1. **Type of Action**
   - ☒ A. Addition  ☐ Regular or ☐ Experimental or ☐ Other  (click and type to specify)
   - ☐ B. Deletion
   - ☐ C. Modification:  ☐ in credits  ☐ in title  ☐ in number or alpha  ☐ in prerequisites or co-requisites  ☐ Other  (click to specify)

2. **New Alpha, Number and Title**  
   - ICS 141 Discrete Mathematics for Computer Science

3. **Credits** 3 credits

4. **Old Alpha, Number and Title**

5. **Credits** *

6. **New Catalog Description**
   
   This course covers logic, sets, functions, matrices, algorithmic concepts, mathematical reasoning, recursion, counting techniques, and probability theory.

7. **Select box and type specific information in text box.**
   - ☒ Prerequisites
   - ☐ Corequisites or
   - ☐ Recommended Preparation
   - Grade of "C" or better in Math 103, placement into Math 135 or higher, satisfactory placement test score, or consent of instructor

8. **Student Contact Hours Per Week**
   - Lecture 3
   - Lecture/Lab
   - Lab
   - Other (click to specify)

9. **Proposed Date of First Offering**
   - Semester Spring
   - Year 2009

10. **This course ☒ is proposed for the Liberal Arts Program. ☐ can fulfill AA Elective* If Other, specify**

11. **This course Makes No Difference in the number of credits required for the program/core.**

12. **Equivalent or similar courses offered in the UH System:**

<table>
<thead>
<tr>
<th>Campus</th>
<th>Alpha, Number, Title</th>
<th>Campus</th>
<th>Alpha, Number, Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>UH Manoa</td>
<td>ICS 141 Discrete Mathematics for Computer Science I</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>UH Hilo</td>
<td>CS 141 Discrete Mathematics for Computer Science I</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>LeewardCC</td>
<td>ICS 141 Discrete Mathematics for Computer Science I</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>KapiolaniCC</td>
<td>ICS 141 Discrete Mathematics for Computer Science I</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>HonoluluCC</td>
<td>ICS 141 Discrete Mathematics for Computer Science I</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

13. **This course is (check one and click in appropriate textbox and provide details):**
   - ☒ Already articulated with
     - Provide details of existing or desired articulation (date, college(s), purposes, pre-major, etc.) in this space:
   - ☐ Not yet appropriate for Articulation.

14. **Reason for Initiating, Modifying or Deleting Courses or Other Pertinent Comment:**
   - 1. ICS 141 is an appropriate course to follow the ICS 111 offering at WCC. Several students enrolled in ICS 111 are interested in this course and state that it is often filled at UH.
   - 2. WCC's Strategic Plan's Objective 7D is to support and expand high quality technical, occupational and professional business/technology course offerings based on community needs to enable students to earn a living wage. Programming is a high demand and high paying occupation. ICS 141 is a beginning course for programming majors.
   - 3. ICS 141 will fulfill the technology component for STEM courses and thus promotes WCC' goal to offer more STEM courses.
   - 4. The ICS offering also allows students at WCC to complete courses for the Computer Science programs at UH, UH Hilo and LCC.

**Requested by: [Signature] Date: 10/10/2008**

**Approved by: [Signature] Date: 10/14/08**

**Faculty Senate Chairperson [Signature] Date: 10/21/08**

CCC#6100 (Amended for WCC use October 2002)
Levels of Review of Course Proposal at Windward Community College

Course Alpha, Number, and Title: ICS 141 Discrete Mathematics for Computer Science I

Signatures

1. Department Area (more than one departmental instructor’s signature required)
   
   [Signatures]

2. Department
   
   Department Chairperson

   [Signatures]

   Was this course discussed in a department meeting? ☐ Yes ☒ No

   Due to deadline for offering course, the addition was discussed via email and a discussion with Jean Okumura, Peggy Regentine, & Dave Maxson.

3. Division
   
   [Signatures]

4. Curriculum Committee Review

   Approved ☒

   Disapproved ☐

   Reason:

   [Signatures]

   Curriculum Committee Chairperson
University of Hawaii Community Colleges
Proposal to Initiate, Modify or Delete a Course
New Course Proposal Form – Go to next page for Course Modification)

WCC Form for New Course Proposals
(This sheet was originally pink.)

1. How is this course related to the education needs and goals of the College/Department/Community as reflected in the EDP/ADP?
   1. ICS 141 is an appropriate course to follow the ICS 111 offering at WCC. Several students enrolled in ICS 111 are interested in this course and state that it is often filled at UH.
   2. WCC's Strategic Plan's Objective 7D is "to support and expand high quality technical, occupational and professional business/technology course offerings based on community needs to enable students to earn a living wage." Programming is a high demand and high paying occupation. ICS 141 is a beginning course for programming majors.
   3. ICS 141 will fulfill the technology component for STEM courses and thus promotes WCC goal to offer more STEM courses.
   4. The ICS offering also allows students at WCC to complete courses for the Computer Science programs at UH, UH Hilo and LCC.

2. Provide details of any additional staff, equipment, facilities, library/media material, faculty preparation and other financial support that would be required to implement this course. (Include an estimate of the actual cost of supplies and equipment.) What has been done to provide for these additional costs for the proposed date of offering? Who will teach the course?

   There are existing full-time faculty who are qualified to teach the class in the Math Business Department. If their teaching load does not permit, there are lecturers available.

3. Is a similar course taught elsewhere in the UH system? Yes If yes, provide details of how this course differs from existing similar courses.

   No differences. This course follows a master plan that was developed for the entire ICS curriculum in the UH system. It was reviewed and previously approved by the ICS statewide PCC.

4. Is this course experimental and/or unique to Windward Community College? No If yes, provide rationale and details of its impact on the College Curriculum

5. Is a similar course taught in the upper division level by a 4-year UH college? No If yes, explain why this course is appropriate at the lower division or how it differs from its upper division counterpart. This course is offered at UH and UH Hilo during the first two years.

6. Please attach a complete course outline. Your course outline should address all the items listed in the Guidelines for Course Outlines.

7. If this course is numbered 100 or above or appropriate for transfer to a 4-year college, complete and attach WCC Form for Transfer Courses (blue). See criteria for transfer courses.
University of Hawaii Community Colleges
Proposal to Initiate, Modify or Delete a Course
Articulation with 4-year UH Campus Form

WCC Form for Transfer Courses
(To be completed for articulation with any 4-year UH campus)
(This sheet was originally blue.)

Course Alpha and Number ICS 141 Discrete Mathematics for Computer Science I

Submitted by Peggy Regentine

Date October 10, 2008

1. List the counterpart to this course on any 4-year UH campus. Describe the relationship between the course any related baccalaureate program area.

   This course is offered at UH and UH Hilo during the first two years.

2. Is this course taught or accepted by major accredited colleges or universities? Give one or two examples.

   Yes. UH and UH Hilo.

3. Please attach a complete course outline if you have not done so already. Your course outline should address all the items listed in the Guidelines for Course Outlines.
COURSE ARTICULATION FORM (GENERAL EDUCATION CORE)

ORIGINATING CAMPUS: Windward Community College DATE SUBMITTED: October 10, 2008

COURSE ALPHA & NUMBER: SEMESTER CREDITS: *

COURSE TITLE:

DATE OF OUTLINE: October 10, 2008

(* * Representative outline, no multiple syllabi, please.)

1. Articulation committee to review this course:

   Standing Committees
   Written Communication □
   Mathematical & Logical Thinking □
   World Civilizations □
   Languages □
   Arts & Humanities □
   Natural Science □
   Social Science □

2. The information in this item is required by the reviewing committee so that it has a starting point for reviewing the course. It is the responsibility of the submitting campus to do the necessary research to provide this information.

In the opinion of the originating campus, this course is equivalent to the following and/or meets the criteria for the indicated core categories. Every core category space, except your own campus, must be filled in (can include ‘none’). An equivalent course, if known, may be helpful to committee members but is not required.

<table>
<thead>
<tr>
<th>Receiving Campus</th>
<th>Equivalent Course (Alpha and Number)</th>
<th>Core Category</th>
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</thead>
<tbody>
<tr>
<td>UH Hilo</td>
<td></td>
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<tr>
<td>UH Manoa</td>
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<tr>
<td>UH West Oahu</td>
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<td>Hawaii CC</td>
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<td>Leeward CC</td>
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<td>Maui CC</td>
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<tr>
<td>Windward CC</td>
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</tbody>
</table>

3. If submitted electronically, I understand that this outline will be posted to a publicly accessible website to enable open access for reviewing committees and campuses. The outline will be taken off the site upon completion of the review.

Typed Name or Signature

Note: If possible submit coversheet and course outline electronically as e-mail attachments (preferably in ‘pdf’ format). If submitting in printed form, 20 copies of coversheet and course outline are required for distribution for appropriate review.

Note: UCA Clearinghouse
John Muth, Office of the Chancellor for Community Colleges, is acting as staff to the University Council on Articulation and is responsible for tracking all courses submitted for articulation.

Revised 1/29/2001
University of Hawaii Community Colleges
Proposal to Initiate, Modify or Delete a Course
Articulation with 4-year UH Campus Form

ARTICULATED COURSE
CHANGE IN ALPHA/NUMBER/TITLE

Old Course

Course Alpha & Number:
Title:

________________________

Revised Course

Course Alpha & Number:
Title:
Semester and Year when the revised course was/will be first offered:

Reason for the change in Alpha/Number/and/or Title:

________________________

Note: A current outline of the course must be submitted with this form. Undated outlines are not acceptable.

I certify that this course has had its alpha, number, and/or title changed, but that it is substantially the same course as the course that was reviewed and approved for articulation.

Campus: Windward Community College
Certifying Authority (Typed Name or Signature and Title)
Date:

SUBMIT TO: UCA Clearinghouse, Attn: John Muth
Chancellor's Office for CC, 2327 Dole Street

Revised 1/19/01
ICS 141 Discrete Mathematics for Computer Science I
3 credits

INSTRUCTOR: TBA
OFFICE: TBA
OFFICE HOURS: TBA
TELEPHONE: TBA
EFFECTIVE DATE: Spring 2009

WINDWARD COMMUNITY COLLEGE MISSION STATEMENT

Windward Community College is committed to excellence in the liberal arts and career development; we support and challenge individuals to develop skills, fulfill their potential, enrich their lives, and become contributing, culturally aware members of our community.

CATALOG DESCRIPTION

This course covers logic, sets, functions, matrices, algorithmic concepts, mathematical reasoning, recursion, counting techniques, and probability theory.

PREREQUISITES

Grade of “C” or better in Math 103, placement into Math 135 or higher, satisfactory placement test score, or consent of instructor.

REQUIRED TEXTBOOK


STUDENT LEARNING OUTCOMES

Upon completion of ICS 141, the student should be able to:

Analyze issues and apply mathematical problem solving skills to plan courses of action in decision-making situations, using:
1. Basic mathematical formal logic.
2. Proofs.
3. Recursion.
4. Analysis of algorithms.
5. Sets.
7. Relations.
8. Functions.
ICS 141 includes many of the major topics of mathematics and computer science theory. This includes logic, sets, functions, matrices, mathematical reasoning and counting techniques.

Students will:
- master precision in working with formal systems
- understand the concept of proof as a chain of inferences
- apply formal rules or algorithms to problem solving
- use appropriate symbolic techniques in the context of problem solving, and in the presentation and critical evaluation of evidence.
- master developing a rigorous argument to support a concept.

ASSESSMENT TASKS AND GRADING

Grading Policy:
All grades will be based upon coursework, problem solving, quizzes and two exams. In addition, each student is expected to participate in the online discussions. There will be 40 assignments worth 30 points each. There will be 6 quizzes worth 50 points each. There will be 2 exams worth 200 points each. Participation in discussions will be worth 100 points.

Final Grades will be based upon:

A 100-90%  2000 - 1800 points
B 89.9-80%  1790 - 1600 points
C 79.9-70%  1590 - 1400 points
D 69.9-60%  1390 - 1200 points
F 59.9 - 0%  1190 - 0 points

Student Contributions:
Students are expected to spend at least 6 hours per week on this course. Active participation in class activities and discussions are vital for success in this course.

Additional information will vary depending on the instructor teaching the course.

DISABILITIES ACCOMMODATION STATEMENT

If you have a physical, sensory, health, cognitive, or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Disability Specialist Counselor to discuss reasonable accommodations that will help you succeed in this class. Ann Lemke can be reached at 235-7448, lemke@hawaii.edu, or you may stop by Hale ‘Akoakoa 213 for more information.
COURSE SYLLABUS
(Subject to Revision)

Topic/Homework

Week 1
Sec. 1.1: Propositional Logic
Sec. 1.2: Propositional Equivalences
Sec. 1.3: Predicates & Quantifiers

Week 2
Sec. 1.4: Nested Quantifiers
Sec. 1.5: Rules of Inferences
Sec. 1.6: Introduction to Proofs

Week 3
Sec. 1.7: Proof Methods and Strategy
Quiz One
Sec. 2.1: Sets
Sec. 2.2: Set Operations

Week 4
Sec. 2.3: Functions
Sec. 2.4: Sequences and Summations
Quiz Two
Sec. 3-1: Algorithms

Week 5
Sec. 3.2: The Growth of Functions
Sec. 3.3: Complexity of Algorithms
Sec. 3.4: The Integers and Division

Week 6
Sec. 3.5: Primes and Greatest Common Divisors
Sec. 3.6: Integers and Algorithms
Sec. 3.7: Applications of Number Theory
Quiz Three

Week 7
Exam One
Sec. 3.8: Matrices

Week 8
Sec. 4.1: Mathematical Induction
Sec. 4.2: Strong Induction and Well-Ordering
Quiz Four
Week 9
Sec. 4.3: Recursive Definitions
Sec. 4.4: Recursive Algorithms
Sec. 4.5: Program Correctness

Week 10
Sec. 5.1: The Basics of Counting
Sec. 5.2: The Pigeonhole Principle
Sec. 5.3: Permutations & Combinations

Week 11
Sec. 5.4: Binomial Coefficients
Quiz Five
Sec 6.1: Introduction to Discrete Probability
Sec. 6.2: Probability Theory

Week 12
Sec. 6.3: Bayes Theorem
Sec. 6.4: Expected Value & Variance
Sec. 7.1: Recurrence Relations

Week 13
Sec. 7.2: Solving Linear Recurrence Relations
Sec. 7.3: Divide-and-Conquer Algorithms and Recurrence Relations

Week 14
Sec. 7.4: Generating Functions
Sec. 7.5: Inclusion-Exclusion

Week 15
Sec. 7.6: Applications of Inclusion-Exclusion
Quiz 6

Final Exam