institute for Physical AI.

To meet the needs of the market, Purdue University Online, in partnership with the Colleges of Agriculture, the Daniels School of Business, Education, Engineering, Health and Human Sciences, Liberal Arts, Libraries and School of Information Studies, Pharmacy, the Polytechnic Institute, Science, and the Graduate School propose a new interdisciplinary and fully online MS in Artificial Intelligence. Additionally, two new majors will exist under the larger degree program to support the needs of AI builders and AI translators. AI Builders will be interested in the AI and Machine Learning major and AI translators will be interested in the AI Management and Policy major.

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

According to a [2021 report](#) developed by Purdue faculty members and funded by Microsoft, AI is making strides in Indiana manufacturing; however, the state lags behind global and national trends and there is not a clear AI and business case for adoption across the state. Further, the report indicates that technical resources are lacking, including higher education resources. The proposed program seeks to alleviate these challenges. The AI builders track (MS Artificial Intelligence, Major in AI and Machine Learning) is going to focus heavily on infrastructure, development, and implementation of artificial intelligence. The AI translators track (MS Artificial Intelligence, Major in AI Management and Policy) is going to provide a foundational overview of AI for business leaders and policymakers who will be able to bridge the gap between ideation and implementation and implement change management principles to assist with adoption and strategy of AI in the workplace.

The top five states for artificial intelligence positions are California, Texas, New York, Pennsylvania, and New Jersey (Lightcast, 2023). While many of the university's online students enroll from out-of-state, the regional demand for artificial intelligence in the Midwest is promising (see Figure 1 below). Graduates are expected to earn competitive wages, with the current average of \$124,200 per year. The Mid-West pays comparably well with other states; there is no significant wage difference between employees in California or Indiana (Lightcast, 2023). There are over 275,000 unique job postings with over 20,000 employers competing for the same employees. Job postings include software developers, managers, engineers, and computer programmers. In addition to security clearance, the top requested skill by employers is a Master's degree (Lightcast, 2023).

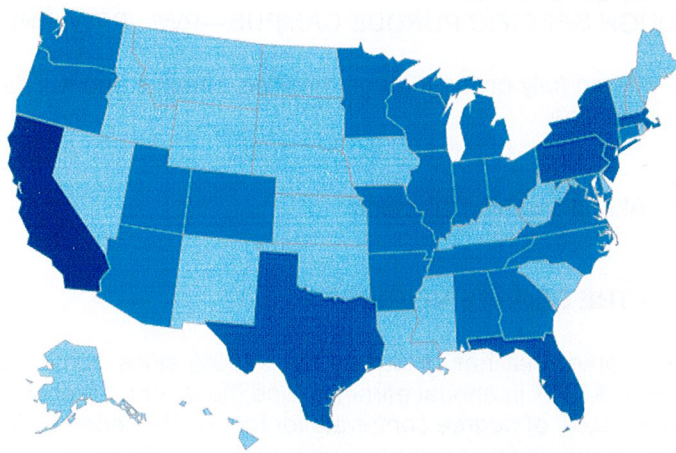


Figure 1. Regional breakdown of Artificial Intelligence jobs by region. Indiana and the Midwest are areas of high activity (Lightcast, 2023). The darker blue colors indicate high regions of Artificial Intelligence activity.

4. COSTS

- A. Tuition and Fees—In-state and out-of-state
 - a. In-state: \$950/credit hour
 - b. Out-of-state: \$1,000/credit hour

- 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

At the graduate level, Purdue University has highly ranked and successful programs in Interdisciplinary Engineering, Computer Science, Business Analytics, and Management. The interdisciplinary nature of this program builds from elements from existing programming in these fields to create a distinctive new degree to meet the needs of the labor market. At the undergraduate level, there are majors in Artificial Intelligence for BA or BS degree-seeking students. Existing programs are not expected to compete with the new MS Artificial Intelligence degree because the new interdisciplinary MS leverages courses from nearly all of the Colleges at Purdue's campus allowing students to create their own learning experience.

This degree will have a shared core of classes related to AI foundations, seminars, ethics, and policy courses, as well as a capstone experience for learners to demonstrate expertise in their field.

AI builders will have classes to ensure that they have a detailed understanding of the AI industry and have the technical expertise to be highly competitive candidates in the labor market. AI translators will have classes to ensure that they can utilize data to make decisions and implement change management strategies to ensure the successful adoption of AI in their workplaces.

Students in either track will have the opportunity to round out their learning experience with a wide range of elective courses so that they can customize their degree to meet their personal and professional learning goals.

6. COMPETITIVE DEGREES – BRIEF SUMMARY

At the graduate level, there were 397 conferrals in 2021 in the Artificial Intelligence CIP code (11.0102) spread out among 22 institutions, representing a 175% growth over the past five years. This field is expected to grow tremendously over the next several years. Johns Hopkins University, the University of Texas, Drexel University, Duke University, the University of Arizona, Brandeis University, and Penn State World Campus all have online artificial intelligence degrees. Existing programs market primarily to AI translators; AI builders would need to pursue training in computer science, data science, or computer engineering at other institutions. Purdue University's program will equip both market segments to be successful AI business leaders (i.e., translators) and scientists (i.e., builders), making the proposed MS in Artificial Intelligence unique in the market.

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

11/10/2023
Date

Approved:



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

11/13/2023
Date

Table 1
Program Financial Projection
Financial Office Table
Purdue West Lafayette
MS Artificial Intelligence, Majors in AI and Machine Learning and AI Management and Policy (Graduate School)

	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). We used 18 credit hours for this calculation.					
a. Existing Courses	194	475	583	670	702
b. New Courses	130	317	389	446	468
Total	324	792	972	1116	1170
2. Full-Time Equivalents (FTE)					
a. Full-Time FTEs	0	0	0	0	0
b. Part-Time FTEs	14	33	41	47	49
Total Full/Part-Time FTE	14	33	41	47	49
c. On-Campus Transfer FTEs	0	0	0	0	0
d. New-to-Campus FTEs	14	33	41	47	49
Total On/New-to-Campus FTE	14	33	41	47	49
3. Program Majors - Headcount					
a. Full-Time Students	0	0	0	0	0
b. Part-Time Students	18	44	54	62	65
Total Full/Part-Time HC	18	44	54	62	65
c. In-State	4	9	11	13	13
d. Out-of-State	14	35	43	49	52
Total In/Out of State HC	18	44	54	62	65

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.

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Program Financial Projection
Financial Office Table
Purdue West Lafayette

MS Artificial Intelligence, Majors in AI and Machine Learning and AI Management and Policy (Graduate School)

	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⁾	18	44	54	62	65
2. General Tuition & Fees ⁽²⁾					
a. General Service	\$ 266,652	\$ 651,816	\$ 799,956	\$ 918,468	\$ 962,910
b. Purdue Online Infrastructure Fe	\$ 6,091	\$ 14,890	\$ 18,274	\$ 20,981	\$ 21,996
c. Digital Education Fee	\$ 16,200	\$ 39,600	\$ 48,600	\$ 55,800	\$ 58,500
d. Facilities and Administration	\$ 32,076	\$ 78,408	\$ 96,228	\$ 110,484	\$ 115,830
Total General Service T&F	\$ 321,019	\$ 784,714	\$ 963,058	\$ 1,105,733	\$ 1,159,236
2. Additional Fees - if applicable ⁽³⁾					
a. Differential Fees	-	-	-	-	-
b. Course Fees	-	-	-	-	-
c. Other Fees	-	-	-	-	-
Total Additional Fees	\$ -	\$ -	\$ -	\$ -	\$ -
Total Incremental Revenue	\$ 321,019	\$ 784,714	\$ 963,058	\$ 1,105,733	\$ 1,159,236

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.

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Program Financial Projection
Financial Office Table
Purdue West Lafayette

MS Artificial Intelligence, Majors in AI and Machine Learning and AI Management and Policy (Graduate School)

	Year #1 FY 2025		Year #2 FY 2026		Year #3 FY 2027		Year #4 FY 2028		Year #5 FY 2029	
	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost
III. EXPENDITURES										
1. Salary and Wages										
a. Faculty		32,400		79,200		97,200		111,600		117,000
b. Limited Term Lecturers		-		-		-		-		0
c. Graduate Students		34,020		83,160		102,060		117,180		122,850
d. Other (Post Doc/Staff)		-		-		-		-		-
Total S&W	0.00	\$ 66,420	0.00	\$ 162,360	0.00	\$ 199,260	0.00	\$ 228,780	0.00	\$ 239,850
2. Fringes and Fee Remissions										
a. Fringe Benefits		-		-		-		-		-
b. Fee Remissions		-		-		-		-		-
Total FB & FR		\$ -		\$ -		\$ -		\$ -		\$ -
3. Supplies and Expenses										
a. General Supplies & Expenses (Course Prodt)		184,100		180,612		128,455		322,151		210,102
b. Minor Equipment		-		-		-		-		-
c. Recruiting, Marketing, & Student Support)		250,000		250,000		250,000		250,000		250,000
d. Travel & Entertainment		-		-		-		-		-
e. Other (Library, subscriptions, IT)		-		-		-		-		-
Total Supplies and Expense		\$ 434,100		\$ 430,612		\$ 378,455		\$ 572,151		\$ 460,102
4. Capital										
a. Capitalized Equipment		-		-		-		-		-
b. Repair & Replacement		-		-		-		-		-
Total Equipment		\$ -		\$ -		\$ -		\$ -		\$ -
Total Expenditures		\$ 500,520		\$ 592,972		\$ 577,715		\$ 800,931		\$ 699,952

Projected Program Surplus/(Deficit) \$ (479,501) \$ 191,742 \$ 385,393 \$ 304,807 \$ 459,284

* 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.

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Program Financial Projection
Financial Office Table
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MS Artificial Intelligence, Majors in AI and Machine Learning and AI Management and Policy (Graduate School)

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Purdue West Lafayette
MS Artificial Intelligence, Majors in AI and Machine Learning and AI Management and Policy (Graduate School)

FOOTNOTES

I. Enrollment Details

1. Program Credit Hours Generate Used 18 CR per student per year. Assumed 40% new courses (7.2 credits) and 60% existing (10.8 credits).
2. Full-Time Equivalents (FTE) No students are FTEs, all will be part-time.
3. Program Majors - Headcount All students are program majors.

II. Incremental Revenue Details

1. Projected # of New Students Based on competitive benchmarking (Lightcast, 2023) and existing similar program enrollments (Statistics, Engineering, Management) when the program is launched.
2. General Tuition & Fees Total average tuition is \$990 per credit hour inclusive of all fees (\$950/\$1000 IS/OOS; 20%/80% split).
3. Additional Fees - if applicable None

III. Expenditure Details

1. Salary and Wages Based on \$100/CR for faculty and \$105/CR for TAs. This rate includes fringe. No new faculty hires are required to launch this program.
2. Fringes and Fee Remissions Does not apply.
3. Supplies and Expenses Includes course development, marketing, recruiting, and student support.
4. Capital No additional capital is needed.

Table 2
Program Revenue and Expenditure Summary
Board of Trustees Table
Purdue West Lafayette

MS Artificial Intelligence, Majors in AI and Machine Learning and AI Management and Policy (Graduate School)

	Year #1 FY 2025	Year #2 FY 2026	Year #3 FY 2027	Year #4 FY 2028	Year #5 FY 2029
Total Incremental Revenue*	\$ 321,019	\$ 784,714	\$ 963,058	\$ 1,105,733	\$ 1,159,236
Total Expenditures	\$ 500,520	\$ 592,972	\$ 577,715	\$ 800,931	\$ 699,952
Projected Program Surplus/(Deficit)	\$ (179,501)	\$ 191,742	\$ 385,343	\$ 304,802	\$ 459,284

*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 Artificial Intelligence, Majors in AI and Machine Learning and AI Management and Policy (Graduate School)

	Year #1 FY 2025	Year # 2 FY 2026	Year # 3 FY 2027	Year # 4 FY 2028	Year # 5 FY 2029
Enrollment Projections (Headcount)	18	44	54	62	65
Enrollment Projections (FTE)	14	33	41	47	49
Degree Completions Projection	0	18	44	54	62