

IRAO OFFICE USE ONLY	
Received	3/21/17
In Banner	
MTVCOMP/Codeset	
Master Curriculum	
CIP Code	
Program Code	
Program Description	

University of Hawai'i
Code Request Form for Academic Programs for

Reset Form

NEW OR MODIFY PROGRAM CODE



New Program Code



Modify Program Code

Date: FEB 27 2017

REQUESTOR CONTACT INFORMATION

Name Charles Sasaki Campus Windward CC
 Title Dean, Division II Email cokimi@hawaii.edu (secretary Carol Okimi)
 Office/Dept Academic Affairs Phone 235-7463 (secretary Carol Okimi)

NEW PROGRAM CODE TO CREATE

Institution WIN - Windward CC Campus WIN - Windward CC
 Level UG - Undergraduate Effective Term Fall 2017

	Code (Max. Characters)	Description	Check if requesting new code:
College	(2) <u>IN</u>	<u>Instructional</u>	<input type="checkbox"/> See Banner form STV_COLL
Department	(4) <u>NATS</u> ✓	<u>Natural Sciences</u>	<input type="checkbox"/> See Banner form STV_DEPT
Degree/Certificate	(6) <u>AS</u>	<u>Associate in Science</u>	<input type="checkbox"/> See Banner form STV_DEGC
Major	(4) <u>NSCI</u>	<u>Natural Science</u>	<input type="checkbox"/> See Banner form STV_MAJR
Concentration	(4) <u>IGS ICT</u> sh	<u>Info & Communication Sci Tech</u> sh	<input type="checkbox"/> See Banner form STV_MAJR
Minor	(4) _____	_____	<input type="checkbox"/> See Banner form STV_MAJR

If a similar major/concentration code exists in Banner, please list the code: _____

Justification to warrant a new major/concentration code similar to an existing major/concentration code: _____

Is this major/concentration code being used the same way at the other UH campuses? Yes No

Should this program be available for applicants to select as their planned course of study on the online application? *If yes, student may select the code as their only program of study.* Yes No

RULES PERTAINING TO FINANCIAL AID AND 150% DIRECT SUBSIDIZED LOAN LIMIT LEGISLATION

Is 50% or greater of the classes in this program offered at a location other than the Home Campus? Yes No

Is this program/major/certificate financial aid eligible? Yes No

Does this certificate qualify as a Gainful Employment Program (Title IV-eligible certificate program)? Yes No

See <http://www.ifap.ed.gov/GainfulEmploymentInfo.index.html>

Program Length

In academic years; decimals are acceptable. The length of the program should match what is published by the campus in any online and/or written publication.

2 years

Special Program Designations

See Special Program Designations Code Definitions on IRAO Program Code Request webpage

A B N P T U

Required Terms of Enrollment: Fall Spring Summer Extended

ADDITIONAL COMMENTS

ATTACHMENTS

BOR Approved: Associate, Bachelor and Graduate Degrees, and sole credential certificates

- BOR Meeting Minutes & Supporting Documents Curriculum

Chancellor Approved: Certificates related to authorized BOR program & Associate in Technical Studies (ATS) Degree

- Memo from Chancellor to notify VPAA about new program Curriculum

For new certificates approved by the Chancellor, the related BOR authorized academic program is:

VERIFICATIONS

By signing below, I verify that I have reviewed and confirm the above information that is pertinent to my position.

Registrar:

Geru Imai

Print Name



Signature

02-27-17

Date

Financial Aid Officer:

Steven Chigawa

Print Name



Signature


2/27/17

Date

For Community Colleges, verification of consultation with OVPCC Academic Affairs:

Suzette Robinson

Print Name



Signature

3/15/17

Date

**Windward Community College
Program Proposal**

Proposed Name: Associate of Science in Natural Science with Concentration in Pre-Computer Science (AS-NSCI-~~CS~~)^{ICT} *ok*

Date of proposal: April 22, 2016

Date of proposed implementation: Fall 2017

Date of proposed end date: _____

Type of Program or Certificate

- | | |
|--|--|
| <input type="checkbox"/> Associate of Arts | <input checked="" type="checkbox"/> Associate of Science |
| <input type="checkbox"/> Academic Subject Certificate (ASC) | <input type="checkbox"/> Certificate of Achievement (CA) |
| <input type="checkbox"/> Certificate of Competence (CC) | <input type="checkbox"/> Certificate of Participation (CP) |
| <input type="checkbox"/> Certificate of Professional Development (CPD) | |

i. Narrative of the Program

Is this certificate or one similar to it, offered at any other college in the system? If so, discuss the similarities and differences between the course offerings.

An Associate of Science in Natural Science with a concentration in Pre-Computer Science will create a transfer degree for students interested in pursuing an academic study and career in fields related to computer science, including database design, website creation, and mobile applications.

Similarities

Kapi'olani Community College has an Associate of Science in Natural Science in Pre-Computer Science which is similar to the degree we are proposing. The degree will prepare students to move on to similar four-year degrees.

- https://www.kapiolani.hawaii.edu/wp-content/uploads/2013/09/KCC_ASNS_Pre-CS.pdf
- <https://www.kapiolani.hawaii.edu/academics/programs-of-study/information-technology-program/>

Leeward Community College also has an Associate of Science in Natural Science in Pre-Computer Science which is also similar to the degree we are proposing. The degree will prepare students to move on to similar four-year degrees.

- <http://www.leeward.hawaii.edu/stem-asns>

- https://sites.google.com/a/hawaii.edu/lcc_asns/asnsconcentrations/pre-computer-science

Differences

Leeward Community College requires students to take 1 course in Hawaiian Asian Pacific (HAP) but Kapiolani Community College does not. WCC will be following KCC's guidelines and will not require HAP.

ii. Student Learning Outcomes

WCC's Program Learning Outcomes for the AS in NS.

Upon graduation, students will be able to:

1. Analyze data effectively using the most currently available technology
2. Communicate scientific ideas and principles clearly and effectively
3. Analyze and apply fundamental concepts and techniques in mathematics, physics, and chemistry to scientific issues and chosen field of study.

Student Learning Outcomes for concentration in Pre-Computer Science

Upon successful completion of the Associate of Science degree in Natural Science with a concentration in Pre-Computer Science, students will be able to:

- Analyze and solve a problem, and generate an appropriate programming solution
- Design and write object-oriented computer programs
- Use computer-based mathematics skills to aid in problem solving.

iii. Courses connected to the Program

Specify the total number of credit hours required to earn the certificate. Provide a brief description of each required course, indicating the specific competencies to be attained. Indicate courses that are not currently offered by the college.

All AS in NS degrees require a minimum of 60 credits of college-level courses. With the Pre-Computer Science concentration, students will earn a total of 61 credits.

A total of 60 credits are required.

Common Requirements with the ASNS Concentration in Pre-Computer Science	Pre-Computer Science Concentration (31)
<p>English 100 (Foundation FW) (3)</p> <p>Two courses from Foundation FG A, B, and C) (6)</p> <p>One diversification course from DA, DH, or DL (3)</p> <p>One diversification course from DS (3)</p> <p>One diversification course from DB (3)</p> <p>General Electives: Any transfer-level courses in any field to achieve a total of 60 credits.</p> <p>Note:</p> <ol style="list-style-type: none"> 1) FS requirement will be met in the core concentration requirements via Math 205. 2) Natural Science electives (DP & DY) will also be met via the core requirements. 	<p>CHEM 161 (3) & CHEM 161L (1)/ CHEM 162 (3) & CHEM 162L (1)</p> <p style="text-align: center;">or</p> <p>PHYS 151 (3) & PHYS 151L (1) / PHYS 152 (3) & PHYS 152L (1)</p> <p style="text-align: center;">or</p> <p>PHYS 170 (4) & PHYS 170L (1) / PHYS 272 (3) & PHYS 272L (1)</p> <p>MATH 205 (4) & MATH 206 (4)</p> <p>ICS 111 (3)</p> <p>ICS 141 (3)</p> <p>ICS 211 (3)</p> <p>ICS 212 or ICS 215 (3)</p> <p>ICS 241 (3)</p>

Course Descriptions

Course descriptions for the college are available at <http://windward.hawaii.edu/courses/>.

CHEM 161: General Chemistry I - (3 credits)

<http://windward.hawaii.edu/courses/CHEM161/>

Basic principles of inorganic chemistry with an emphasis on problem solving. First course of a two- course sequence designed to meet the one-year General Chemistry requirement for pre-med, science and engineering majors. Topics include chemical calculations, electronic structure, chemical bonding, states of matter and solutions. (3 hours lecture)

Pre-Requisite(s): A grade of "C" or better in Math 103 or higher, or placement into Math 135 or consent of instructor.

Co-Requisite(s): Registration in CHEM 161L.

CHEM 162L: General Chemistry Laboratory II (1 credit)

<http://windward.hawaii.edu/Courses/CHEM162L/>

Laboratory experiments illustrating fundamental principles of chemistry. (3 hours laboratory)

Pre-Requisite(s): Credit for or registration in CHEM 162.

Upon completion of the course, the student will be able to:

- Develop an appreciation for the methods of scientific inquiry through computer-based laboratory experiments showing real-time data.
- Apply knowledge to determine molar mass of unknown substance using freezing point depression data of solution.
- Calculate chemical reaction rate and constant using graphing analysis.
- Predict the effects of concentration and temperature changes on equilibrium mixtures using Le Chatelier's principle.
- Determine whether equilibrium is established and calculate equilibrium concentrations/constants and cell potentials.
- Apply and articulate the scientific method by preparing lab reports using the standard scientific format. Express in writing core chemistry principles, results of experiments and do critical thinking by synthesizing conclusions based on observations and data.

PHYS 151: College Physics I (3 credits)

http://windward.hawaii.edu/Credit_Courses/PHYS151/

A non-calculus one semester course for pre-professional or non-engineering majors. Study of the basic concepts of physics, including the fundamental principles and theories in mechanics, energy, and waves. (3 hours lecture)

Pre-Requisite(s): Credit for or registration in MATH 140 or higher, or consent of instructor.

Co-Requisite(s): PHYS 151L.

Student Learning Outcomes

- Upon completion of the course, the student will be able to:
- Demonstrate a general understanding of the underlying philosophy of the physics, including the scientific method.
- Apply the basic concepts of physics, including mechanics, energy, simple oscillatory systems, gas laws and fluid dynamics.
- Apply the concept of conservation laws in problem solving.
- Apply basic algebraic and graphical analysis techniques to physics problems.
- Compare and contrast macroscopic and microscopic systems in physics.
- Define quantitatively and qualitatively the common terms used in physics.
- Assess the limitations of the scientific method and apply error analysis.

- Determine when to apply physics principles to everyday situations.

PHYS 151L: College Physics Laboratory I (1 credit)

http://windward.hawaii.edu/Credit_Courses/PHYS151L/

Experiments in statics, mechanics, energy, waves, and friction. (3 hours laboratory)

Pre-Requisite(s): Credit for or registration in PHYS 151.

Upon completion of the course, the student will be able to:

- Apply the scientific method to physical science systems involving mechanics, energy, simple oscillatory systems, gas laws and fluid dynamics.
- Collect, report and analyze data obtained in a laboratory setting in a manner exhibiting organization, proper documentation and critical thinking.
- Manipulate data and apply quantitative techniques, such as graphing and statistical analysis.
- Demonstrate a basic understanding of the standard instruments used in physics.
- Identify environmental factors, which affect the outcome of an experiment or observation and apply basic error analysis techniques.

PHYS 152: College Physics II (3 credits)

<http://windward.hawaii.edu/Courses/phys152/>

A non-calculus, one-semester course for pre-professional or non-engineering majors.

Study of the basic concepts of physics, including the fundamental principles and theories in electricity, magnetism, optics, and modern physics. (3 hours lecture)

Pre-Requisite(s): Credit for PHYS 151 or equivalent, or consent of instructor.

Co-Requisite(s): PHYS 152L.

Upon completion of the course, the student will be able to:

- Demonstrate a general understanding of the underlying philosophy of the physics, including the scientific method.
- Apply the basic concepts of physics, including thermodynamics, static and dynamic laws of electricity and magnetism, circuit analysis, electromagnetic radiation, optical systems, and the fundamentals of atomic and nuclear physics.
- Apply the concept of conservation laws in problem solving.
- Apply basic algebraic and graphical analysis techniques to physics problems.
- Compare and contrast macroscopic and microscopic systems in physics.
- Define quantitatively and qualitatively the common terms used in physics.
- Assess the limitations of the scientific method and apply error analysis.
- Recognize the physical science principles as applied to everyday situations.

PHYS 152L: College Physics Laboratory II (1 credit)

<http://windward.hawaii.edu/Courses/phys152L/>

Experiments in electricity, magnetism, optics, and modern physics. (3 hours laboratory)

Pre-Requisite(s): Credit for or registration in PHYS 152.

Upon completion of the course, the student will be able to:

- Apply the scientific method to physical science systems involving thermodynamics, static and dynamic laws of electricity and magnetism, electrical and electronic circuit analysis, electromagnetic radiation, optical systems, and the fundamentals of atomic and nuclear physics.
- Collect, report and analyze data obtained in a laboratory setting in a manner exhibiting organization, proper documentation and critical thinking.
- Manipulate data and apply quantitative techniques, such as graphing and statistical analysis.
- Demonstrate a basic understanding of the standard instruments used in physics.
- Identify environmental factors, which affect the outcome of an experiment or observation and apply basic error analyses techniques.

PHYS 170: General Physics I (4 credits)

http://windward.hawaii.edu/credit_courses/PHYS170/

This is the first of a rigorous, calculus-based course in physics for the professional or engineering majors. The study of the concepts of physics including the fundamental principles and theories of mechanics, energy, waves and thermodynamics.(4 hours lecture)

Pre-Requisite(s): Credit for MATH 205 or higher or equivalent or consent of instructor.

Co-Requisite(s): PHYS 170L and credit for or registration in MATH 206 or equivalent, or consent of instructor.

Student Learning Outcomes:

- Demonstrate a solid conceptual understanding of kinematics, dynamics, wave phenomena, and thermodynamics.
- Solve applicable problems using differential calculus and vector analysis.
- Apply the laws of physics to computational problems in kinematics, dynamics, wave phenomena, and thermodynamics.

PHYS 170L: General Physics I Laboratory (1 credit)

http://windward.hawaii.edu/credit_courses/PHYS170L/

This laboratory course is a rigorous, calculus-based study for professional or engineering majors. Laboratory exercises are designed to reinforce the fundamental concepts of kinematics, mechanics, energy, waves and thermodynamics.(3 hours laboratory)

Co-Requisite(s): Credit for or registration in PHYS 170.

Student Learning Outcomes:

- Demonstrate an experimental understanding of some basic physical concepts and theories.

- Demonstrate familiarity with various instruments and their use in making reliable and precise measurements.
- Calculate a result with the appropriate number of significant figures.
- Analyze data using calculation and graphical methods.
- Organize an accurate and complete laboratory notebook

PHYS 272: General Physics II

http://windward.hawaii.edu/Credit_Courses/PHYS272/

This is the second in a rigorous, calculus-based physics course for the professional or engineering major. The study of the concepts of physics including the fundamental principles and theories of electricity, magnetism, light, and optical theory.

Pre-Requisite(s): Credit for MATH 206 or higher or equivalent and a grade of "C" or better in PHYS 170 or consent of instructor.

Co-Requisite(s): Credit for or registration in PHYS 272L

Student Learning Outcomes

- Demonstrate a solid conceptual understanding of electricity, magnetism, light, and optical theory.
- Solve applicable problems using calculus and vector analysis.
- Apply the laws of physics to computational problems in electricity, magnetism, and wave phenomena.

PHYS 272L: General Physics II Laboratory

http://windward.hawaii.edu/Credit_Courses/PHYS272L/

This laboratory course is a rigorous, calculus-based study for professional or engineering majors. Laboratory exercises are designed to reinforce the fundamental concepts of electricity, magnetism, light and optical theory.

Co-Requisite(s): Credit for or registration in PHYS 272

Student Learning Outcomes

- Demonstrate experimental understanding of some basic physical concepts and theories.
- Demonstrate familiarity with various instruments and learn to make reliable measurements.
- Calculate a result with the appropriate number of significant figures.
- Analyze data using calculation and graphical methods.
- Organize an accurate and complete laboratory notebook.

ICS 111 – Introduction to Computer Science (3 credits)

<http://windward.hawaii.edu/Courses/ICS111/>

This is an introductory course for students intending to major in computer science and requiring a computer programming course. Emphasis will be on problem solving, algorithm/pseudocode development, structured programming, computer language coding, implementation and debugging/testing. Students will develop application programs in an IBM microcomputer/DOS/Windows operating system environment. Students will be taught to develop appropriate programs using accepted standards and methodologies.

Actual programming is a part of this course. (3 hours lecture)

Pre-Requisite(s): Credit for MATH 103 or higher; or consent of instructor.

Upon completion of the course, the student will be able to:

- Use an appropriate programming environment to design, code, compile, run and debug computer programs.
- Demonstrate basic problem solving skills: analyzing problems, modeling a problem as a system of objects, creating algorithms, and implementing models and algorithms in an object-oriented computer language (classes, objects, methods with parameters, abstract classes, interfaces, inheritance and polymorphism).
- Illustrate basic programming concepts such as program flow and syntax of a high-level general purpose language.
- Identify relationships between computer systems programming and programming languages.
- Demonstrate working with primitive data types, strings and arrays.

ICS 141: Discrete Mathematics for Computer Science I (3 credits)

<http://windward.hawaii.edu/Courses/ICS141/>

This course covers logic, sets, functions, matrices, algorithmic concepts, mathematical reasoning, recursion, counting techniques, and probability theory. (3 hours lecture)

Pre-Requisite(s): Grade of "C" or better in MATH 103 or placement into MATH 135 or higher, or consent of instructor.

Upon completion of the course, the student will be able to:

- Upon completion of ICS 141, the student will be able to analyze issues and apply mathematical problem solving skills to plan courses of action in decision-making situations, using basic mathematical formal logic, proofs, recursion, analysis of algorithms, sets, combinatorics, relations, functions, matrices and probability.

ICS 211: Introduction to Computer Science II (3 credits)

<http://windward.hawaii.edu/Courses/ICS211/>

Reinforce and strengthen problem solving skills using more advanced features of programming languages and algorithms such as recursion, pointers, and memory management. Emphasize the use of data structures such as arrays, lists, stacks and queues. (3 hours lecture)

Pre-Requisite(s): A grade of "C" or better in ICS 111 or consent of instructor.

Student Learning Outcomes

Upon completion of the course, the student will be able to:

- Recognize the use of arrays, lists, stacks, queues, and other data structures.
- Select the appropriate searching and sorting algorithm based on the algorithm's behavior.
- Develop recursive algorithms and programs.
- Select appropriate data structure for a given application.

- Use advanced object-oriented programming techniques (polymorphism, inheritance, and encapsulation) and standard libraries.
- Produce robust programs using exception handling and extensive program testing.
- Create simple graphical user interface (GUI) program.

ICS 212: Program Structure (3 credits)

Program organization paradigms, programming environments, implementation of a module from specifications, the C and C++ programming languages. (3 hours lecture)

Upon completion of the course, the student will be able to:

- Use an editor, make a file, and a compiler in the UNIX environment.
- Use recursion, arrays, pointers, character variables, bitwise operators, structures, and linked data structures in C.
- Use classes (constructors, destructor, and overloading assignment), operator overloading, inheritance, and polymorphism in C++.
- Use linked data structures and recursion in C++.
- Use standard C++ strings and C++ STL library data structures, such as STL lists.

ICS 215: Introduction to Scripting (3 credits)

Introduction to scripting languages for the integration of applications and systems.

Scripting in operating systems, web pages, server-side application integration, regular expressions, event handling, input validation, selection, repetition, parameter passing, Perl, JavaScript, and PHP.

Student Learning Outcomes

- Program proficiently in a variety of scripting languages.
- Choose an appropriate scripting language to handle various web-user interactions, disparate applications and systems.
- Solve problems by applying scripting for various applications.

ICS 241: Discrete Mathematics for Computer Science II (3 credits)

<http://windward.hawaii.edu/courses/ICS241/>

Includes 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. (3 hours lecture)

Pre-Requisite(s): Grade of "C" or better in ICS 141 or consent of instructor.

Upon completion of the course, the student will be able to:

- Analyze issues and apply more complex mathematical problem solving skills to plan courses of actions in high-level decision-making situations.
- Utilize such tools as graphs, trees, boolean algebra, and recurrence relations.
- Explain discrete math concepts such as formal languages, finite-state machines, and program correctness.

MATH 206: Calculus II (4 credits)

<http://windward.hawaii.edu/courses/MATH206/>

Differentiation and integration concepts of trigonometric, exponential, logarithmic and hyperbolic functions. Integration implements, infinite series, and applications of derivatives and integrals are also featured. (4 hours lecture)

Pre-Requisite(s): Grade of "C" or better in MATH 205 or equivalent or consent of instructor.

Student Learning Outcomes

- Apply limits, derivatives, and integrals to inverse functions, logarithmic, exponential, hyperbolic, and inverse trigonometric functions.
- Utilize various techniques of integration.
- Determine whether a sequence or series converges.
- Use concepts from the course to solve problems.
- Solve differential equations.
- Utilize precise mathematical language and symbols to effectively communicate mathematics in written and/or oral form.

iv. Description of demand and social value of the program

Windward Community College is the only college servicing the Windward side of Oahu, which is where most of our students live. Having a Pre-Computer Science concentration for the AS in NS degree would allow Windward students another option for a STEM-related degree.

Computer Science is a growing field both nationally and locally. By offering the AS in NS degree with a concentration in Pre-Computer Science, students will be able to easily transfer to UH Mānoa to continue their education and earn a BS in Computer Science. This will help to provide local companies with a greater number of qualified employees.

v. Description of resources needed, including budget, personnel, and facilities.

If none are required, how will existing facilities and equipment be utilized?

Windward Community College already offers all of the courses required for this degree. Existing faculty and lecturers are qualified and able to teach these courses. In terms of facilities, the use of our two existing computer labs is sufficient to cover our needs in terms of course scheduling.

The ICS Discipline coordinator or designee will be in charge of the ICS Concentration.

Review of Windward Community College Program

Name: ASNS with concentration in Pre-Computer Sci

1. Proposer ICS Discipline

2. Department Area (more than one departmental instructor's signature required) ⇒ vote: 8-0

Mukul B 3-16-16
Signature Date

[Signature] 3/16/16
Signature Date

Alexander Hanson 3-16-16
Signature Date

3. Department [Signature] 3/16/16
Department Chairperson Date

4. Division [Signature] 3/21/16
Dean of Academic Affairs Date

5. Curriculum Committee Review Approved / Disapproved

Laura K. Vylek 8/30/16
Curriculum Committee Chairperson Date

6. Faculty Senate Review Approved / Disapproved

Jamie Boyd 10-12-16
Faculty Senate Chairperson Date

7. Vice Chancellor for Academic Affairs Approved / Disapproved

[Signature] 10.14.16
Vice Chancellor of Academic Affairs Date

8. Chancellor Approved / Disapproved

[Signature] 10/18/16
Chancellor Date

If disapproved, please provide reasons on the back of the form

APR 11 2017

Office of the Chancellor

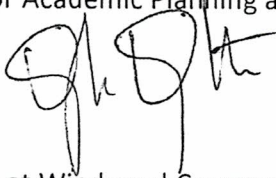


UNIVERSITY of HAWAII*
WINDWARD
COMMUNITY COLLEGE

April 4, 2017

MEMORANDUM

TO: Risa Dickson
Vice President for Academic Planning and Policy

FROM: Douglas Dykstra 
Chancellor

SUBJECT: Program Actions at Windward Community College

I have approved the following program actions:

New

AA-Liberal Arts-Art

Approved on October 18, 2016

Effective Fall 2017

AS-Natural Science-Information and Communication Technology

Approved on October 18, 2016

Effective Fall 2017

- c Pearl Iboshi, IRAO
- Ardis Eschenberg, Vice Chancellor for Academic Affairs
- Geri Imai, Registrar
- Steven Chigawa, Financial Aid Officer

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An Equal Opportunity Affirmative Action Institution