



Request for Substantial Changes to an Existing Program

Existing Program Information

- I. Name and Degree Type of Academic Program: Information Science, BS
 - a) Existing Emphases (if applicable): 1. Data Science 2. Interactive & Immersive Technology
 - b) Academic Unit(s)/College(s): College of Information Science
 - c) Current CIP Code: 11.0401

- II. Primary Contact and Email: Michael McKisson, mckisson@arizona.edu

- III. Planned start term for changes (fall only): Fall 2026

Program Changes

- IV. Describe the proposed changes to the program as well as the rationale for making the specific changes and include any relevant supporting data.

Adding a new subplan in Artificial Intelligence that uses existing InfoSci courses on the topic. AI, NLP and ML are obviously in demand and this emphasis will allow our students to highlight their expertise in the area. This is something both students and industry are requesting.
- V. Comparison Chart

UNDERGRADUATE <i>Only list modifications to requirements, if there is no change, leave blank.</i>	Existing Major Requirements	Requirements For Modified Major
Major requirements. List all major requirements including core and electives. 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 (house number limit, etc.). Provide course use form if adding courses not owned by your department. Recommend ordering requirements in the same order as your advisement report.	Common Core: 30 units ISTA 100: Great Ideas of the Information Age (3) ISTA 116: Statistical Foundations of the Information Age (3) ISTA 130: Computational Thinking and Doing (4) ISTA 131: Dealing with Data (4) ISTA 161: Ethics in a Digital World (3) ESOC 302: Quantitative Methods for the Digital Marketplace (3) Computational Arts & Media- 1 course (Choose from ART 432A, ART 437A, ESOC 300, ESOC 340, FA	

	<p>432A, FA 437A, GAME 425, GAME 451, ISTA 301, ISTA 302, ISTA 303, ISTA 329, ISTA 330, ISTA 352, ISTA 401, ISTA 403, ISTA 416, ISTA 424, LING 388)</p> <p>Society- 1 course (Choose from ESOC 313, ESOC 314, ESOC 315, ESOC 316, ESOC 317, ESOC 318, ESOC 319, ESOC 330, ESOC 418, ESOC 477, ESOC 478, ESOC 495)</p> <p>Independent Study, Directed Research, or Internship – 3 units (Choose from ESOC 480, HSD 392, HSD 492, INFO 492, INFO 493, INFO 499, ISTA 391, ISTA 392, ISTA 399, ISTA 399H, ISTA 491, ISTA 499H)</p> <p>Senior Thesis or Senior Project – 3 units (Choose from ISTA 498, ISTA 498H)</p>	
<p>Emphases. If making changes to emphases, or adding emphases for the first time, list those changes or new requirements here.</p>	<p>Data Science Emphasis – 5 courses Choose from</p> <p>ISTA 311: Foundation of Information and Inference (3) ISTA 320: Applied Data Visualization (3) ISTA 321: Data Mining & Discovery (3) ISTA 322: Data Engineering (3) ISTA 331: Principles and Practice of Data Science (3) ISTA 350: Programming for Informatics Applications (4) ISTA 355: Introduction to Natural Language Processing (3) ISTA 410: Bayesian Modeling and Inference (3) ISTA 421: Introduction to Machine Learning (3) BE/ISTA /PLS 429: Applied Cyberinfrastructure Concepts (3) ISTA 431: Data Warehousing and Analytics in the Cloud (3) ISTA 439: Statistical Natural Language Processing (3) ISTA 450: Artificial Intelligence (3)</p>	<p>Emphasis in Artificial Intelligence – 5 courses Choose from</p> <p>ISTA 321: Data Mining & Discovery (3) ISTA 355: Introduction to Natural Language Processing (3) INFO 402: Data Ethics (3) ISTA 410: Bayesian Modeling and Inference (3) ISTA 421: Introduction to Machine Learning (3) GAME 426: Game Artificial Intelligence (3) ISTA 450: Artificial Intelligence (3) ISTA 455: Applied Natural Language Processing (3) ISTA 457: Neural Networks (3) ISTA 439: Statistical Natural Language Processing (3)</p>

	<p>ISTA 453: Biodiversity Informatics (3) ISTA 455: Applied Natural Language Processing (3) ISTA 456: Text Retrieval and Web Search (3) ISTA 457: Neural Networks (3) ISTA 495: Special Topics (1-6) GEOG/GIST/RNR 417: Geographic Information Systems for Natural and Social Science (3) LIS 470: Database Management and Development (3) MATH 129: Calculus II (3) MATH 313: Introduction to Linear Algebra (3)</p> <p>Interactive & Immersive Tech Emphasis – 5 courses Choose from</p> <p>CSC 337: Web Programming (3) GAME 425: Algorithms for Games (3) GAME 451: Game Development (3) ISTA 303: Introduction to Creative Coding (3) ISTA 320: Applied Data Visualization (3) ISTA 330: Advanced Web Design (3) ISTA 350: Programming for Informatics Applications (3) ISTA 403: Creative Coding (3) ISTA 416: Introduction to Human Computer Interaction (3) ISTA 424: Virtual Reality (3) ISTA 495: Special Topics (1-6) LING/SLHS 478: Speech Technology (3)</p>	
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- VI. Emphases – if adding emphases for the first time, please complete the following.
- Total number of students that have completed the major in the past 3 years (include double majors and dual degree majors): 241
 - Total number of students currently enrolled in the program: 171 including active unenrolled students
 - Special Conditions for Admission/Declaration – explain in detail the criteria to declare the emphases, including GPA requirements, completion of courses prior to declaration, application process, interviews, etc. These conditions must be approved by faculty governance to be enforced: Successful completion of core coursework
 - Transcript – Should the emphasis name appear on the transcript? **Yes**

- e) Diploma – Should the emphasis name appear on the diploma? **Yes**
- f) Description and Learning Outcome(s) – at least one new learning outcome is required per emphasis requested. Add rows and tables as needed. Visit the [University Center for Assessment, Teaching and Technology \(UCATT\)](#) for resources and consultation. UCATT review and approval is required.

Emphasis 1:

<p>Learning Outcome #1: Students will demonstrate proficiency in designing and implementing statistical and neural-based natural language processing models for text analysis, information extraction, and automated reasoning.</p>
<p>Concepts: Syntactic parsing, semantic analysis, language modeling, Bayesian inference, transformer-based models, machine translation and sentiment analysis</p>
<p>Competencies: Develop and apply NLP techniques including syntactic parsing, part-of-speech tagging, and semantic analysis.</p> <p>Implement and optimize machine learning and Bayesian inference methods for language modeling tasks.</p> <p>Evaluate and compare different neural network architectures for NLP applications, including recurrent and transformer-based models.</p> <p>Design and develop applied NLP solutions for tasks such as machine translation, chatbot development, and sentiment analysis using modern NLP toolkits.</p>
<p>Learning Outcome #2: Students will be able to evaluate, implement, and design artificial intelligence models and algorithms for autonomous problem-solving, decision-making under uncertainty, and adaptive learning in dynamic environments.</p>
<p>Concepts: AI ethics, search algorithms, logical reasoning, reinforcement models, probabilistic inference and Bayesian modeling</p>
<p>Competencies:</p> <p>Apply foundational AI techniques, including search algorithms, knowledge representation, and logical reasoning, to solve complex problems.</p> <p>Develop and optimize machine learning models, including neural networks, Bayesian networks, and reinforcement learning agents.</p> <p>Implement AI-driven decision-making systems capable of reasoning with uncertain information using probabilistic inference and decision theory.</p> <p>Evaluate the performance and limitations of AI models in real-world applications, including robotics, game AI, and autonomous systems.</p>

Address ethical and societal challenges related to AI, including bias, fairness, and transparency in automated decision-making.

Learning Outcome #3: Students will design, implement, and evaluate machine learning models with an emphasis on model interpretability, scalability, and ethical deployment in real-world contexts.

Concepts: Supervised and unsupervised learning, deep learning, model evaluation, feature engineering, ensemble methods, model interpretability, fairness in ML

Competencies:

Select and implement appropriate supervised and unsupervised learning algorithms for classification, regression, and clustering tasks.

Engineer features and preprocess data to optimize the performance of machine learning models.

Design and train deep learning architectures such as convolutional and recurrent neural networks for structured and unstructured data.

Apply ensemble learning methods, including boosting and bagging, to improve predictive performance and model robustness.

Evaluate model performance using appropriate statistical metrics and validation techniques.

Analyze and mitigate issues of model bias and ensure fairness, transparency, and accountability in machine learning deployments.

Scale and deploy machine learning solutions.

Curriculum Map: Which courses in the emphasis connect to these learning outcomes? Use the table below to provide the information, Key: “I” = Introduced; “R”= reinforced and opportunity to practice; “M”= mastery at the senior or exit level; “A”= assessment evidence collected for program-level decision making

	ISTA 321	ISTA 355	INFO 402	ISTA 410	ISTA 421	GAME 426	ISTA 439	ISTA 450	ISTA 455	ISTA 457	ISTA 498
Learning Outcome #1: Designing and implementing statistical and neural-based natural language processing models for text analysis, information extraction, and automated reasoning.	I	I		R	R		M		M	M	A
Learning Outcome #2: Design, implement, and evaluate artificial intelligence models and algorithms for autonomous problem-solving, decision-making under uncertainty, and adaptive learning in dynamic environments.	I		I			R		M			A
Learning Outcome #3: Students will design, implement, and evaluate machine learning models with an emphasis on model interpretability, scalability, and ethical deployment in real-world contexts.	I	I			R				M	M	A

Budgetary Considerations

- VII. Faculty impact – will new faculty hires be required to deliver the new, proposed curriculum? Note: New hires will require funding directly from the college and/or department. Proposal approval does not denote approval for institutional funding. **No. Classes are existing classes and already being taught by college faculty.**
- VIII. Budgetary impact – indicate new resources needed at the department/college and institutional level to implement proposed changes. If reallocating resources, indicate where resources will be taken from and the impact this will have on students/faculty/program/unit. **No changes.**

Additional Details

- IX. Accreditation/Board Approval - Specific fields of study requiring accreditation must independently seek accreditation via professional, state and/or federal accrediting bodies and provide verification to the Office of Curricular Affairs within 6 months of internal approval (i.e. College of Nursing new programs and sub-plans must seek State Board of Nursing approval through submitting application AND submit accreditation documents through CCNE and specialty accreditation organizations.) **N/A**
- X. Transfer Student Consideration (undergrad only) – Please explain how you have planned and evaluated the changes you requested in the context of:
- Mitigating the complexity of the transfer pathway/curriculum
 - Supporting transfer student success
 - Ensuring transferability of course work from Arizona community colleges

The new emphasis is similar to our existing emphasis areas and the transfer pathway will not be impacted.

XI. Required signatures

Program Director/Main Proposer (print name and title): Michael McKisson, Director of Undergraduate Studies, College of Information Science

Program Director/Main Proposer signature:



Date: 5/22/2025

Department Head (print name and title):

Michael McKisson, Director of Undergraduate Studies, College of Information Science

Department Head's signature:



Date: 5/22/2025

Associate/Assistant Dean (print name):

Diana Daly, Associate Dean Undergraduate Academic Affairs and Student Success

Associate/Assistant Dean's signature:



Date:

5/22/25

Dean (print name):

Catherine Brooks, Interim Dean

Dean's signature:


Catherine Brooks (May 22, 2025 12:23 PDT)

Date: 05/22/2025









AI_Emphasis Substantial Change Request BS InfoSci

Final Audit Report

2025-05-22

Created:	2025-05-22
By:	Michael Mckisson (mckisson@arizona.edu)
Status:	Signed
Transaction ID:	CBJCHBCAABAATEIq3-52iqEhDOVYu-woJN2Fmvq_f4gs

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-  Document created by Michael Mckisson (mckisson@arizona.edu)
2025-05-22 - 5:30:14 PM GMT- IP address: 150.135.165.71
-  Document emailed to Diana Daly (didaly@arizona.edu) for signature
2025-05-22 - 5:31:19 PM GMT
-  Email viewed by Diana Daly (didaly@arizona.edu)
2025-05-22 - 7:02:10 PM GMT- IP address: 97.181.227.209
-  Document e-signed by Diana Daly (didaly@arizona.edu)
Signature Date: 2025-05-22 - 7:02:45 PM GMT - Time Source: server- IP address: 97.181.227.209
-  Document emailed to Catherine Brooks (cfbrooks@arizona.edu) for signature
2025-05-22 - 7:02:46 PM GMT
-  Email viewed by Catherine Brooks (cfbrooks@arizona.edu)
2025-05-22 - 7:21:07 PM GMT- IP address: 172.224.247.28
-  Document e-signed by Catherine Brooks (cfbrooks@arizona.edu)
Signature Date: 2025-05-22 - 7:23:44 PM GMT - Time Source: server- IP address: 73.24.179.2
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2025-05-22 - 7:23:44 PM GMT