CEAS-14-CS-075R

REQUEST TO COLLEGE CURRICULUM COMMITTEE FOR CURRICULAR IMPROVEMENTS

DEPARTMENT: CS **PROPOSED EFFECTIVE SEMESTER:** Spring 2015 **COLLEGE:** CEAS

PROPOSED IMPROVEMENTS

Academic Program
- ☐ New degree*
- ☐ New major*
- ☐ New curriculum*
- ☐ New concentration*
- ☐ New certificate
- ☐ New minor
- ☐ Revised major
- ☐ Revised minor
- ☐ Admission requirements
- ☐ Graduation requirements
- ☐ Deletion ☐ Transfer
- ☐ Other (explain**)

Substantive Course Changes
- ☐ New course
- ☒ Pre or Co-requisites
- ☐ Deletion (required by others)
- ☐ Course #, different level
- ☐ Credit hours
- ☐ Enrollment restriction
- ☐ Course-level restriction
- ☐ Prefix ☒ Title and description (attach current & proposed)
- ☐ General education (select one) Not Applicable
- ☐ Other (explain**)

Misc. Course Changes
- ☒ Title
- ☐ Description (attach current & proposed)
- ☐ Deletion (not required by others)
- ☐ Course #, same level
- ☐ Variable credit
- ☐ Credit/no credit
- ☐ Cross-listing
- ☐ COGE reapproval
- ☒ Other (explain**)

** **Other:** A minimum grade of B in the prerequisite courses.

Title of degree, curriculum, major, minor, concentration, or certificate:

Existing course prefix and #: CS6310 **Proposed course prefix and #:** **Credit hours:**

Existing course title: Advanced Data Structures

Proposed course title: Advanced Design and Analysis of Algorithms

Existing course prerequisite & co-requisite(s): CS4310
Proposed course prerequisite(s) : CS4310 or CS 5310
If there are multiple prerequisites, connect with "and" or "or". To remove prerequisites, enter "none."
Proposed course co-requisite(s)
If there are multiple corequisites, they are always joined by "and."
Proposed course prerequisite(s) that can also be taken concurrently:
Is there a minimum grade for the prerequisites or corequisites?
A minimum grade of B in the prerequisite courses.
Major/minor or classification restrictions:
List the Banner 4 character codes and whether they should be included or excluded.
For 5000 level prerequisites & corequisites: Do these apply to: (circle one) undergraduates **graduates** both

Specifications for University Schedule of Classes:
a. Course title (maximum of 30 spaces): Adv. Design & Analysis of Algorithms
b. Multi-topic course: ☒ No ☐ Yes
c. Repeatable for credit: ☒ No ☐ Yes
d. Mandatory credit/no credit: ☒ No ☐ Yes
e. Type of class and contact hours per week (check type and indicate hours as appropriate)
1. ☒ Lecture 3 cr hrs
2. ☐ Lab or discussion
3. ☐ Lecture/lab/discussion
4. ☐ Seminar or ☐ studio
5. ☐ Independent study
6. ☐ Supervision or practicum

CIP Code (Registrar's use only):

Chair/Director _____ Date 3/26/15

Chair, College Curriculum Committee _____ Date 3/26/15

Dean _____ Date: Graduate Dean: _____ Date 3-26-15

Curriculum Manager: Return to dean ☐ Date Forward to: Date

Chair, COGE/ PEB / FS President Date

FOR PROPOSALS REQUIRING GSC/USC REVIEW:

* ☐ Approve ☐ Disapprove	Chair, GSC/USC	Date
* ☐ Approve ☐ Disapprove	Provost	Date

Revised May 2007. All previous forms are obsolete and should not be used.

1. Explain briefly and clearly the proposed improvement.

   This proposed improvement is to make the following changes to CS6310 (Advanced Data Structures): (1) change its title to Advanced Design and Analysis of Algorithms, (2) change the prerequisite from CS4310 to (CS4310 or CS5310), and (3) change the catalog description to "This course introduces students to advanced concepts for designing and analyzing algorithms. The effect of data structures on program design is investigated. The uses of data structures and algorithms in a variety of application areas are covered. Focus is on algorithmic thinking, performance guarantees and boundary cases, and efficient solutions to practical problems. Advanced topics will cover a selection of modern algorithms, many of which come from real-world applications".

   Proposed course prerequisite(s) : CS4310 or CS 5310
   A minimum grade of B in the prerequisite courses.

2. Rationale. Give your reason(s) for the proposed improvement. (If your proposal includes prerequisites, justify those, too.)

   - Title. The existing title, "Advanced Data Structures", seems to indicate that the course just focuses on data structures. But data structures can't be discussed without the algorithms or vice versa. Therefore, the current title is not reflective of the teaching of the advanced course on data structures, which covers broader topics on design and analysis of algorithms. One could also argue that the meaning/content/focus has evolved overtime so that it really is the SAME course, but the title is just reflecting what the true focus is.
   - Prerequisites. With the most recent addition of three graduate core courses, i.e. CS5310 (Algorithms), CS5410 (Computer Systems), and CS5800 (Theory of Computation), CS5310 provides sufficient background for CS6310. Therefore we list it as an option in addition to the existing prerequisite of CS4310.
   - Description. The current description, "The representation and implementation of various data structures. The effect of data structures on program complexity is investigated. The uses of data structures in a variety of application areas are covered. Introduces complex data structures", focus solely on data structures. This does not convey the broader topics of the course. The revised description gives a more detailed description of the contents of the course.

3. Effect on other colleges, departments or programs. If consultation with others is required, attach evidence of consultation and support. If objections have been raised, document the resolution. Demonstrate that the program you propose is not a duplication of an existing one.

   None.

4. Effect on your department's programs. Show how the proposed change fits with other departmental offerings.

   The perspective students will have a better understanding of what they expect to learn from the course.

5. Effects on enrolled students: Are program conflicts avoided? Will your proposal make it easier or harder for students to meet graduation requirements? Can students complete the program in a reasonable time? Show that you have considered scheduling needs and demands on students' time. If a required course will be offered during summer only, provide a rationale.

   We expect more enrollments with an additional prerequisite option. The graduate students who did not take CS4310 during their undergraduate study can take CS6310 after taking the mandatory core course CS5310.

6. Student or external market demand. What is your anticipated student audience? What evidence of student or market demand or need exists? What is the estimated enrollment? What other factors make your proposal beneficial to students?

   No change.

7. Effects on resources. Explain how your proposal would affect department and University resources, including faculty, equipment, space, technology, and library holdings. Tell how you will staff additions to the program. If more advising will be needed, how will you provide for it? How often will course(s) be offered? What will be the initial one-time costs and the ongoing base-funding costs for the proposed program? (Attach additional pages, as necessary.)

   None.

8. General education criteria. For a general education course, indicate how this course will meet the criteria for the area or proficiency. (See the General Education Policy for descriptions of each area and proficiency and the criteria. Attach additional pages as necessary. Attach a syllabus if (a) proposing a new course, (b) requesting certification for baccalaureate-level writing, or (c) requesting reapproval of an existing course.) N/A

9. List the learning outcomes for the proposed course or the revised or proposed major, minor, or concentration. These are the outcomes that the department will use for future assessments of the course or program. N/A

10. Describe how this curriculum change is a response to assessment outcomes that are part of a departmental or college assessment plan or informal assessment activities. N/A

11. (Undergraduate proposals only) Describe, in detail, how this curriculum change affects transfer articulation for Michigan community colleges. For course changes, include detail on necessary changes to transfer articulation from Michigan community college courses. For new majors or minors, describe transfer guidelines to be developed with Michigan community colleges. For revisions to majors or minors, describe necessary revisions to Michigan community college guidelines. Department chairs should seek assistance from college advising directors or from the admissions office in completing this section. N/A

Current Catalog Description

CS 6310 - Advanced Data Structures

The representation and implementation of various data structures. The effect of data structures on program complexity is investigated. The uses of data structures in a variety of application areas are covered. Introduces complex data structures.

Prerequisites/Corequisites: Prerequisite: CS 4310.

Credits: 3 hrs.

Notes: Open to Graduate Students Only.

Proposed Catalog Description

CS 6310 - Advanced Design and Analysis of Algorithms

This course introduces students to advanced concepts for designing and analyzing algorithms. The effect of data structures on program design is investigated. The uses of data structures and algorithms in a variety of application areas are covered. Focus is on algorithmic thinking, performance guarantees and boundary cases, and efficient solutions to practical problems. Advanced topics will cover a selection of modern algorithms, many of which come from real-world applications.

Prerequisites/Corequisites: Prerequisite: CS 4310 or CS 5310.

Credits: 3 hrs.

Notes: Open to Graduate Students Only.