U-CAAC Review of New Program Proposal

This form provides committee-wide feedback on the following proposed program.

Undergraduate ☑ Graduate ☐ College: Science

Proposal Name: BS in Artificial Intelligence

Proposer's Name and Email: Christian Collberg, collberg@arizona.edu

Reviewers: Amy Kimme-Hea, Peggy Ann Jenkins, Diana Daly, Rebecca Gomez, Linda Denno

1. **Rationale.**
   Is the mission of the program well justified?

   The proposal talks frankly about the need to build a student body that is prepared to lead by leveraging the advancements of the 4th Industrial Revolution. Developments in artificial intelligence are some of the most important components of the disruptive changes that are driving the 4IR. The mission of the program is well justified and clearly aligns with the strategic goals of the University.

2. **Academic Standards/Compliance.**
   Do the curriculum and student support provisions meet the academic and policy standards of the university?

   The curriculum of this proposed program clearly meets the academic and policy standards of the University. Because of the rigorous requirements of the program, student support services are critical and will need to be built up over time.

3. **Overlaps.**
   Are there perceived duplications with other UArizona programs? Conversely, could shared interests and emphases lead to collaborative or synergistic programs with other parts of the university? (These could take the form of co-ownership, co-delivered courses, shared faculty, shared facilities, etc.)

   There are a number of computer science related programs across the University, but nothing that would constitute a duplication. The strong mathematics focus of this degree program along with the specific focus on Artificial Intelligence means that this program is additive to current UArizona programs and not duplicative. CS is clearly interested in collaborating with current programs and creating synergistic opportunities.

4. **Viability.**
   Is the program likely to enroll enough students to meet UArizona benchmarks for productive programs? Is there plausible evidence to back up enrollment predictions and budget projections?

   The Computer Science currently has an enrollment of over 1300 majors in our BS and BA programs. Given the ubiquitous and sudden popularity of AI, there is a strong likelihood that this program will prove to be very popular with students. The projection of 150 majors within the first three years is very plausible, and provides support for the budget projections.

5. **Other feedback/comments.**

   It was suggested that a "Building Connections" GenEd course in AI Ethics be considered in the near future that is truly cross-disciplinary, leveraging expertise in social science, ethics, and philosophy.

6. **Approval or Revisions Requested.**

   We recommend approval of this degree proposal.

THE UNIVERSITY OF ARIZONA

New Academic Program Workflow Form

General

Proposed Name: Artificial Intelligence

Transaction Nbr: 00000000000187

Plan Type: Major

Academic Career: Undergraduate

Degree Offered: Bachelor of Science

Do you want to offer a minor? N

Anticipated 1st Admission Term: Fall 2024

Details

Department(s):

SCNC

DEPTMNT ID	DEPARTMENT NAME	HOST
0412	Computer Science	Y

Campus(es):

MAIN

LOCATION	DESCRIPTION
TUCSON	Tucson

Admission application terms for this plan: Spring: Y Summer: Y Fall: Y

Plan admission types:

Freshman: Y Transfer: Y Readmit: Y Graduate: N

Non Degree Certificate (UCRT only): N

Other (For Community Campus specifics): N

Plan Taxonomy: 11.0102, Artificial Intelligence.

Program Length Type: Program Length Value: 0.00

Report as NSC Program:

SULA Special Program:

Print Option:

Diploma: Y Bachelor of Science in Artificial Intelligence

Transcript: Y Bachelor of Science in Artificial Intelligence

Conditions for Admission/Declaration for this Major:

The BS in Artificial Intelligence will have an "Advanced Standing" structure. This matches our existing structure for the BA and BS in Computer Science. Any student can declare the BS in Artificial Intelligence at the point of admission or afterwards. Students must complete the following coursework and meet the GPA requirements to move into Advanced Standing:

-CSC 110 (4) Introduction to Computer Programming I
-CSC 120 (4) Introduction to Computer Programming II
-CSC 144 (3) Discrete Mathematics for Computer Science I
-CSC 210 (4) Software Development
-CSC 244 (3) Discrete Mathematics for Computer Science II
-CSC 2xx (3) Introduction to Artificial Intelligence (New)
-MATH 163 (3) Basic Statistics

GPA requirements for Advanced Standing:
-Cumulative UA GPA of 2.4 or higher.
-GPA of 3.0 or higher in best attempts at the following 4 courses, taken at UA or elsewhere: CSC 120, CSC 210, CSC 244, CSC 2xx (Introduction to Artificial Intelligence)
-GPA of 2.0 or higher in all attempts at CSC courses (excluding GRO 1st attempts) taken at UA.
-At least two programming courses (from list below) completed at UA: CSC 110, 120, 210, 252, 317, 335, 337, 343, 346, 352, 372, 380.

Requirements for Accreditation:

We are not seeking accreditation.

Program Comparisons

University Appropriateness

The BS in Artificial Intelligence degree supports the University's mission, especially in relation to the strategic plan's first two pillars: Pillar 1: The Wildcat Journey and Pillar 2: Grand Challenges.

Both of these pillars emphasize the need to build a student body that is prepared

to lead by leveraging the advancements of the 4th Industrial Revolution. Developments in artificial intelligence are some of the most important components of the disruptive changes that are driving the 4IR. This program will prepare students for careers in this field and give them the skills, knowledge, and mindsets to create and thrive in this rapidly changing environment.

Arizona University System

NBR	PROGRAM	DEGREE	#STDNTS	LOCATION	ACCRDT
1	BAS in App. Comp, AI Emphasis	BAPS	1	UArizona, Tucson, Online/DIST	N

Peer Comparison

We compared our proposed program with BS in AI degrees offered by Carnegie Mellon University and Purdue University and a BS in AI & Decision Making degree offered by MIT. Our proposed BS in AI program is very similar to these undergraduate AI degrees offered by computer science departments at peer institutions. Specifically, the math and core computer science requirements are well aligned, and the AI specialty courses have a high degree of overlap, including Introductory AI, machine learning, natural language processing, computer vision, and ethics. Also, the proposed program and the peer programs all aim to train students for career paths that include both AI application areas (e. g., healthcare, transportation, and robotics) as well as fundamental AI technology development (e.g., machine learning and computer vision).

One difference is that the proposed program includes the requirement for an AI Capstone Project. In this course, students will work in small teams to build an AI system either for a specific application task or to demonstrate capabilities for a fundamental AI technology (e.g., students might build their own machine learning toolkit). This project will give students hands-on experience creating their own AI system under the guidance of computer science faculty, and it will help students integrate the knowledge that they acquired across different courses in the program.

Another difference is that the proposed program is designed to encourage and support interdisciplinary interests for students who want to become AI experts and have a strong interest in a related subject (e.g., cognitive science) or application area (e.g., medicine). The proposed degree program includes two elective classes that can be "AI-adjacent" interdisciplinary courses offered by other departments. In addition, the AI Capstone Project will allow for interdisciplinary projects that use AI technology to tackle problems in another discipline, or that apply insights from another discipline to AI methods or technologies.

At the University of Arizona, the College of Applied Science & Technology

(CAST) currently offers a Bachelor's of Applied Science (BAS) degree in Applied Computing, which includes an Applied Artificial Intelligence Emphasis Area. There is some common curriculum between these degrees, for example Applied Computing students doing the AI Emphasis are required to take Artificial Intelligence, Cyber Ethics, and Capstone courses offered by CAST. However, the CAST degree is fundamentally different from the proposed Computer Science degree because it is very applied in nature, with some emphasis on security-related applications. The Computer Science program will offer a Bachelor's of Science (BS) degree that requires in-depth study of fundamental areas of math and computer science, including 3 required math courses, 3 computer programming courses, 2 discrete math courses, an algorithms course, a machine learning course, plus 4 additional AI courses on advanced topics in computer science (e.g., natural language processing and computer vision).

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science (e.g., natural language processing and computer vision).

Resources

Library

Acquisitions Needed:

No additional library acquisitions needed during the next three years for the program.

Physical Facilities & Equipment

Existing Physical Facilities:

The senior capstone projects will require access to a GPU cluster, which the department does not currently have.

Additional Facilities Required & Anticipated:

In the third year, when initial students reach the senior capstone project, the department will need a GPU cluster.

Other Support

Other Support Currently Available:

Existing support staff available for the proposed program include undergraduate academic advisors, coordinator of career development, and IT staff.

Other Support Needed over the Next Three Years:

0.5 Undergraduate Academic Advisor
2 Graduate Teaching Assistants

Comments During Approval Process

10/31/2023 3:07 PM

MARTINMARQUEZ

Comments
Put "1" as the value for the new CAST BAS in Applied Computing: Artificial Intelligence Emphasis in the program comparison field, would not let me put in "0".

11/1/2023 10:20 AM

COLLBERG

Comments
Approved.

11/2/2023 11:18 AM

MELANIECMADDEN

Comments
Added Preliminary Proposal document. ABOR form is still needed.

NEW ACADEMIC PROGRAM – MAJOR
Preliminary Proposal Form

THE UNIVERSITY OF ARIZONA

I. **Program Details**

a. **Name (and Degree Type) of Proposed Academic Program:** BS in Artificial Intelligence
   i. **Emphases (if applicable):** Applications, Theory
b. **Academic Unit(s)/College(s):** Computer Science/College of Science
c. **Campus/Location(s):** Main
d. **First Admission Term:** Fall 2024
e. **Primary Contact and Email:** Christian Collberg (collberg@cs.arizona.edu)

II. **Executive Summary:**

- Over the last few years, the Department of Computer Science (CS) has made significant investments in building a strong Artificial Intelligence (AI) research group. We currently have 7 faculty in AI, who specialize in Computer Vision (CV), Natural Language Processing (NLP), and theoretical and applied Machine Learning (ML). Our incoming Department Head, Ellen Riloff (currently at the University of Utah), does research in NLP.
- Along with our investment in AI faculty, we are in the process of expanding our catalog of AI courses. Our current AI course listing includes: CSC 380 Principles of Data Science, CSC 477 Introduction to Computer Vision, CSC 480 Principles of Machine Learning, CSC 483 Text Retrieval and Web Search.
- According to the World Economic Forum, AI will drive the creation of 97 million new jobs. In response to the demand for trained AI professionals, there is a recent trend to create dedicated AI degrees. The number of institutions with AI degrees is currently fairly small, but includes strong Computer Science programs such as MIT, CMU, and Purdue in the US, and, in Europe, Johannes Kepler University, Saarland University, University of Edinburgh, University of Groningen, University of Leiden, and University of Rome.
- The creation of this degree (Bachelor of Science in Artificial Intelligence, AI-BS) ensures that UA establishes itself as a center of *AI research* as well as *AI pedagogy*. We will build on the current strengths of the CS department, ensuring that students graduating with a degree in BS-AI will have a solid grounding in Computer Science (essential to build AI tools), AI applications, AI theory, and societal impacts of AI.

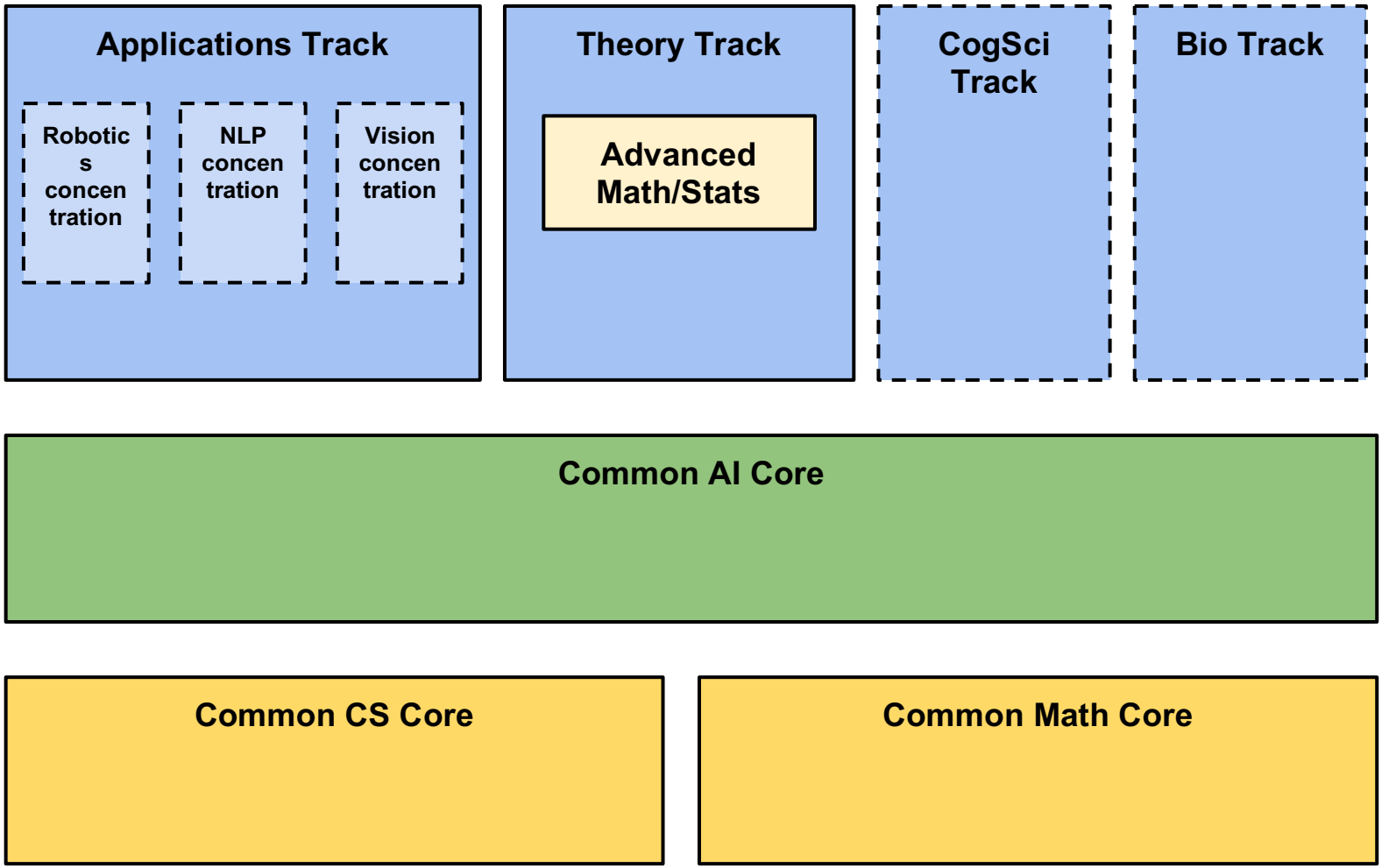
III. **Brief Program Description:**

Emerging Artificial Intelligence technologies need leaders and innovators to meet the rapidly growing needs of the 21st century. Students pursuing a Bachelor of Science in Artificial Intelligence will study methods for constructing systems that display intelligent behavior. Modern applications of AI include autonomous vehicles, fraud detection, healthcare, agriculture, personal assistants, epidemiology, gaming, industrial robots, and smart appliances. The program will provide students with a solid foundation in Computer Science, and the theoretical background and practical training in Artificial Intelligence they need to build systems that transform unstructured data (such as images, video, audio, or natural language) and structured data (databases) into decisions.

This degree was designed to meet the needs of students who seek a professional career in AI application development, and who want to join industry as an AI expert upon graduation. The degree is also suitable for those who want to attend graduate school with an emphasis on AI theory or applications, or who want to combine AI with an interest in other fields of study. Students pursing the degree will have the opportunity to work with the department's AI research group on impactful research in state-of-the-art facilities.

IV. **Program Rationale:**

To be successful, students will need significant coursework in Computer Science, Math, Statistics, and Machine Learning, and will need to study the ethical aspects of AI in order to understand its societal aspects. The degree it consists of a Common core of CS and Mathematics courses, a Common AI Core, and applied and theory emphases: The **Common CS Core** will give the students the necessary skills to build advanced applications and the **Common Math Core** will provide the background necessary for Machine Learning (ML) course work (linear algebra, calculus, etc.). On top of the common CS and Math cores, the **Common AI Core** will provide knowledge that



all AI students must acquire, regardless of their downstream specialization. These would minimally include courses in Data Science, Data Visualization, Ethics, Deep Learning, and Traditional AI.

Once students acquire basic knowledge, they will choose one of several tracks. Initially, we propose two tracks, both housed within the CS department, one in **Applications** and one in **Theory**. The **AI Theory Track** would include courses in ML, Deep Learning, Philosophy and AI, and Cognitive Science. The **Applications Track** would include courses in NLP, CV, etc.

Revised May 2023

Over time, we expect the number of options for students to grow. Such future developments are in dashed boxes in the figure above. For example, the **Applied AI Track** could have concentrations within the track. We are also anticipating additional tracks, such as AI for Bioinformatics, AI for Computational Chemistry, Cognitive Science and AI, and so on. These tracks would be developed in collaboration with the relevant departments.
The proposed program draws courses from the existing Computer Science BS degree, but will require additional course development. In particular, new courses will be required in Ethics/Fairness, Generic AI, and Deep Learning (both introductory and advanced). We will also explore the possibility of adding courses taught by the Philosophy Department and Cognitive Science.

There is a smattering of AI-related courses taught around the university:

Courses already cross-listed with CS:

- LING/PSY/CSC 438 Computational Linguistics
- LING/ISTA/CSC 439 Statistical Natural Language Processing
- PHIL/PSY/CSC 455 Philosophy and Artificial Intelligence

Mathematics/Statistics

- DATA 375: Introduction to Statistical Computing

ISchool

- ESOC 214: Introduction to Data Science
- INFO 420: Ethical Issues in Information
- ISTA 355: Introduction to Natural Language Processing
- ISTA 410: Bayesian Modeling and Inference
- ISTA 421: Introduction to Machine Learning
- ISTA 450: Artificial Intelligence

Electrical and Computer Engineering

- ECE 466 Knowledge-System Engineering

College of Applied Science and Technology (CAST)

- CAST has a Bachelor of Applied Science degree program that has an Applied Artificial Intelligence emphasis.

V. **Projected Enrollment for the First Three Years:**

Computer Science currently has an enrollment of over 1300 majors in our BS and BA programs. Given the current popularity of AI, we project a sizable fraction of our CS majors will switch to an AI degree, and that we will attract additional students to the new major..

Year 1	Year 2	Year 3
50	100	150

VI. **Evidence of Market Demand:** *Please provide an estimate of the future state-wide and national demand for graduates of the proposed academic program. Curricular Affairs can provide a job posting/demand report (from Lightcast) by skills obtained/CIP code of the proposed major. If job market data is unavailable or not applicable, please explain why and elaborate another justification for the proposed program.*

The World Economic Forum (https://www.weforum.org/agenda/2022/05/robots-help-humans-future-jobs) estimates that "97 million new roles will be created by 2025 as humans, machines and algorithms increasingly work together." A 2019 survey by Gartner (https://www.gartner.com/en/newsroom/press-releases/2019-01-21-gartner-survey-shows-37-percent-of-organizations-have) shows that 37% of organizations have implemented AI in some form, and that 54% of respondents view skill shortage as the biggest challenge facing their organization.

Please see a full report, attached to the end of this pre-proposal, of nationwide jobs data for CIP 11.0102 Artificial Intelligence and 11.0804 Modeling, Virtual Environments and Simulation. The data are from Burning Glass, provided by Frederick Lewis in the Office of Curricular Affairs. For students based in the U.S., the marketing report for CIP codes 11.0102 and 11.0804 list a projected average job growth over the next 5 years of 14.3%, with annual earnings of $105.1k, and with 135k annual openings.

VII. **Similar Programs Offered at Arizona Public Universities:**
We are aware of no other similar programs at other Arizona universities.

VIII. **Resources**

a. **Summarize new resources required to offer the program:** The department will need an additional academic advisor for the program. Through resources provided by the College of Science, the department is expected to grow to 30 tenure track faculty within the next few years. Currently, the department has 20 TT faculty. Additional AI faculty (to teach courses in Generative AI, Ethics, Systems for AI, etc.) will come from these resources.
b. **Estimate total expected cost:** $85,000 for the advisor.
c. **Estimate total expected revenue of the program:** We project that 50 new majors will be added to the department. The total number of majors in the proposed BS in AI program will likely be much higher (see point V above), but some students will be switching into the new program from the current Computer Science BS program. This results in a cost in year 1 of $85k (for the additional advisor) and revenue of $250k (from 1,200 SCH), yielding a net projected fiscal effect of $164k.

IX. **Required Signatures** *(the following should be included in the notification memo to campus after ABOR approval):*

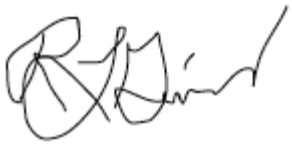
a. **Program Director/Main Proposer:**

i. **Signature: _____**
ii. **Name and Title:** Christian Collberg, Interim Head of Department, Department of Computer Science, College of Science
iii. **Date:**

b. **Managing Unit/Department Head:**

i. **Signature: _____**
ii. **Name and Title:** Christian Collberg, Interim Head of Department, Department of Computer Science, College of Science
iii. **Date:**

c. **College Dean/Associate Dean:**

i. **Signature: _____**  **_____**

ii. **Name and Title:**

iii. **Date:**

THE UNIVERSITY OF ARIZONA

ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

I. MAJOR REQUIREMENTS

UNDERGRADUATE

Total units required to complete the degree	120
Upper-division units required to complete the degree	42
Foundation courses	
Second language	2nd Semester Proficiency
Math	S-Strand
General education requirements	Entry Course (1 unit) Exploring Perspectives (4 courses, 12 units) (one course from each domain required) -Artist -Humanist -Natural Scientist -Social Scientist Building Connections (3 courses, 9 units) Exit Course (1 unit)
Pre-major? (Yes/No).	No
List any special requirements to declare or gain admission to this major (completion of specific coursework, minimum GPA, interview, application, etc.)	Complete the following coursework to move into Advanced Standing: -CSC 110 (4) Introduction to Computer Programming I -CSC 120 (4) Introduction to Computer Programming II -CSC 144 (3) Discrete Mathematics for Computer Science I -CSC 210 (4) Software Development -CSC 244 (3) Discrete Mathematics for Computer Science II -CSC 2xx (3) Introduction to Artificial Intelligence (New) -MATH 163 (3) Basic Statistics

	GPA requirements for Advanced Standing: -Cumulative UA GPA of 2.4 or higher. -GPA of 3.0 or higher in best attempts at the following 4 courses, taken at UA or elsewhere: CSC 120, CSC 210, CSC 244, CSC 2xx (Introduction to Artificial Intelligence) -GPA of 2.0 or higher in all attempts at CSC courses (excluding GRO 1st attempts) taken at UA. -At least two programming courses (from list below) completed at UA: CSC 110, 120, 210, 252, 317, 335, 337, 343, 346, 352, 372, 380.
Major requirements	
Minimum # of units required in the major (units counting towards major units and major GPA)	54
Minimum # of upper-division units required in the major (upper division units counting towards major GPA)	33
Minimum # of residency units to be completed in the major	18
Required supporting coursework (courses that do not count towards major units and major GPA, but are required for the major). Courses listed must include prefix, number, units, and title. Include any limits/restrictions needed (house number limit, etc.). Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department.	-MATH 122A(1)/B(4) Functions for Calculus and First-Semester Calculus or MATH 125 (3) Calculus I -MATH 313 (3) Intro. to Linear Algebra -MATH 163 (3) Basic Statistics
Major requirements. List all major requirements including core and electives. If applicable, list the emphasis requirements for each proposed emphasis*. Courses listed count towards major units and major GPA. Courses listed must include prefix, number, units, and title. Mark new coursework (New). Include any limits/restrictions needed (house number limit,	**Foundation (24 units)** -CSC 110 (4) Introduction to Computer Programming I -CSC 120 (4) Introduction to Computer Programming II -CSC 144 (3) Discrete Mathematics for Computer Science I -CSC 210 (4) Software Development -CSC 244 (3) Discrete Mathematics for Computer Science II -CSC 2xx (3) Introduction to Artificial Intelligence (New) -CSC 3xx (3) Ethics in Computer Science (New)

etc.). Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department.	**AI Advanced Standing Core (9 units)** -CSC 345 (3) Analysis of Discrete Structures -CSC 380 (3) Principles of Data Science -CSC 480 (3) Principles of Machine Learning **Advanced Artificial Intelligence Requirements (4 of the following; 12 units):** -CSC 477 (3) Introduction to Computer Vision -CSC 483 (3) Text Retrieval and Web Search -LING/PSY/CSC 438 (3) Computational Linguistics -LING/ISTA/CSC 439 (3) Statistical Natural Language Processing -PHIL/PSY/CSC 455 (3) Philosophy and Artificial Intelligence **Electives (at least 2 of the following; 6 units required):** **=**Any of the Advanced Artificial Intelligence Requirements =Relevant advanced non-AI CS courses (all courses listed are 3 units): -CSC 422 Introduction to Parallel and Distributed Programming -CSC 436 Software Engineering -CSC 437 Geometric Algorithms -CSC 444 Data Visualization -CSC 445 Algorithms -CSC 447 Green Computing -CSC 450 Algorithms in Bioinformatics -CSC 453 Compilers and Systems Software -CSC 460 Database Design -CSC 466 Computer Security -CSC 473 Automata, Grammars, and Languages =Approved advanced Math/Stats courses (all courses listed are 3 units): -MATH 402 Mathematical Logic -MATH 412 Linear Algebra for Data Science -MATH 443 Theory of Graphs and Networks -MATH 485 Mathematical Modeling

	=Approved Interdisciplinary AI-adjacent Courses (courses listed are 3 units unless noted otherwise) : -CGSC 344 Modeling the Mind: Computational Models of Cognition -PSY 300 Cognitive Neuroscience: A Guide to Mind and Brain -SLHS 340 Language Science -SLHS 430 Cognitive Neuroscience of Language -NRCS 308 (1 unit) Methods in Neuroscience -NSCS 321 (1 unit) Methods in Cognitive Science -ISTA 424 Virtual Reality **Senior Capstone (3 units)** -CSC 498 AI Capstone Project
Internship, practicum, applied course requirements (Yes/No). If yes, provide description.	No.
Senior thesis or senior project required (Yes/No). If yes, provide description.	Yes. Complete 3 units: -CSC 498 AI Capstone Project. Students will work on AI solutions to problems in a domain of interest. We expect many capstone projects will be in a field of Science, but Literature or History, among others, are also possible. Examples include processing massive datasets in the Astronomy domain to pinpoint the most relevant samples, building predictive models to answer questions in a specific domain (e.g., Literature, History), revealing personality and other traits from language samples and behavior, analyzing decision processes and other topics relevant to cognitive science with AI techniques, building assistive robots for the elderly and other populations, intelligent tutoring systems, and finding evidence of possible diseases in medical images among others.
Additional requirements (provide description)	None
Minor (specify if optional or required)	Optional

Any double-dipping restrictions (Yes/No)? If yes, provide description.	No

II. CURRENT COURSES

Course prefix and number (include cross-listings)	**Units**	**Title**	**Pre-requisites**	**Modes of delivery (online, in-person, hybrid)**	**Typically Offered (F, W, Sp, Su)**	**Dept signed party to proposal ? (Yes/No)**
MATH 122A	1	Functions for Calculus	PPL 75+ or SAT I MSS 660+ or ACT MATH 28+ or recent MATH 120R with C or higher, or MATH 122A.	Fully online	F, Sp, Su	No
MATH 122B	4	First-Semester Calculus	Completed MATH 122A with a grade of C or higher (not currently enrolled in MATH 122A). C or better, or concurrent enrollment in MATH 122A	Fully online, in-person	F, Sp, Su	No
MATH 125	3	Calculus I	PPL 92+ or SAT I MSS 730+ or ACT MATH 32+ or MATH 125 AP credit or UA Math 121B (UA Online) with C or higher. Test scores expire after 1 year.	Fully online, in-person	F, Sp	No
MATH 163	3	Basic Statistics	PPL 60+ or MCLG 88+ or SAT I MSS 640+ or ACT MATH	In-person	F, Sp	No

			26+ or one recent course from MATH 108, 112, 113, 116, 119A, 122B, or 125.			
MATH 313	3	Introduction to Linear Algebra	MATH 129, MATH 223, MATH 243, MATH 254, CSC 144, or CSC 245.	Fully online, in-person	F, Sp, Su	No
CSC 110	4	Introduction to Computer Programming I	PPL 60+ or SAT I MSS 640+ or ACT MATH 26+ or (C or higher in [CSC 101 or MATH 112 or MATH 108]) or one courses from MATH 113, 116, 120R, 122A, 122B, or 125.	Fully online, hybrid	F,Sp,Su	Yes
CSC 120	4	Introduction to Computer Programming II	C or higher in (CSC 110 or CSC 127A or ISTA 130 or ECE 175) or prior programming experience with Python or comparable programming language with department approval.	Fully online, hybrid	F, Sp, Su	Yes
CSC 144	3	Discrete Mathematics for Computer Science I	[C or higher in(CSC 110 or ISTA 130 or ECE 175) or prior prog. lang. experience w/dept. approval] AND [PPL 60+ or SAT I MSS 640+ or ACT MATH 26+ or(C or higher in MATH 108 or 112)or 1 from MATH 113,116,120R,122A,122B,or 125.	Fully online, in-person	F, Sp, Su	Yes
CSC 210	4	Software Development	C or higher in CSC 120.	Fully online, hybrid	F, Sp, Su	Yes

CSC 244	3	Discrete Mathematics for Computer Science II	C or better in CSC 120 and [C or better in CSC 144 or MATH 243 or MATH 323].	Fully online, in-person	F, Sp, Su	Yes
CSC 345	3	Analysis of Discrete Structures	CSC 210 and CSC 244.	In-person	F, Sp	Yes
CSC 380	3	Principles of Data Science	CSC 210 and CSC 244	In-person	F, Sp	Yes
CSC 480	3	Principles of Machine Learning	Major: COSCBA or COSCBS. Completion of CSC 380 and MATH 313.	In-person	F, Sp	Yes
CSC 477	3	Introduction to Computer Vision	CSC 252, CSC 335, CSC 345, CSC 352, and (MATH 215 or MATH 313)	In-person	F	Yes
CSC 483	3	Text Retrieval and Web Search	CSC 345	In-person	F	Yes
LING/PSY/CSC 438	3	Computational Linguistics	None enforced, Class Notes states: “Course Requisites: LING 388 or a course in one of the following: formal languages, syntax, data structures, or compilers.”	In-person	F	No
LING/ISTA/CSC 439	3	Statistical Natural Language Processing	None. Only anti-requisites listed on catalog.	In-person	F	No
PHIL/PSY/CSC 455	3	Philosophy and Artificial Intelligence	None	In-person	F, Sp	No
CSC 422	3	Introduction to Parallel and Distributed Programming	CSC 252, CSC 345, CSC 352	In-person	Sp	Yes
CSC 436	3	Software Engineering	CSC 252, CSC 335, CSC 345, and CSC 352.	In-person, Live Online	F	Yes
CSC 437	3	Geometric Algorithms	Major: COSC and CSC 345	In-person	F	Yes
CSC 444	3	Data Visualization	Major: COSC, CSC 345, and CSC 335.	In-person	Sp	Yes
CSC 445	3	Algorithms	CSC 345	In-person	F, Sp	Yes

CSC 447	3	Green Computing	Major: COSC, CSC 252 and CSC 352.	In-person	Sp	Yes
CSC 450	3	Algorithms in Bioinformatics	CSC 345	In-person	F	Yes
CSC 453	3	Compilers and Systems Software	Major: COSC, CSC 252, CSC 345, and CSC 352.	In-person	Sp	Yes
CSC 460	3	Database Design	CSC 335, and CSC 345.	In-person	F, Sp	Yes
CSC 466	3	Computer Security	CSC 252, and CSC 352.	In-person	F, Sp	Yes
CSC 473	3	Automata, Grammars, and Languages	Major: COSC and CSC 345.	In-person	Sp	Yes
MATH 402	3	Mathematical Logic	None at point of enrollment. Class Notes: "**Course Requisites: MATH 122B or MATH 125; experience with theoretical mathematical reasoning. Credit allowed for only one of these courses: MATH 402 or MATH 401A."	In-person	F (even years)	No
MATH 412	3	Linear Algebra for Data Science	MATH 313	In-person	F	No
MATH 443	3	Theory of Graphs and Networks	MATH 323 or level 09 or ((MATH 243 or CSC 245) AND (Math 215 or Math 313 or Level 08))	In-person	F (even years)	No
MATH 485	3	Mathematical Modeling	(MATH 215 or 313) and (MATH 254 or 355) and (MATH 422 or 454 or 456 or 464 or 475A).	In-person, Fully online	Sp	No
CGSC 344	3	Modeling the Mind: Computational Models of Cognition	None at point of enrollment. Class Notes: "**Course Requisites: CSC 127A or ISTA 130 or other programming course. MATH 263 or PSY 230 or ISTA 116 or other statistics course."	In-person	Sp	No

PSY 300	3	Cognitive Neuroscience: A Guide to Mind and Brain	None at point of enrollment. Class Notes: "**Course Requisites: PSY 101 or PSY 150A1."	In-person	F,Sp,Su	No
SLHS 340	3	Language Science	SLHS majors or minors. Sophomore, Junior, or Senior status only.	In-person	F, Su	No
SLHS 430	3	Cognitive Neuroscience of Language	None. Dept consent required on "Enrollment Info."	In-person	Sp	No
NROS 308	1	Methods in Neuroscience	Major: NCSBS or Minor: NRSCMINU. Prerequisite or concurrent enrollment in NROS 307.	Fully online	F	No
CGSC 321	1	Methods in Cognitive Science	NSCS major or pre-major. If pre-major, NSCS 200 must be in progress or completed.	Fully online	F	No
ISTA 424	3	Virtual Reality	ISTA 350 or CSC 210 or GAME 351 or consent of instructor.	Fully online	F,Sp	No

THE UNIVERSITY OF ARIZONA

ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

III. NEW COURSES NEEDED

Course prefix and number (include cross-listings)	Units	Title	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Status *	Anticipated first term offered	Typically Offered (F, W, Sp, Su)	Dept signed party to proposal? (Yes/No)	Faculty members available to teach the courses
CSC 2xx	3	Introduction to Artificial Intelligence	CSC120, MATH 163	in-person	D	Fall 2025	F	Yes	Kobus Barnard, Eduardo Blanco, Jason Pacheco, Ellen Riloff, Mihai Surdeanu, Xinchen Yu
CSC 3xx	3	Ethics in Computer Science	Advanced Standing in AI or CS	in-person	D	Fall 2025	F	Yes	Saumya Debray, Jason Pacheco, Mihai Surdeanu, Xinchen Yu
CSC 4xx	3	AI Capstone Project	CSC 3xx (Ethics in Computer Science) and 2 of the Advanced Artificial Intelligence Requirements	in-person	D	Spring 2026	Sp	yes	Kobus Barnard, Eduardo Blanco, Adriana Picoral, Kwang-Sung Jun, Chicheng Zhang

*In development (D); submitted for approval (S); approved (A)

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ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

IV. FACULTY INFORMATION

Faculty Member	Involvement	UA Vitae link or Box folder link
Reyan Ahmed	Teach 120, 244, 345	https://cs.arizona.edu/person/reyan-ahmed
Eric Anson	Teach 144, 210, 244, 345, 473	https://cs.arizona.edu/person/eric-anson
Kobus Barnard	Teach 477, see also new courses	https://profiles.arizona.edu/person/kobus
Eduardo Blanco	Teach 480, see also new courses	https://cs.arizona.edu/person/eduardo-blanco
Christian Collberg	Teach 466, 453, 466	https://profiles.arizona.edu/person/collberg
Saumya Debray	Teach 120, 453, see also new courses	https://profiles.arizona.edu/person/debray
Benjamin Dicken	Teach 110	https://cs.arizona.edu/person/benjamin-dicken
Alon Efrat	Teach 345, 437, 445	https://profiles.arizona.edu/person/alon
Cesim Erten	Teach 380, 445, 473	https://cs.arizona.edu/person/cesim-erten
Kwang-Sung Jun	Teach 380, 480, see also new courses	https://cs.arizona.edu/person/kwang-sung-jun
John Kececioglu	Teach 345, 445, 450	https://profiles.arizona.edu/person/kece
Stephen Kobourov	Teach 345, 445, 473	https://profiles.arizona.edu/person/kobourov
Josh Levine	Teach 437, 444	https://profiles.arizona.edu/person/josh
Russell Lewis	Teach 120, 210, 345	https://cs.arizona.edu/person/russell-lewis
Melanie Lotz	Teach 144, 244, 345	https://cs.arizona.edu/person/melanie-lotz
David Lowenthal	Teach 422	https://profiles.arizona.edu/person/dkl1
Lester McCann	Teach 144, 345, 460	https://profiles.arizona.edu/person/mccann
Rick Mercer	Teach 210, 436	https://profiles.arizona.edu/person/mercer
Janalee O-bagy	Teach 110, 120	https://cs.arizona.edu/person/janalee-obagy-0
Jason Pacheco	Teach 380, 480, see also new courses	https://cs.arizona.edu/person/jason-pacheco
Adriana Picoral	Teach 110, 444, see also new courses	https://cs.arizona.edu/person/adriana-picoral
Todd Proebsting	Teach 110, 453	https://profiles.arizona.edu/person/proebsting
Sazzadur Rahaman	Teach 466	https://cs.arizona.edu/person/sazzadur-rahaman
Ellen Riloff	Teach 483, see also new courses	https://cs.arizona.edu/person/ellen-riloff
Ravi Sethi	Teach 453	https://cs.arizona.edu/person/ravi-sethi
Mihai Surdeanu	Teach 483, see also new courses	https://cs.arizona.edu/person/mihai-surdeanu
Xinchen Yu	Teach 110, 380, see also new courses	https://cs.arizona.edu/person/xinchen-yu
Chicheng Zhang	Teach 380, 480, see also new courses	https://cs.arizona.edu/person/chicheng-zhang

V. GRADUATION PLAN

Semester 1		**Semester 2**		**Semester 3**		**Semester 4**	
Course prefix and number	**Units**	**Course prefix and number**	**Units**	**Course prefix and number**	**Units**	**Course prefix and number**	**Units**
CSC 110	4	CSC 120	4	CSC 210	4	MATH 313	3
MATH 122A	1	CSC 144	3	CSC 244	3	CSC 345	3
MATH 122B	4	MATH 163	3	CSC 2XX (Intro AI)	3	CSC 3XX (Ethics)	3
ENGL 101	3	ENGL 102	3	GE	3	Elective (UD)	3
GE	3	GE	3	GE	3	Elective	3
UNIV 101	1						
Total	16	**Total**	16	**Total**	16	**Total**	15
Semester 5		**Semester 6**		**Semester 7**		**Semester 8**	
Course prefix and number	**Units**	**Course prefix and number**	**Units**	**Course prefix and number**	**Units**	**Course prefix and number**	**Units**
CSC 380	3	CSC 480	3	Adv AI	3	CSC 498	3
AI Elective	3	Adv AI	3	Adv AI	3	AI Elective	3
GE (UD)	3	GE (UD)	3	GE	3	UNIV 301	1
Second Language	4	Second Language	4	Elective	3	Adv AI	3
Elective	3			Elective	3	Elective	3
Total	16	**Total**	13	**Total**	15	**Total**	13

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ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

VI. Curriculum Map and Assessment Map

Program: BS in Artificial Intelligence

Learning Outcome #1: Students will design, implement, and test programs that solve significant and meaningful problems, making appropriate design choices that best meet given requirements.
Concepts: Software design, correctness, problem types: classification, clustering, and generation
Competencies: Incorporating artificial intelligence solutions into larger software projects, online learning, reducing real-world problems to problems solvable with artificial intelligence techniques, assessing limitations of existing artificial intelligence techniques
Assessment Methods: coding exercises, written reports and analyses (direct), and student exit survey (indirect)
Measures: instructor grading of coding exercises, reports, homework assignments, and exams, responses to student exit survey
Learning Outcome #2: Students will design and analyze algorithms and reason about their correctness and performance.
Concepts: Runtime and storage complexity, big-O notation, program correctness
Competencies: compare algorithm types for a problem, estimate algorithm complexity, implement and compare sorting and searching algorithms, specify and choose optimal data structures for a given problem
Assessment Methods: programming assignments, analyze pseudo-code, analyze multiple algorithmic solutions to the same problem (direct), and student exit survey (indirect)
Measures: correctness against test cases, instructor grading of homework assignments and exams, responses to student exit survey
Learning Outcome #3: Students will analyze and compare algorithms that learn from data, and evaluate their performance in realistic settings.
Concepts: Statistical analysis, data interpretation, building and evaluating predictive models, domain adaptation
Competencies: estimate decision boundaries, define and apply informative evaluation metrics, conduct hypothesis testing, train and evaluate models in multiple domains
Assessment Methods: implementation of algorithms, theoretical analysis of algorithms, improvements and modifications of known algorithms, experimental design, empirical evaluation (direct), and student exit survey (indirect)
Measures: test cases against benchmarks, instructor grading of homework assignments and exams, responses to student exit survey
Learning Outcome #4: Students will employ the underlying statistical and mathematical foundations of modern artificial intelligence and machine learning algorithms to build predictive models.
Concepts: statistical mathematical foundations, linear algebra, calculus
Competencies: define and calculate conditional probabilities, test for statistical independence, perform operations on vectors and matrices, calculate the gradient for simple functions, define loss functions
Assessment Methods: exams and homework assignments, programming assignments and projects (direct), and student exit survey (indirect)
Measures: instructor grading of exams and homework assignments, responses to student exit survey

Learning Outcome #5: Students will develop algorithmic solutions using AI techniques for a domain-specific problem and assess their societal impact when deployed.
Concepts: data acquisition and preprocessing, data quality, building models with artificial intelligence techniques, evaluation, consequences of deploying artificial intelligence solutions in the real world
Competencies: collect and clean data, analyze and evaluate the data, establish baselines, build predictive models
Assessment Methods: Capstone project, homeworks and projects with real data, reports describing and justifying decisions that best match the chosen problem (direct), and student exit survey (indirect)
Measures: instructor grading of intermediate and final report, instructor grading of implementation, evaluation against benchmarks, , responses to student exit survey

Curriculum Map

	LO #1	LO #2	LO #3	LO #4	LO #5
CSC 110: Intro to Computer Programming I	I				
CSC 120: Intro to Computer Programming II	R	I			
CSC 144: Discrete Mathematics for Computer Science I		I			
CSC 210: Software Development	R	R			
CSC 244: Discrete Mathematics for Computer Science II		R			
CSC 2xx: Intro to Artificial Intelligence			I		I
CSC 3xx: Ethics in Computer Science					I / R
CSC 345: Analysis of Discrete Structures		M			
CSC 380: Principles of Data Science			R	I	R
CSC 480: Principles of Machine Learning			M	R / M	R

CSC 498: AI Capstone Project	M / A	A	A	A	M / A

I - Introduced, R - Reinforced, M - Mastered, A - Assessed

VII. PROGRAM ASSESSMENT PLAN

Assessment Measure	Source(s) of Evidence	Data Collection Point(s)
Student retention	Enrollment statistics	Start of each semester
Mid-degree survey	Student survey	At the end of the 2nd year
Job Placement Statistics	Student/Alumni Survey	At graduation and as part of alumni survey
Academic Program Review	Reviewers' responses	Every 7 years

VIII. ANTICIPATED STUDENT ENROLLMENT

5-YEAR PROJECTED ANNUAL ENROLLMENT					
	1st Year	2nd Year	3rd Year	4th Year	5th Year
Number of Students	50	100	150	200	250

Data/evidence used to determine projected enrollment numbers: The Computer Science major has had an average of 555 students in advanced standing over the last 4 years, with a substantial growth in recent years (52% more students with advanced standing since 2018). We expect the Artificial Intelligence major to be the choice of students with an interest in not only on the computational foundations of artificial intelligence, but also interdisciplinary applications.

IX. ANTICIPATED DEGREES AWARDED

PROJECTED DEGREES AWARDED ANNUALLY					
	1st Year	2nd Year	3rd Year	4th Year	5th Year
Number of Degrees	45	90	145	180	220

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ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

Data/evidence used to determine number of anticipated degrees awarded annually: The Computer Science major has had an average of 555 students in advances standing over the last 4 years. Of those, 209 graduated (40%) this past academic year. We expect a similar graduation rate for students in the Artificial Intelligence major: 40% annual graduation rate for those with advanced standing.

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COURSE USE/COLLABORATION/CONCERN FORM

Please use this form to notify other colleges that your proposed new program intends to use course(s) under their ownership; has identified potential avenues for interdisciplinary collaboration; and/or wants to hear their concerns about the creation of this program.

Note: Requesting college should provide this request to leadership in unit who owns courses. Responding unit should respond within 10 business days from receipt. Lack of response after the 10 business days is presumed approval.

FOR REQUESTING COLLEGE:

I. **Initiating College:** What college is requesting use of the course(s)? College of Science, Department of Computer Science

II. **Representative(s) making the request:** Who is representing the requesting college? Prof. and Head, Christian Collberg, Department of Computer Science

III. **Planned proposed program:** What program will the requested course be a part of? Bachelor of Science in Artificial Intelligence

IV. **Planned program start date:** Fall 2024

V. **Courses planned to be included, belonging to college / departments:**
LING 438, LING 439 -Department of Linguistics
PHIL 455 - Philosophy Department

FOR REVIEWING COLLEGE:

1. LING 438 **Yes** ✓ **No**☐ **Conditionally**☐**:** *Under what conditions?*
2. LING 439 **Yes** ✓ **No**☐ **Conditionally**☐**:** *Under what conditions?*
3. PHIL 455 **Yes** ✓ **No**☐ **Conditionally**☐**:** *Under what conditions?*

VI. **Parameters of Use (add rows as necessary):**

Undergraduate/Graduate

Course #	Units	Description of use (i.e., gen ed, major core, emphasis, elective/selective)
LING 438	**3**	**Elective option**
LING 439	**3**	**Elective option**
PHIL 455	**3**	**Elective option**

VII. **Expected Yearly Enrollment (add rows as necessary):**

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COURSE USE/COLLABORATION/CONCERN FORM

Course #	Units	Exp Enrollment for Yr 1	Exp Enrollment for Yr 2	Exp Enrollment for Yr 3
LING 438	**3**	**5**	**10**	**20**
LING 439	**3**	**5**	**10**	**20**
PHIL 455	**3**	**5**	**10**	**20**

VIII. **Opportunities for Interdisciplinary Collaboration (leave blank if none):**

IX. **Concerns about Proposed Program (leave blank if none):**

X. **Representative(s) reviewing request:** Who is representative reviewing the request? (Should be Associate Dean / Dean)

Signature:  Date: October 24, 2023

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COURSE USE/COLLABORATION/CONCERN FORM

Please use this form to notify other colleges that your proposed new program intends to use course(s) under their ownership; has identified potential avenues for interdisciplinary collaboration; and/or wants to hear their concerns about the creation of this program.

Note: Requesting college should provide this request to leadership in unit who owns courses. Responding unit should respond within 10 business days from receipt. Lack of response after the 10 business days is presumed approval.

FOR REQUESTING COLLEGE:

I. **Initiating College:** What college is requesting use of the course(s)? College of Science, Department of Computer Science

II. **Representative(s) making the request:** Who is representing the requesting college? Prof. and Head, Christian Collberg, Department of Computer Science

III. **Planned proposed program:** What program will the requested course be a part of? Bachelor of Science in Artificial Intelligence

IV. **Planned program start date:** Fall 2024

V. **Courses planned to be included, belonging to college / departments:**
ISTA 424 - iSchool

FOR REVIEWING COLLEGE:

1. ISTA 424 **Yes** ☒ **No** ☐ **Conditionally** ☐**:** *Under what conditions?*

VI. **Parameters of Use (add rows as necessary):**

Undergraduate/Graduate

Course #	Units	Description of use (i.e., gen ed, major core, emphasis, elective/selective)
ISTA 424	**3**	**Elective option**

VII. **Expected Yearly Enrollment (add rows as necessary):**

Course #	Units	Exp Enrollment for Yr 1	Exp Enrollment for Yr 2	Exp Enrollment for Yr 3
ISTA 424	**3**	**5**	**10**	**10**

VIII. **Opportunities for Interdisciplinary Collaboration (leave blank if none):**

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COURSE USE/COLLABORATION/CONCERN FORM

IX. **Concerns about Proposed Program (leave blank if none):**

X. **Representative(s) reviewing request:** Who is representative reviewing the request? (Should be Associate Dean / Dean)

Signature:  Date: 10/25/23

Dr. Diana Daly, Associate Dean, Undergraduate Academic Affairs and Student Success

University of Arizona iSchool

CATALOG YEAR	CAREER	PROGRAM	PLAN	SUBPLAN
2021	UGRD			
Requirement Line Description	**Subject**	**Catalog**	**Units**	**Type**
SEMESTER 1				
Course Title				
CSC 110 - Introduction to Computer Programming I	CSC	110		
MATH 122A/B - Calculus I	MATH	122A/122B		
ENGL 101 - English Composition I	ENGL	101		
GE Core: Exploring Perspectives or Building Connections				
UNIV 101 -Introduction to the General Education Experience (Entry Course)	UNIV	101		
SEMESTER 2				
CSC 120 - Introduction to Computer Programming II	CSC	120		
CSC 144 - Discrete Math for CS I	CSC	144		
MATH 163 - Basic Statistics	MATH	163		
ENGL 102 - English Composition II	ENGL	102		
GE Core: Exploring Perspectives or Building Connections				
SEMESTER 3				
CSC 210 - Software Development	CSC	210		
CSC 244 - Discrete Math for CS II	CSC	244		
CSC 2## - Intro to Artificial Intelligence	CSC	2##		
GE Core: Exploring Perspectives or Building Connections				
GE Core: Exploring Perspectives or Building Connections				
SEMESTER 4				
MATH 313 - Introduction to Linear Algebra	MATH	313		
CSC 345 - Analysis of Discrete Structures	CSC	345		
CSC 3XX - Ethics in Computer Science	CSC	3##		

General Elective (Upper-Division)				
General Elective				
SEMESTER 5				
CSC 380 - Principles of Data Science	CSC	380		
AI Elective				
GE Core: Exploring Perspectives or Building Connections (Upper-Division)				
1st Semester Second Language				
General Elective				
Summer SEMESTER 5				
SEMESTER 6				
CSC 480 - Principles of Machine Learning	CSC	480		
Advanced AI				
GE Core: Exploring Perspectives or Building Connections (Upper-Division)				
2nd Semester Second Language				
SEMESTER 7				
Advanced AI				
Advanced AI				
GE Core: Exploring Perspectives or Building Connections				
General Elective				
General Elective				
SEMESTER 8				
CSC 498- AI Capstone Project	CSC	498		
AI Elective				

UNIV 301 - General Education Portfolio (Exit Course)	UNIV	301		
Advanced AI				
General Elective				

STUDENT GROUP	DTSR Req
Value	general notes
	Please fill in YELLOW shaded areas ONLY!!
	Add Sub and Catalog for courses if there is only ONE option

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BUDGET PROJECTION FORM

Name of Proposed Program or Unit: BS in Artificial Intelligence, Department of Computer Science

Budget Contact Person: Alicia Cool, Department of Computer Science, Business Manager	Projected **1st Year** 2024 - 2025	**2nd Year** 2025 - 2026	**3rd Year** 2026 - 2027	
METRICS				
Net increase in annual college enrollment UG	50	100	150	
Net increase in college SCH UG	600	1,200	1,800	
Net increase in annual college enrollment Grad				
Net increase in college SCH Grad				
Number of enrollments being charged a Program Fee				
New Sponsored Activity (MTDC)				
Number of Faculty FTE	0.50	0.50	1.00	
FUNDING SOURCES				
Continuing Sources				
UG AIB Revenue	166,750	333,500	500,250	
Grad AIB Revenue				
Program Fee Revenue (net of revenue sharing)				
F and A AIB Revenues				
Reallocation from existing College funds (attach description)				
Other Items (attach description)				
Total Continuing	**$ 166,750**	**$ 333,500**	**$ 500,250**	
One-time Sources				
College fund balances				
Institutional Strategic Investment				
Gift Funding				
Other Items (attach description)				
Total One-time	**$ -**	**$ -**	**$ -**	
TOTAL SOURCES	**$ 166,750**	**$ 333,500**	**$ 500,250**	
EXPENDITURE ITEMS				
Continuing Expenditures				
Faculty	50,000	50,000	100,000	
Other Personnel	6,250	12,500	18,750	
Employee Related Expense	21,300	23,300	44,600	
Graduate Assistantships	25,000	25,000	50,000	
Other Graduate Aid - **Tuition Costs**	12,718	12,718	25,436	
Operations (materials, supplies, phones, etc.)				
Additional Space Cost				
Other Items (attach description)			25,000	GPU Cluster
Total Continuing	**$ 115,268**	**$ 123,518**	**$ 263,786**	
One-time Expenditures				
Construction or Renovation				
Start-up Equipment				
Replace Equipment				
Library Resources				
Other Items (attach description)				
Total One-time	**$ -**	**$ -**	**$ -**	
TOTAL EXPENDITURES	**$ 115,268**	**$ 123,518**	**$ 263,786**	
Net Projected Fiscal Effect	**$ 51,482**	**$ 209,982**	**$ 236,464**	

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New Academic Program
PEER COMPARISON

Select three peers (if possible/applicable) for completing the comparison chart from ABOR-approved institutions, AAU members, and/or other relevant institutions recognized in the field. The comparison programs are not required to have the same degree type and/or title as the proposed UA program. Information for the proposed UA program must be consistent throughout the proposal documents. Minors and Certificates may opt to include only 2 peer comparisons.

Program name, degree, and institution	Proposed UA Program	School of Computer Science, BS in AI, Carnegie Mellon University	Computer Science, BS in AI, Purdue University	Department of EE&CS, BS in AI & Decision Making, Massachusetts Institute of Technology
Current number of students enrolled		112	100	198
Program Description	Emerging Artificial Intelligence technologies need leaders and innovators to meet the rapidly growing needs of the 21st century. Students pursuing a Bachelor of Science in Artificial Intelligence will study methods for constructing systems that display intelligent behavior. The program will provide students with a solid	"The BSAI program gives you the in-depth knowledge you need to transform large amounts of data into actionable decisions. The program and its curriculum focus on how complex inputs — such as vision, language and huge databases — can be used to make decisions or enhance human capabilities. The curriculum includes coursework in	"Students in the AI major will master the foundations and tools for building and understanding artificial intelligence systems which reason about data, correct themselves, and make decisions. Students will explore the link between cognitive psychology, neuroscience, and AI, and the ethics of AI, which are integral to a	"This major teaches students to develop techniques for the analysis and synthesis of systems that interact with an external world via perception, communication, and action, and that learn, make decisions, and adapt in a changing environment. It integrates disciplines typically taught in different departments, including electrical

	foundation in Computer Science, and the theoretical background and practical training in Artificial Intelligence they need to build systems that transform unstructured data (such as images, video, audio, or natural language) and structured data (databases) into decisions.	computer science, math, statistics, computational modeling, machine learning and symbolic computation. Because CMU is devoted to AI for social good, you'll also take courses in ethics and social responsibility, with the option to participate in independent study projects that change the world for the better — in areas like healthcare, transportation and education."	holistic understanding of AI."	engineering, computer science, statistics, operations research and brain and cognitive sciences."
Target Careers	This degree is designed for students who seek a career in AI application development, and who want to join industry as an AI expert upon graduation. The degree is also suitable for those who want to attend graduate school with an emphasis on AI theory or applications, or	healthcare, transportation, education, epidemiology, robotics, smart technology	"The major will open pathways to new careers ranging from healthcare and sustainability to business and economics."	Students learn foundations of machine learning and decision systems & embodied intelligence systems (vision, NLP, robotics) with applications to real-world autonomous systems; life sciences; and the interface between data-driven decision-making and society.

	who want to combine AI with an interest in other fields of study.			
Emphases? (Yes/No) List, if applicable	no	no	no	no
Minimum # of units required	60	81 (approx)	62-63	64
Level of Math required (if applicable)	Calculus I, Linear Algebra, Statistics	Math Foundations of Computer Science, Integration and Approximation, Matrices and Linear Transformations, Calculus in Three Dimensions, Probability Theory for Computer Scientists, Modern Regression	Multivariate Calculus, Linear Algebra, Probability, Statistics	Mathematics for Computer Science, Linear Algebra & Optimization, Probability
Level of Second Language required (if applicable)	2nd semester proficiency (UA requirement)	n/a	n/a	n/a
Pre-Major? (Yes/No) If yes, provide requirements.	no	no	no	no
Special requirements to declare/gain admission? (i.e. pre-requisites, GPA, application, etc.)	must complete CSC 110, 120, 144, 210, 244, Stats, and the Intro to AI course	no	C or better required in courses	no

Internship, practicum, or applied/experiential requirements? If yes, describe.	We expect that many capstone projects will involve practical applications of AI, although some may focus on developing foundational AI systems software.	none	none	none

Additional questions:

1. How does the proposed program align with peer programs? Briefly summarize the similarities between the proposed program and peers, which could include curriculum, overall themes, faculty expertise, intended audience, etc.

The proposed BS in AI program is very similar to the undergraduate AI degrees offered by computer science departments at peer institutions. Specifically, the math and core computer science requirements are well aligned, and the AI specialty courses have a high degree of overlap, including Introductory AI, machine learning, natural language processing, computer vision, and ethics. Also, the proposed program and the peer programs all aim to train students for career paths that include both AI application areas (e.g., healthcare, transportation, and robotics) as well as fundamental AI technology development (e.g., machine learning and computer vision).

2. How does the proposed program stand out or differ from peer programs? Briefly summarize the differences between the proposed program and peers, which could include curriculum, overall themes, faculty expertise, intended audience, etc.

One difference is that the proposed program includes the requirement for an AI Capstone Project. In this course, students will work in small teams to build an AI system either for a specific application task or to demonstrate capabilities for a fundamental AI technology (e.g., students might build their own machine learning toolkit). This project will give students hands-on experience creating their own AI system under the guidance of computer science faculty, and it will help students integrate the knowledge that they acquired across different courses in the program.

Another difference is that the proposed program is designed to encourage and support interdisciplinary interests for students who want to become AI experts and have a strong interest in a related subject (e.g., cognitive science) or application area (e.g.,

medicine). The proposed degree program includes two elective classes that can be “AI-adjacent” interdisciplinary courses offered by other departments. In addition, the AI Capstone Project will allow for interdisciplinary projects that use AI technology to tackle problems in another discipline, or that apply insights from another discipline to AI methods or technologies.

3. How do these differences make this program more applicable to the target student population and/or a better fit for the University of Arizona?

   The University of Arizona is a very large institution with a broad array of departments and areas of study. By encouraging interdisciplinary coursework and projects, the proposed degree should appeal to a wide swath of students who have a strong interest in AI technology in relation to a specific subject that they have studied (or will study) elsewhere on campus. As stated earlier, the AI Capstone Project course is also intended to serve as a vehicle in which interdisciplinary interests can be explored and integrated with AI technology.

   Another important benefit of the AI Capstone Project is to give students hands-on experience building their own software system to tackle a specific problem using AI techniques. This project course should make UA students even more valuable to employers and improve the students’ ability to succeed in their future careers.

Management Information Systems
Eller College of Management
The University of Arizona
mis.eller.arizona.edu

THE UNIVERSITY OF ARIZONA
Eller MIS

1130 E. Helen Street #430
P.O. Box 210108
Tucson, AZ 85721-0108
520.621.2748

9/21/2023

Christian Colberg
Department Head
Computer Science

Dear Christian,

I was very happy to see that Computer Science is proposing a Bachelor of Science in Artificial Intelligence (AI). It is an exciting time in our disciplines, and I am very optimistic that this program will be well-received. This program truly leverages the research expertise in the Computer Science department and other computing disciplines on campus. I have been doing some research on AI curricula myself, and I believe that this program includes all of the relevant content one would expect from such a program.

After reviewing the curriculum, it is clear to me that even if Management Information Systems were to move in the direction of AI, we would approach it from a very different perspective. As a result, I see no current or future overlap with the degree. I strongly support the degree and wish you all the best as you move forward with it.

Sincerely,

Susan Brown
Stevie Eller Professor and Department Head of MIS
Department of Management Information Systems
Eller College of Management
The University of Arizona
520-621-2429
suebrown@arizona.edu

College of Applied Science & Technology

1140 N. Colombo Ave.
Sierra Vista, AZ 85635
Tel: 520-458-8278
Fax: 520-458-5823
azcast.arizona.edu

August 23, 2023

Christian Collberg
Interim Department Head & Professor
Department of Computer Science, College of Science
University of Arizona

Dear Christian,

The College of Applied Science and Technology (CAST), supports the Bachelor of Science in Artificial Intelligence being proposed by the Computer Science Department.

Effective Fall 2024, the CIIO Department in CAST will be offering our Cyber Operations, Applied Computing, and Intelligence and Information Operations majors, minors, and certificates on Main campus. One of our emphasis areas in the BAS in Applied Computing major is Applied Artificial Intelligence. We welcome future students in the BS degree in Artificial Intelligence to enroll in CAST courses.

We look forward to future collaborations with the Computer Science Department.

Sincerely,

Nicole Kontak

Nicole Kontak, Ph.D.
Assistant Dean, Curricular & Academic Affairs
College of Applied Science & Technology
University of Arizona

THE UNIVERSITY OF ARIZONA
RESEARCH, INNOVATION & IMPACT
Institute for Computation
& Data-Enabled Insight

September 19, 2023

Christian Collberg, PhD
Interim Department Head and Professor
Computer Science
College of Science

Dear Professor Collberg,

I am excited to hear of your plans to develop a bachelor's degree in Artificial Intelligence in the Computer Science Department at the University of Arizona. Given the recent breakthroughs in AI (after eight decades, one could argue that ChatGPT has finally passed the Turing test), this is the perfect time to create this degree program. This degree should be very attractive to students and potential employers who will need to hire people who are well versed in the technologies and ethical issues associated with AI.

As you know, AI has been a core part of the Computer Science curriculum, along with Algorithms and Systems since the inception of the discipline. However, the specific meaning of AI has varied quite a bit over time. When I was in graduate school (several decades ago), the AI portion of the CS curriculum included Linguistics and Cognitive Science. Over time, the AI emphasis shifted to Expert Systems and Agent Based Modeling. More recently, the emphasis has shifted to Deep Learning, Foundational Models, and Natural Language Processing. Looking back, I believe that the changing nature of AI was due to two things: first, the limited amount of AI material that could be integrated into a general CS degree, and second, the search for tools that could fulfill the AI promises of the 1960's, when it seemed that technologies like ChatGPT would be available by the end of the decade. Now that generative AI tools have emerged, it is apparent that an effective AI curriculum needs to include everything from Cognitive Science to Deep Learning along with ethical considerations that are uniquely associated with AI. Creating an AI degree program in Computer Science will provide students with a solid foundation while also enabling coverage of the wide range of methods that constitute modern AI.

As the Executive Director of the Institute for Computation and Data-Enabled Insight, I am committed to getting UArizona recognized as a leader in developing and using computational and data-enabled methods to gain insight; that is, getting UArizona recognized as an AI university. Having an AI degree in Computer Science is an important step in attaining this recognition. I am more than happy to offer any assistance that you may need in establishing this degree, including working with local industry and the national laboratories to support experiential learning opportunities for students and faculty exchange programs, helping to develop parts of the curriculum, and helping to find instructors for classes.

Sincerely,

Arthur (Barney) Maccabe, PhD
Executive Director
Institute for Computation & Data-Enabled Insight (ICDI)
maccabe@arizona.edu

THE UNIVERSITY OF ARIZONA
School of Information

Harvill Building
1103 E. 2nd St., Room 409
Tucson, AZ 85721
Phone: 520-621-3565
Web: ischool.arizona.edu/

September 13, 2023

Christian Collberg, Ph.D.
Interim Head of Computer Science

Dear Dr. Collberg,

I am happy to support the new proposed program, BS in Artificial Intelligence, a program that is complementary to the iSchool's programs and courses. Our leadership team here in the iSchool is in full support of your using any existing courses we offer to help round out the choices for students. We are also quite enthusiastic about working with you and are so pleased to see you launching such an exciting opportunity for students here at the University of Arizona.

Sincerely,

Catherine F. Brooks

Dr. Catherine Brooks
iSchool Interim Dean and Professor

COLLEGE OF ENGINEERING
Office of the Dean
1209 E. 2nd Street, Room 100
Tucson, AZ 85721-0072

Office: 520-621-6595
engineering.arizona.edu

THE UNIVERSITY OF ARIZONA
College of Engineering

October 25, 2023

To: Dean Carmie Garzione, College of Science

From: David W. Hahn, Craig M. Berge Dean, College of Engineering

Subject: New Degree – BS in Artificial Intelligence

The College of Engineering, including the Department of Electrical and Computer Engineering, is supportive of the College of Science's proposal to create a BS degree in Artificial Intelligence.

THE UNIVERSITY OF ARIZONA

PSYCHOLOGY DEPARTMENT
COLLEGE OF SCIENCE

1503 East University Blvd.
P.O. Box 210068
Tucson, Arizona 85721-0068

www.psychology.arizona.edu

Dear Colleague,

I'm writing in my capacity as Interim Director of the Cognitive Science Program to offer my strong support for the proposed BS program in Artificial Intelligence.

AI has played a critical role in Cognitive Science since its foundation, providing theoretical insights into the workings of the mind and providing computational tools for the analysis of data. Indeed, many past and present cognitive scientists (myself included) maintain links to the AI community attending the same conferences and publishing in the same journals. It is therefore my belief that a dedicated undergraduate degree in AI will substantially benefit Cognitive Science at the University and beyond.

Specifically I see two direct benefits to the Cognitive Science program:

- More AI-related classes that can be offered as electives in the Neuroscience and Cognitive Science (NSCS) major
- Opportunities for AI majors to take NSCS classes as electives

More generally, given the increased importance of AI in all of our daily lives, training students to handle this new technology – to understand its impressive strengths and grapple with its all too real flaws and risks – will be of huge benefit to society in the years to come.

Sincerely,

Robert Wilson, Ph.D.

Associate Professor of Psychology and Cognitive Science
Interim Director of Cognitive Science
University of Arizona

THE UNIVERSITY OF ARIZONA

COURSE USE/COLLABORATION/CONCERN FORM

Please use this form to notify other colleges that your proposed new program intends to use course(s) under their ownership; has identified potential avenues for interdisciplinary collaboration; and/or wants to hear their concerns about the creation of this program.

Note: Requesting college should provide this request to leadership in unit who owns courses. Responding unit should respond within 10 business days from receipt. Lack of response after the 10 business days is presumed approval.

FOR REQUESTING COLLEGE:

I. **Initiating College:** What college is requesting use of the course(s)? College of Science, Department of Computer Science

II. **Representative(s) making the request:** Who is representing the requesting college? Prof. and Head, Christian Collberg, Department of Computer Science

III. **Planned proposed program:** What program will the requested course be a part of? Bachelor of Science in Artificial Intelligence

IV. **Planned program start date:** Fall 2024

V. **Courses planned to be included, belonging to college / departments:**
CGSC 321, 344 - School of Mind, Brain and Behavior

MATH 122A, MATH 122B, MATH 125, MATH 163, MATH 313, 402, 412, 443, 485 - Department of Mathematics

NROS 308 - Department of Neuroscience

PSY 300 -Psychology Department

SLHS 340, 430 - Department of Speech, Language, and Hearing Sciences

FOR REVIEWING COLLEGE:

1. CGSC 321 **Yes X** **No☐** **Conditionally☐:** *Under what conditions?*
2. CGSC 344 **Yes X** **No☐** **Conditionally☐:** *Under what conditions?*
3. MATH 122A **Yes X** **No☐** **Conditionally☐:** *Math expects to offer this course regularly and expects to be able to accommodate the additional students without any difficulties. Normal prerequisites and registration priorities will apply.*
4. MATH 122B **Yes X** **No☐** **Conditionally☐:** *Same as above*
5. MATH 125 **Yes X** **No☐** **Conditionally☐:** *Same as above*
6. MATH 163 **Yes X** **No☐** **Conditionally☐:** *Same as above*

THE UNIVERSITY OF ARIZONA

COURSE USE/COLLABORATION/CONCERN FORM

7. MATH 313	**Yes X**	**No☐**	**Conditionally☐:**	*Same as above*
8. MATH 402	**Yes X**	**No☐**	**Conditionally☐:**	*Same as above*
9. MATH 412	**Yes X**	**No☐**	**Conditionally☐:**	*Same as above*
10. MATH 443	**Yes X**	**No☐**	**Conditionally☐:**	*Same as above*
11. MATH 485	**Yes X**	**No☐**	**Conditionally☐:**	*Same as above*
12. NROS 308	**Yes X**	**No☐**	**Conditionally☐:**	*Under what conditions?*
13. PSY 300	**Yes X**	**No☐**	**Conditionally☐:**	*No answer from the department head*
14. SLHS 340	**Yes X**	**No☐**	**Conditionally☐:**	*Under what conditions?*
15. SLHS 430	**Yes X**	**No X**	**Conditionally☐:**	*Not currently taught*

VI. **Parameters of Use (add rows as necessary):**

Undergraduate/Graduate

Course #	Units	Description of use (i.e., gen ed, major core, emphasis, elective/selective)
CGSC 321	1	Elective option
CGSC 344	3	Elective option
MATH 122A	1	Required for MATH 122B; supporting coursework
MATH 122B	4	Supporting coursework; foundation math strand
MATH 125	3	Alternative to MATH 122B; supporting coursework; foundation math strand
MATH 163	3	Required supporting coursework
MATH 313	3	Required supporting coursework
MATH 402	3	Elective option
MATH 412	3	Elective option
MATH 443	3	Elective option
MATH 485	3	Elective option
NROS 308	1	Elective option
PSY 300	3	Elective option
SLHS 340	3	Elective option
SLHS 430	3	Elective option

VII. **Expected Yearly Enrollment (add rows as necessary):**

Course #	Units	Exp Enrollment for Yr 1	Exp Enrollment for Yr 2	Exp Enrollment for Yr 3
CGSC 321	1	3	3	3
CGSC 344	3	5	5	5
MATH 122A	1	50	100	150
MATH 122B	4	50	100	150

MATH 125	**3**	**10**	**10**	**10**
MATH 163	**3**	**50**	**100**	**150**
MATH 313	**3**	**50**	**100**	**150**
MATH 402	**3**	**10**	**10**	**10**
MATH 412	**3**	**10**	**10**	**10**
MATH 443	**3**	**10**	**10**	**10**
MATH 485	**3**	**10**	**10**	**10**
NROS 308	**1**	**5**	**5**	**5**
PSY 300	**3**	**10**	**10**	**10**
SLHS 340	**3**	**10**	**10**	**10**
SLHS 430	**3**	**10**	**10**	**10**

VIII. **Opportunities for Interdisciplinary Collaboration (leave blank if none):**

IX. **Concerns about Proposed Program (leave blank if none):**

X. **Representative(s) reviewing request:** Who is representative reviewing the request? (Should be Associate Dean / Dean)

Rebecca Gomez
Associate Dean for Undergraduate Student Success, College of Science

Signature: _____ _____ Date: __11/3/23_____

ARIZONA BOARD OF REGENTS
ASU ◆ NAU ◆ UA

Request to Establish New Academic Program in Arizona

University: University of Arizona

Name of Proposed Academic Program: Bachelor of Science in Artificial Intelligence
Academic Department: Department of Computer Science
Geographic Site: Tucson- Main
Instructional Modality: In-person
Total Credit Hours: 120
Proposed Inception Term: Fall 2024
Brief Program Description: A short outline of the content and skills that the proposed program will deliver. A brief description of how the program fits into the institutional mission of the university. If relevant, please provide succinct information about existing related or complementary academic programming. Emerging Artificial Intelligence technologies need leaders and innovators to meet the rapidly growing needs of the 21st century. Students pursuing a Bachelor of Science in Artificial Intelligence will study methods for constructing systems that display intelligent behavior. Modern applications of AI include autonomous vehicles, fraud detection, healthcare, agriculture, personal assistants, epidemiology, gaming, industrial robots, and smart appliances. The program will provide students with a solid foundation in Computer Science, and the theoretical background and practical training in Artificial Intelligence they need to build systems that transform unstructured data (such as images, video, audio, or natural language) and structured data (databases) into decisions. This degree was designed to meet the needs of students who seek a professional career in AI application development, and who want to join industry as an AI expert upon graduation. The degree is also suitable for those who want to attend graduate school with an emphasis on AI theory or applications, or who want to combine AI with an interest in other fields of study. The BS in Artificial Intelligence degree supports the University's mission, especially in relation to the strategic plan's first two pillars: Pillar 1: The Wildcat Journey and Pillar 2: Grand Challenges. Both of these pillars emphasize the need to build a student body that is prepared to lead by leveraging the advancements of the 4th Industrial Revolution. Developments in artificial intelligence are some of the most important components of the disruptive changes that are driving the 4IR. This program will prepare students for careers in this field and give them the skills, knowledge, and mindsets to create and thrive in this rapidly changing environment.

Learning Outcomes and Assessment Plan:

Learning Outcome #1: Students will design, implement, and test programs that solve significant and meaningful problems, making appropriate design choices that best meet given requirements.
Concepts: Software design, correctness, problem types: classification, clustering, and generation
Competencies: Incorporating artificial intelligence solutions into larger software projects, online learning, reducing real-world problems to problems solvable with artificial intelligence techniques, assessing limitations of existing artificial intelligence techniques
Assessment Methods: coding exercises, written reports and analyses (direct), and student exit survey (indirect)
Measures: instructor grading of coding exercises, reports, homework assignments, and exams, responses to student exit survey
Learning Outcome #2: Students will design and analyze algorithms and reason about their correctness and performance.
Concepts: Runtime and storage complexity, big-O notation, program correctness
Competencies: compare algorithm types for a problem, estimate algorithm complexity, implement and compare sorting and searching algorithms, specify and choose optimal data structures for a given problem
Assessment Methods: programming assignments, analyze pseudo-code, analyze multiple algorithmic solutions to the same problem (direct), and student exit survey (indirect)
Measures: correctness against test cases, instructor grading of homework assignments and exams, responses to student exit survey
Learning Outcome #3: Students will analyze and compare algorithms that learn from data, and evaluate their performance in realistic settings.
Concepts: Statistical analysis, data interpretation, building and evaluating predictive models, domain adaptation
Competencies: estimate decision boundaries, define and apply informative evaluation metrics, conduct hypothesis testing, train and evaluate models in multiple domains
Assessment Methods: implementation of algorithms, theoretical analysis of algorithms, improvements and modifications of known algorithms, experimental design, empirical evaluation (direct), and student exit survey (indirect)
Measures: test cases against benchmarks, instructor grading of homework assignments and exams, responses to student exit survey
Learning Outcome #4: Students will employ the underlying statistical and mathematical foundations of modern artificial intelligence and machine learning algorithms to build predictive models.
Concepts: statistical mathematical foundations, linear algebra, calculus
Competencies: define and calculate conditional probabilities, test for statistical independence, perform operations on vectors and matrices, calculate the gradient for simple functions, define loss functions
Assessment Methods: exams and homework assignments, programming assignments and projects (direct), and student exit survey (indirect)
Measures: instructor grading of exams and homework assignments, responses to student

exit survey
Learning Outcome #5: Students will develop algorithmic solutions using AI techniques for a domain-specific problem and assess their societal impact when deployed.
Concepts: data acquisition and preprocessing, data quality, building models with artificial intelligence techniques, evaluation, consequences of deploying artificial intelligence solutions in the real world
Competencies: collect and clean data, analyze and evaluate the data, establish baselines, build predictive models
Assessment Methods: Capstone project, homeworks and projects with real data, reports describing and justifying decisions that best match the chosen problem (direct), and student exit survey (indirect)
Measures: instructor grading of intermediate and final report, instructor grading of implementation, evaluation against benchmarks, , responses to student exit survey

	LO #1	LO #2	LO #3	LO #4	LO #5
CSC 110: Intro to Computer Programming I	I				
CSC 120: Intro to Computer Programming II	R	I			
CSC 144: Discrete Mathematics for Computer Science I		I			
CSC 210: Software Development	R	R			
CSC 244: Discrete Mathematics for Computer Science II		R			
CSC 2xx: Intro to Artificial Intelligence			I		I
CSC 3xx: Ethics in Computer Science					I/R
CSC 345: Analysis of Discrete Structures		M			
CSC 380: Principles of Data Science			R	I	R
CSC 480: Principles of Machine Learning			M	R/M	R
CSC 498: AI Capstone Project	M/A	A	A	A	M/A

I - Introduced, R - Reinforced, M - Mastered, A - Assessed

Projected Enrollment for the First Three Years:

	1st year	2nd year	3rd year
Number of Students in major	50	100	150

Evidence of Market Demand:

The World Economic Forum (https://www.weforum.org/agenda/2022/05/robots-help-humans-future-jobs) estimates that "97 million new roles will be created by 2025 as humans, machines and algorithms increasingly work together." A 2019 survey by Gartner (https://www.gartner.com/en/newsroom/press-releases/2019-01-21-gartner-survey-shows-37-percent-of-organizations-have) shows that 37% of organizations have implemented AI in some form, and that 54% of respondents view skill shortage as the biggest challenge facing their organization.

We compiled reports of nationwide jobs data for CIP 11.0102 Artificial Intelligence and 11.0804 Modeling, Virtual Environments and Simulation. The data are from Burning Glass, provided by Frederick Lewis in the Office of Curricular Affairs. For students based in the U.S., the marketing report for CIP codes 11.0102 and 11.0804 list a projected average job growth over the next 5 years of 14.3%, with annual earnings of $105,100, and with 135,000 annual openings.

Similar Programs Offered at Arizona Public Universities:

The College of Applied Science & Technology (CAST) at UA offers a *Bachelor's of Applied Science (BAS) degree in Applied Computing*, which includes an Applied Artificial Intelligence Emphasis Area. The CAST degree is fundamentally different from the proposed Computer Science degree because it is very applied in nature, with some emphasis on security-related applications. The Computer Science program will offer a Bachelor's of Science (BS) degree that requires in-depth study of fundamental areas of math and computer science, including 3 required math courses, 3 computer programming courses, 2 discrete math courses, an algorithms course, a machine learning course, plus additional AI courses on advanced topics in computer science (e.g., natural language processing and computer vision).

Objection(s) Raised by Another Arizona Public University? YES NO
Has another Arizona public university lodged a written objection to the proposed program with the proposing university and the Board of Regents within seven days of receiving notice of the proposed program?

If Yes, Response to Objections:
Please provide details of how the proposing university has addressed the objection. If the objection remains unresolved, please explain why it is in the best interests of the university system and the state that the Board override it.

ARIZONA BOARD OF REGENTS
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New Resources Required? (i.e. faculty and administrative positions; infrastructure, etc.):

Existing support staff available for the proposed program include undergraduate academic advisors, coordinator of career development, and IT staff. Existing computer science faculty can cover most of the planned teaching.

As the BS in AI program progresses and grows, by the third year we estimate that we will need 1 additional faculty member, a 0.5 undergraduate academic advisor, and 2 graduate student teaching assistants. In addition, we estimate approximately $25k in costs for GPU computing infrastructure to support the AI software development for the capstone projects.

Plan to Request Program Fee/Differentiated Tuition? YES NO

Estimated Amount:

Program Fee Justification:
If planning to levy a program fee, please justify the estimated amount.

Note: The fee setting process requires additional steps, and forms need to be completed. Please work with your university and the ABOR Finance team (Leatta.McLaughlin@azregents.edu) to complete a fee request.

Specialized Accreditation? YES NO

Accreditor:
The name of the agency or entity from which accreditation will be sought