

Curriculum Action Request (CAR) Form

**COURSE** (New Course, Course Modification, Five Year Review)

University of Hawai'i Maui College

Curriculum Proposal # 2015.31  
(for CURCOM use only)

1. Curriculum Action

- New Course       Course Modification       Five Year Review

2. Proposer

Debasis and Dan Kruse

3. Department

- Allied Health       Business & Hospitality       Career & Tech Education  
 English       Humanities       Social Science  
 Science/Tech/Eng/Math

4. Course Alpha

ICS

5. Course Number

241

6. Course Title

DISCRETE MATH FOR COMP SCI II

7. If this is a course modification or a five year review, please check the curriculum items being modified.

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> 1. Course Alpha                   | <input type="checkbox"/> 2. Course Number        | <input type="checkbox"/> 3. Course Title            |
| <input type="checkbox"/> 4. Credits                        | <input type="checkbox"/> 5. Contact Hours        | <input type="checkbox"/> 6. Course Description      |
| <input type="checkbox"/> 7. Prerequisites                  | <input type="checkbox"/> 8. Corequisites         | <input type="checkbox"/> 9. Rec Prep                |
| <input type="checkbox"/> 10. Cross-list w other course     | <input type="checkbox"/> 13. Grading Method      | <input type="checkbox"/> 14. Repeatable for credit? |
| <input type="checkbox"/> 15. SLOs                          | <input type="checkbox"/> 16. Course Competencies | <input type="checkbox"/> 17. Content & Timeline     |
| <input type="checkbox"/> 18. PLOs                          | <input type="checkbox"/> 19. CASLOs              | <input type="checkbox"/> 21. Method of Delivery     |
| <input type="checkbox"/> 22. Text and Materials            | <input type="checkbox"/> 23. Maximum Enrollment  | <input type="checkbox"/> 29. Course Designation     |
| <input type="checkbox"/> 31. Catalog Modification          |  |   |
| <input type="checkbox"/> Other <u>                    </u> |  |   |

8. Proposed Semester

Fall 2015

9. Effective Semester (1 Year from Proposed Semester)

Fall 2016

**University of Hawaii Maui College**  
**ICS 241 - DISCRETE MATHEMATICS FOR COMPUTER SCIENCE II**

**1. Course Alpha.**

ICS

**2. Course Number.**

241

**3. Course Title/Catalog Title.**

DISCRETE MATHEMATICS FOR COMPUTER SCIENCE II

**4. Number of Credits.**

3

**5. Contact Hours/Type.**

- Hour lecture (3)

**6. Course Description.**

Provides instruction for program correctness, recurrence relations and their solutions, divide and conquer relations, graph theory, trees and their applications, Boolean algebra, introduction to formal languages and automata theory.

**7. Pre-Requisites.**

ICS 141 with grade C or better, or consent.

**8. Co-requisites.**

None

**9. Recommended Preparation.**

None.

**10. Is this a cross-listed course?**

NO

**11. Reason for Proposal. Why is this course being proposed or modified? This question requires specific information as part of the explanation.**

This is a new course at UHMC, as part of a required course sequence in the new ICT concentration in the existing ASNS degree. This course ICS 241 is identical to a course taught in UHCC colleges such as LCC, KapCC and HonCC. An identical course is taught at UH Manoa.

**12. Effective Semester and Year.**

Fall 2016

**13. Grading Method. What grading methods may be used for this course?**

- Standard (Letter,Cr/NCr,Audit) (0)

**14. Is this course repeatable for credit? How often can this course be counted toward a degree or certificate?**

NO

**15. Course Student Learning Outcomes (SLOs).**

Course SLO/Competency	Create plan to solve complex mathematical problems using problem solving skills and critical thinking.	Determine a plan to use complex mathematical concepts such as graphs, trees, Boolean algebra and others.	Construct a model to demonstrate concepts such as finite-state machines and program correctness.
Analyze issues and apply complex mathematical problem solving skills to find solutions in high-level decision-making situations.	<input checked="" type="checkbox"/>		
Utilize such tools as graphs, trees, Boolean algebra, and recurrence relations.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Explain discrete math concepts such as formal languages, finite-state machines, and program correctness.	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

Course SLO/PSLO	Explain the natural and technological world using reflection and quantitative analysis including preparation of a plan to collect, process, and interpret data; evaluation of the plan, procedures, and findings; and communication of the conclusions.	Explain scientific knowledge and understanding to different audiences for a range of purposes.	Apply scientific knowledge, skills, and understanding s to problems and issues in daily life.
Analyze issues and apply complex mathematical problem solving skills to find solutions in high-level decision-making situations.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Utilize such tools as graphs, trees, Boolean algebra, and recurrence relations.	<input checked="" type="checkbox"/>		
Explain discrete math concepts such as formal languages, finite-state machines, and program correctness.	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

**16. Course Competencies.**

Competency
Create plan to solve complex mathematical problems using problem solving skills and critical thinking.
Determine a plan to use complex mathematical concepts such as graphs, trees, Boolean algebra and others.
Construct a model to demonstrate concepts such as finite-state machines and program correctness.

**17. Recommended Course Content and Timeline. The course content facilitates the course competencies. Course content may be organized by weeks, units, topics or the like.**

**Concepts**

1. Graphs and Trees. - Week 1 and 2
2. Boolean algebra. - Week 3 and 4
3. Exam 1 - Week 5

4. Finite-state machines. - Week 6 and 7
5. Formal languages. - Week 8 and 9
6. Exam 2 - Week 10
7. Program correctness. - Week 11 and 12
8. Solving recurrence relations. - Week 13, 14 and 15
9. Final Exam - Week 16

Curriculum guidelines covering the breadth, depth and relevancy of the two semester discrete mathematics course are endorsed by the Association for Computing Machinery with the input of hundreds of computer science faculty around the world. The title, catalog description SLOs and course content of the discrete mathematics courses are articulated in an agreement dated 11/22/05. Discussions were held at that time to ensure the course sequence is taught to ACM guidelines.

### 18. Program Learning Outcomes.

Program SLO
Explain the natural and technological world using reflection and quantitative analysis including preparation of a plan to collect, process, and interpret data; evaluation of the plan, procedures, and findings; and communication of the conclusions.
Explain scientific knowledge and understanding to different audiences for a range of purposes.
Apply scientific knowledge, skills, and understandings to problems and issues in daily life.

### 19. College-wide Academic Student Learning Outcomes (CASLOs).

	<b>Creativity</b> - Able to express originality through a variety of forms.
<input checked="" type="checkbox"/>	<b>Critical Thinking</b> - Apply critical thinking skills to effectively address the challenges and solve problems. <input checked="" type="checkbox"/> Level 2
<input checked="" type="checkbox"/>	<b>Information Retrieval and Technology</b> - Access, evaluate, and utilize information effectively, ethically, and responsibly. <input checked="" type="checkbox"/> Level 2
	<b>Oral Communication</b> - Practice ethical and responsible oral communications appropriately to a variety of audiences and purposes.
<input checked="" type="checkbox"/>	<b>Quantitative Reasoning</b> - Synthesize and articulate information using appropriate mathematical methods to solve problems of quantitative reasoning accurately and appropriately. <input checked="" type="checkbox"/> Level 2
	<b>Written Communication</b> - Write effectively to convey ideas that meet the needs of specific audiences and purposes.

### 20. Linking.

### 21. Method(s) of delivery appropriate for this course.

- Cable TV (0)
- Classroom/Lab (0)
- HITS/Interactive TV (0)
- Hybrid (0)
- Online (0)

**22. Text and Materials, Reference Materials, and Auxiliary Materials.**

Discrete Mathematics with Applications 4th Edition by Susanna S. Epp

ISBN13: 9780495391326

ISBN10: 0495391328

**23. Maximum enrollment.**

35

**24. Particular room type requirement. Is this course restricted to particular room type?**

YES

Computer Classroom Required

**25. Special scheduling considerations. Are there special scheduling considerations for this course?**

NO

**26. Are special or additional resources needed for this course?**

No

**27. Does this course require special fees to be paid for by students?**

NO

**28. Does this course change the number of required credit hours in a degree or certificate?**

No.

**29. Course designation(s) for the Liberal Arts A.A. degree and/or for the college's other associate degrees.**

Degree	Program	Category
Associate in Arts:	Liberal Arts	LE - Elective
AS:	ECET - All	PE - Program Elective
AAS:	Bus. Tech. - Information Processing	PE - Program Elective
BAS:	BAS - All	PE - Specialization/Program Electives
Developmental/Remedial:	N/A	

**30. Course designation(s) for other colleges in the UH system.**

Yes. This course has been articulated with UH Manoa since 1975 and with UH Hilo since 11/22/05. The changes made are to comply with an October 2014 system-wide ICS/CS Articulation Agreement. Link to agreement - <http://www.hawaii.edu/offices/aa/aapp/articulation/ICS-Oct2014.pdf>

**31. Indicate the year and page # of UHMC catalog referred to. For new or modified courses, please indicate the catalog pages that need to be modified and provide a sheet outlining those changes.**

UHMC General Catalog 2015-2016. Modifications needed for the following:

Pages 10, 23, and 26 need to insert courses in ASNS ICT Concentration

**32. College-wide Academic Student Learner Outcomes (CASLOs).**

<b>Standard 1 - Written Communication</b>	
Write effectively to convey ideas that meet the needs of specific audiences and purposes.	
Outcome 1.1 - Use writing to discover and articulate ideas.	1
Outcome 1.2 - Identify and analyze the audience and purpose for any intended communication.	1
Outcome 1.3 - Choose language, style, and organization appropriate to particular purposes and audiences.	1
Outcome 1.4 - Gather information and document sources appropriately.	1
Outcome 1.5 - Express a main idea as a thesis, hypothesis, or other appropriate statement.	1
Outcome 1.6 - Develop a main idea clearly and concisely with appropriate content.	1
Outcome 1.7 - Demonstrate a mastery of the conventions of writing, including grammar, spelling, and mechanics.	1
Outcome 1.8 - Demonstrate proficiency in revision and editing.	1
Outcome 1.9 - Develop a personal voice in written communication.	1
<b>Standard 2 - Quantitative Reasoning</b>	
Synthesize and articulate information using appropriate mathematical methods to solve problems of quantitative reasoning accurately and appropriately.	
Outcome 2.1 - Apply numeric, graphic, and symbolic skills and other forms of quantitative reasoning accurately and appropriately.	3
Outcome 2.2 - Demonstrate mastery of mathematical concepts, skills, and applications, using technology when appropriate.	3
Outcome 2.3 - Communicate clearly and concisely the methods and results of quantitative problem solving.	3
Outcome 2.4 - Formulate and test hypotheses using numerical experimentation.	3
Outcome 2.5 - Define quantitative issues and problems, gather relevant information, analyze that information, and present results.	3
Outcome 2.6 - Assess the validity of statistical conclusions.	3
<b>Standard 3 - Information Retrieval and Technology</b>	
Access, evaluate, and utilize information effectively, ethically, and responsibly.	
Outcome 3.1 - Use print and electronic information technology ethically and responsibly.	2
Outcome 3.2 - Demonstrate knowledge of basic vocabulary, concepts, and operations of information retrieval and technology.	2
Outcome 3.3 - Recognize, identify, and define an information need.	2
Outcome 3.4 - Access and retrieve information through print and electronic media, evaluating the accuracy and authenticity of that information.	2
Outcome 3.5 - Create, manage, organize, and communicate information through electronic media.	2
Outcome 3.6 - Recognize changing technologies and make informed choices about their appropriateness and use.	2
<b>Standard 4 - Oral Communication</b>	
Practice ethical and responsible oral communications appropriately to a variety of audiences and purposes.	
Outcome 4.1 - Identify and analyze the audience and purpose of any intended communication.	1
Outcome 4.2 - Gather, evaluate, select, and organize information for the communication.	1
Outcome 4.3 - Use language, techniques, and strategies appropriate to the audience and occasion.	1
Outcome 4.4 - Speak clearly and confidently, using the voice, volume, tone, and articulation appropriate to the audience and occasion.	1
Outcome 4.5 - Summarize, analyze, and evaluate oral communications and ask coherent questions as needed.	1
Outcome 4.6 - Use competent oral expression to initiate and sustain discussions.	1
<b>Standard 5 - Critical Thinking</b>	
Apply critical thinking skills to effectively address the challenges and solve problems.	
Outcome 5.1 - Identify and state problems, issues, arguments, and questions contained in a body of information.	2
Outcome 5.2 - Identify and analyze assumptions and underlying points of view relating to an issue or problem.	2
Outcome 5.3 - Formulate research questions that require descriptive and explanatory analyses.	2

Outcome 5.4 - Recognize and understand multiple modes of inquiry, including investigative methods based on observation and analysis.	2
Outcome 5.5 - Evaluate a problem, distinguishing between relevant and irrelevant facts, opinions, assumptions, issues, values, and biases through the use of appropriate evidence.	2
Outcome 5.6 - Apply problem-solving techniques and skills, including the rules of logic and logical sequence.	2
Outcome 5.7 - Synthesize information from various sources, drawing appropriate conclusions.	2
Outcome 5.8 - Communicate clearly and concisely the methods and results of logical reasoning.	2
Outcome 5.9 - Reflect upon and evaluate their thought processes, value system, and world views in comparison to those of others.	2
Standard 6 - Creativity Able to express originality through a variety of forms.	
Outcome 6.1: Generate responses to problems and challenges through intuition and non-linear thinking.	1
Outcome 6.2: Explore diverse approaches to solving a problem or addressing a challenge.	1
Outcome 6.3: Sustain engagement in activities without a preconceived purpose.	1
Outcome 6.4: Apply creative principles to discover and express new ideas.	1
Outcome 6.5: Demonstrate the ability to trust and follow one's instincts in the absence of external direction	1
Outcome 6.6: Build upon or adapt the ideas of others to create novel expressions or new solutions.	1

### 33. Additional Information