

Clackamas Community College

Online Course/Outline Submission System

Published Requests

CS-250 Discrete Structures I

General education certified: Yes No

- Writing
 Oral Communication
 Arts and Letters
 Science & Computer Science
 Mathematics
 Social Science
 Cultural Literacy
 Health & Physical Education

 Approved Date (mm/dd/yyyy): / / **Section #1 General Course Information****Department:** Business & Computer Science: Computer Science**Submitter**

First Name: Jen

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Email: jen.miller

Course Prefix and Number: CS - 250**# Credits:** 4**Contact hours**

Lecture (# of hours): 44

Lec/lab (# of hours):

Lab (# of hours):

Total course hours: 44

For each credit, the student will be expected to spend, on average, 3 hours per week in combination of in-class and out-of-class activity.

Course Title: Discrete Structures I

Course Description:

Students will be introduced to discrete structures and techniques for computing. The course, which is the first in the two-term sequence, aims to convey the skills in discrete mathematics that are used in the study and practice of computer science. Topics include: Sets. Graphs and trees; Functions: properties, recursive definitions, solving recurrences; Relations: properties, equivalence, partial order; Proof techniques, inductive proof; Counting techniques and discrete probability.

Type of Course: Lower Division Collegiate**Reason for the new course:**

This new course is required for completion of the AS in Computer Science degree. CCC Students pursuing an AS in Computer Science currently have to take this course at PCC or PSU.

Is this class challengeable?**Yes****Can this course be repeated for credit in a degree?****No****Is general education certification being sought at this time?****No****Does this course map to any general education outcome(s)?****No****Is this course part of an AAS or related certificate of completion?****Yes****Name of degree(s) and/or certificate(s):** AS in Computer Science with PSU**Are there prerequisites to this course?****Yes****Pre-reqs:** MTH-251**Have you consulted with the appropriate chair if the pre-req is in another program?****Yes (A 'Yes' certifies you have talked with the chair and have received approval.)*****Are there corequisites to this course?****No****Are there any requirements or recommendations for students taken this course?****No****Are there similar courses existing in other programs or disciplines at CCC?****No**

Will this class use library resources?

Yes

Have you talked with a librarian regarding that impact?

No

Is there any other potential impact on another department?

No

Does this course belong on the Related Instruction list?

No

GRADING METHOD:

A-F or Pass/No Pass

Audit: Yes

When do you plan to offer this course?

✓ Winter

Is this course equivalent to another?

If yes, they must have the same description and outcomes.

No

Will this course appear in the college catalog?

Yes

Will this course appear in the schedule?

Yes

Student Learning Outcomes:

Upon successful completion of this course, students should be able to:

1. describe basic properties of sets, bags, tuples, relations, graphs, trees, and functions;
2. perform traversals of graphs and trees, construct simple functions by composition of known functions, determine whether simple functions are injective, surjective, or bijective, and classify simple functions by rate of growth;
3. describe the concepts of countable and uncountable sets and apply the diagonalization method to construct elements that are not in certain countable sets,
4. construct inductive definitions for sets, construct grammars for languages (sets of strings), and construct recursive definitions for functions and procedures;
5. determine whether a binary relation is reflexive, symmetric, or transitive and construct closures with respect to these properties;
6. construct a topological sort of a partially ordered set and determine whether a partially ordered set is well-founded,
7. use elementary counting techniques to count simple finite structures that are either ordered or unordered, count

- the worst case number of comparisons, and with discrete probability, count the average number of comparisons for simple decision trees;
8. find closed form solutions for simple recurrences using the techniques of substitution, cancellation, and generating functions;
 9. demonstrate standard proof techniques and the technique of inductive proof by writing short informal proofs about simple properties of numbers, sets, and ordered structures.

This course does not include assessable General Education outcomes.

Major Topic Outline:

1. Sets, bags, ordered structures (tuples, lists, strings, languages, relations), graphs, and trees.
2. Functions: constructions, properties, and countability.
3. Construction techniques for inductively defined sets, recursive functions and procedures, and grammars.
4. Relational structures: properties, equivalence, order, and inductive proof techniques.
5. Analysis tools: finding closed forms, counting and discrete probability, solving recurrences, comparing growth rates.

Does the content of this class relate to job skills in any of the following areas:

- | | |
|--------------------------------------|-----------|
| 1. Increased energy efficiency | No |
| 2. Produce renewable energy | No |
| 3. Prevent environmental degradation | No |
| 4. Clean up natural environment | No |
| 5. Supports green services | No |

Percent of course: 0%

Section #2 Course Transferability

Concern over students taking many courses that do not have a high transfer value has led to increasing attention to the transferability of LDC courses. The state currently requires us to certify that at least one OUS school will accept a new LDC course in transfer. Faculty should communicate with colleagues at one or more OUS schools to ascertain how the course will transfer by answering these questions.

1. Is there an equivalent lower division course at the University?
2. Will a department accept the course for its major or minor requirements?
3. Will the course be accepted as part of the University's distribution requirements?

If a course transfers as an elective only, it may still be accepted or approved as an LDC course, depending on the nature of the course, though it will likely not be eligible for Gen Ed status.

Which OUS schools will the course transfer to? (Check all that apply)

PSU (Portland State University)

Identify comparable course(s) at OUS school(s)

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How does it transfer? (Check all that apply)

required or support for major

:

First term to be offered:

Specify term: Winter 2016
