

APC Document 24 (CSCI): Delete CSCI 312 and 412, replacing with new topical course, CSCI 339: Topics in AI and Machine Learning; Change prerequisite and offering pattern for CSCI 346, Computer Graphics

Effective Date: Fall 2024

1a. Delete: On page 121, the entry for **CSCI 312, Introduction to Artificial Intelligence:**

312 Introduction to Artificial Intelligence (3)

An introduction to the sub-discipline of artificial intelligence. Students will investigate and implement various models of intelligent agents interacting within defined environments. Topics include knowledge representation, problem-solving via search, reasoning via probabilistic methods, and machine learning. Prerequisite: grade of C or higher in CSCI 202; STAT 185 or 225. Odd years Fall.

1b. Delete: On page 122, the entry for **CSCI 412, Computer Vision:**

412 Computer Vision (3)

A study of inference from noisy and uncertain data using probabilistic, statistical, data-driven approaches. Topics include image processing; segmentation, grouping, and boundary detection; recognition and detection; motion estimation and structure from motion. Prerequisites: grade of C or higher in CSCI 202; STAT 185 or 225. Even years Fall.

2. Add: On page 121, new course, **CSCI 339, Topics in AI and Machine Learning:**

339 Topics in AI and Machine Learning (3)

Course designed to present a particular topic within the areas of Artificial Intelligence (AI) and Machine Learning. Topics such as Introduction to AI, Computer Vision, Natural Language Processing, and others will rotate. Course may be repeated as content varies. Prerequisites: grade of C or higher in CSCI 202; MATH 295; or permission of instructor. Fall.

Impact: CSCI 339 will replace CSCI 312: Intro to Artificial Intelligence, CSCI 412: Computer Vision, and special topics courses such as CSCI 373: Data Science and CSCI 373: Natural Language Processing, condensing them into one course number where the particular topic can change. Previously, we offered CSCI 312 odd years fall and CSCI 412 even years fall. With this new course, the department will have more flexibility to choose the topic for any particular semester based on faculty expertise/availability and/or emerging technologies in the field. This flexibility is helpful for the Computer Science faculty. However, the one potential negative impact is that students cannot reliably predict when a particular topic, such as Computer Vision, will be offered based purely on the catalog. This course will become part of the proposed Minor in Data Science.

This course will fulfill the “Data Science” requirement of the Computer Science major and is an upper-level elective for the CS minor.

The specific SLOs will vary by topic but in all versions of the course,

- students will explore a subfield of AI in depth.
- students will apply principles of probability and statistics to a particular domain.
- students will generate and/or access data and gain experience working with data.

- students will apply optimization methods to a particular domain.
- students will implement AI-related algorithms and interpret the results.
- students will consider ethical issues in AI.

The course will be structured similarly to nearly all of our upper-level courses, with expected class sizes typically capped around 22, in a 4 contact hour MWF or TR block with an integrated lecture-lab format in either a regular classroom or one of our computer lab classrooms based on instructor preference.

At present, at least 4 of our 6 full-time faculty are able to teach the course. The course will be offered every fall. (We expect Big Data Analytics (STAT/CSCI 329) or an additional section of this course will often be offered in the spring as an additional opportunity for CS students to satisfy the Data Science requirement of the major, based on demand.) Adding this course should not substantially affect our ability to deliver our curriculum or meet commitments to the LAC as it is effectively replacing two other courses with a single course number. This course is not part of the UNC Common Numbering System.

Rationale: CSCI 312 and CSCI 412 have been taught by Marietta Cameron for many years. However, she has transitioned into the Dean role. Other departmental faculty have different interests and expertise such as Natural Language Processing (NLP). Rather than create additional courses (or special topics courses) for courses such as NLP, this new course provides flexibility to offer a different rotation of AI and ML-related courses rather than adding separate courses to the curriculum. (This is similar to courses in other departments, for example, CHEM 430.) This flexibility to offer a course such as NLP or others within our regular course offering schedule rather than as an additional course is especially beneficial if enrollments decline (while also providing greater flexibility if enrollments increase).

3. Delete: On page 122, the pre-or corequisite and offering pattern for **CSCI 346, Computer Graphics:**

346 Computer Graphics (3)

The study of programming techniques for the display of two-and three-dimensional objects. Topics include affine transformations, hidden line and surface elimination, raster methods, color theory, and animation. Prerequisite: grade of C or higher in CSCI 202; pre- or corequisite: MATH 365. Even years Spring.

Add: On page 122 in place of deleted entry:

346 Computer Graphics (3)

The study of programming techniques for the display of two-and three-dimensional objects. Topics include affine transformations, hidden line and surface elimination, raster methods, color theory, and animation. Prerequisite: grade of C or higher in CSCI 202; MATH 295. See department chair.

Impact: Since CSCI 346 will no longer be offered on a regular schedule, students might not be able to take the course; however, when we do offer CSCI 346, more students should be eligible to enroll because they will have taken MATH 295 as it will be required for the major. From a faculty perspective, these changes provide more flexibility with course scheduling, but otherwise should have no impact on faculty workload or other resources.

Rationale: With the addition of CSCI 339, Topics in AI and Machine Learning, we are phasing out offering CSCI 346 on a regular rotation because the course has generally had low enrollments (the MATH 365 prerequisite might have contributed to this) and the faculty member who

regularly taught the course has transitioned to a Dean role. The new prerequisite of MATH 295 covers the necessary linear algebra prerequisite material and, since we will require MATH 295 for the computer science major, it will be easier for students to satisfy the prerequisite, as MATH 365 has more extensive prerequisites.