

UNIVERSITY OF HAWAI'I
CODE REQUEST FORM FOR ACADEMIC PROGRAM CODES

REQUESTOR CONTACT INFORMATION	
Date: 6/19/14	Effective term of request (Semester-Year): Fall 2014
Name: Brian Richardson	Title: Dean, Divison II
Campus: Windward Community College	Office/Department: Academic Affairs
Phone: 235-7416, 235-7463 (Carol Okimi, secretary)	Email: cokimi@hawaii.edu (secretary)

1. PROGRAM CODE, MAJOR CODE, CONCENTRATION CODE		Banner forms: SMAPRLE, SOACURR, STVMAJR
Institution: Windward CC (WIN)	College: IN	Department: NATS
<input type="checkbox"/> New program code <input type="checkbox"/> Change/replace existing program code:		
Level: <input checked="" type="checkbox"/> Undergraduate <input type="checkbox"/> Graduate <input type="checkbox"/> First-Professional <input type="checkbox"/> Post-Baccalaureate <input type="checkbox"/> Other:		
Degree: Associate of Science in Natural Science	Certificate:	
If requesting an existing Major code and/or Concentration code in Banner:		
Existing Major: NSCI Assoc in Sci in Nat Sci	Existing Concentration:	
<small>Code Description</small>	<small>Code Description</small>	
If requesting a new <input type="checkbox"/> Major code or <input checked="" type="checkbox"/> Concentration code that does not exist in Banner:		
New Code [4 char/space limit]: NSCI-NATS-ENGR Description [30 char/space limit]: Pre-Engineering Concentration		
If a similar major/concentration code exists in Banner, please list the code: ENGR		
Is this major/concentration code being used the same way at other UH campuses? Yes		
Is 50% or greater of the classes in this program offered at a location other than the Home Campus? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <small>(Please consult your Financial Aid Officer on Program Participation Agreement impact)</small>		
Is this program/major/certificate financial aid eligible? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <small>(Financial Aid Officer consultation required for all new program codes)</small>		
Should this program be available for applicants to select as their planned course of study on the online application? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <small>(If yes, students may select the code as their <u>only</u> program of study.)</small>		

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Replacing or eliminating an existing program code:

If replacing an existing program code, are current students “grandfathered” under the old code? Yes No

Should the old program code be available for use in Banner? Yes No

Will the old program code be available for:	Banner Module	Yes	No	Ending Term (Semester-Year)
	Online Application	<input type="checkbox"/>	<input type="checkbox"/>	_____
	Recruitment	<input type="checkbox"/>	<input type="checkbox"/>	_____
	Admissions	<input type="checkbox"/>	<input type="checkbox"/>	_____
	General Student	<input type="checkbox"/>	<input type="checkbox"/>	_____
	Academic History	<input type="checkbox"/>	<input type="checkbox"/>	_____

2. CERTIFICATES ONLY:

Does this certificate qualify as a Gainful Employment Program (Title IV-eligible certificate program)? Yes No
(Please consult your Financial Aid Officer or see: <http://www.ifap.ed.gov/GainfulEmploymentInfo/index.html>)

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

3. NEW CAMPUS, COLLEGE, DIVISION, OR DEPARTMENT CODE		Banner forms: STVCAMP, STV_COLL, STVDIVS, STVDEPT
Campus code [3 char]: WIN	Campus description [30 char/space limit]: Windward Community College	
College code [2 char]: 00	College description [30 char/space limit]: Windward Community College	
Division code [4 char/space limit]: NATS	Division description [30 char/space limit]: Natural Science	
Department code [4 char/space limit]: NATS	Department description [30 char/space limit]: Natural Science	

UNIVERSITY OF HAWAI'I
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4. NEW COURSE SUBJECT CODE (Subject Alpha)		Banner form: STVSUBJ
College:	Department:	
Subject code [4 char/space limit]:	Subject description [30 char/space limit]:	

5. NEW MINOR (Minor codes are listed on the Major code table)		Banner form: STVMAJR
Minor Code [4 char/space limit]: PEN	Minor Description [30 char/space limit]: Pre-Engineering	

Please briefly describe your request and explain why you are requesting the code(s): This is a newly added concentration in the Associate of Science in Natural Science.

SUPPORTING DOCUMENTATION
Please see the Code Request Guide for the required supporting documents to be submitted. Documents submitted with this form: <ul style="list-style-type: none"><input type="checkbox"/> Board of Regents meeting minutes and supporting documents provided to the BOR<input type="checkbox"/> Memo from UH President<input checked="" type="checkbox"/> Memo from Chancellor<input type="checkbox"/> Curriculum (required for requests for new programs/majors/minors/certificates)<input type="checkbox"/> Gainful Employment Program notification to the US Department of Education<input type="checkbox"/> Other: _____

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CAMPUS VERIFICATION		
Requestor Signature	Date <u>June 18/14</u>	
Registrar (If different from Requestor)		
Geri Imai _____ Print name	 _____ Signature	<u>06/23/14</u> _____ Date
Email/memo in lieu of Registrar's signature may be attached		
Financial Aid Officer (Financial Aid Officer consultation required for all new program codes)		
<u>Steven Chigawa</u> _____ Print name	 _____ Signature	<u>7/8/14</u> _____ Date
Email/memo in lieu of Financial Aid Officer's signature may be attached		
For Community Colleges, verification of consultation with OVPCC Academic Affairs:		
<u>Suzelle Robinson</u> _____ Print name	 _____ Signature	<u>7/21/14</u> _____ Date
Email/memo in lieu of signature may be attached		

Send completed form and supporting documentation to:

Institutional Research and Analysis Office (IRAO)
 1633 Bachman Place Email: iro-mail@lists.hawaii.edu
 Sinclair Annex 2, Room 4 Fax: 808-956-9870
 Honolulu, HI 96822 Phone: 808-956-7532

After all required forms and supporting documents have been submitted, please allow at least two weeks for processing by IRAO and Banner Central.

FOR INTERNAL USE ONLY	Date form/docs received:
Program code [12]:	Program Description [30]:
CIP code [6]:	CIP description [30]:

**Windward Community College
Program Proposal**

Proposed Name : Associate of Science in Natural Science (Concentration in Pre-Engineering)

Date of proposal: Feb 12, 2014

Date of proposed implementation : Fall 2014

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.

This proposal is similar to those at KapCC and LeeCC. All the course requirements are the same. All require 60 credits (total).

Differences: WCC has two required WI courses. KapCC and LeeCC have no WI requirements.

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 mathematical, physical, and chemical concepts and techniques to scientific issues
4. apply fundamental concepts and techniques in their chosen field of study.

Learning Outcomes for concentration in Pre-Engineering:

Upon successful completion of the Associate in Science degree in Natural Science with a concentration in Pre-Engineering, the student should be able to:

- o *Articulate essential underlying facts, concepts, principles, theories, and applications relating to chosen areas in engineering.*
- o *Relate scientific knowledge and understanding to address situations in order to plan and carry out project work.*

- Apply scientific/mathematical language, terminology and techniques to understand phenomena and solve problems in engineering.

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.

A total of 60 credits are required.

Common Requirements with the ASNS Concentration in Biological and Physical Sciences	for Pre-Engineering Concentration (minimum 33-34 credits)
ENG 100 (Foundation FW)	CHEM 161 (3)
Two courses from Foundation FG A, B, and C	CHEM 161L (1)
One diversification course from DA, DH, or DL	CHEM 162 (3)
One diversification course from DS	MATH 205 (4)
General electives: transfer-level courses in any field to achieve a total of 60 credits	MATH 206 (4)
two Writing Intensive courses	MATH 231 (3)
	MATH 232 (3)
	PHYS 170 (4)
	PHYS 170L (1)
	PHYS 272 (3)
	PHYS 272L (1)
	*EE 160 (4) or *CE 270 (3)
	or *EE 211 (4)
	<i>* Not currently offered, but already submitted to Curriculum Committee for approval.</i>

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.

Co-Requisite(s): CHEM 162L

Student Learning Outcomes

- Predict properties of pure substances using phase diagrams.
- Predict properties (boiling point, melting point, osmotic pressure, vapor pressure) of solutions based on concentration.
- Determine reaction rate law and calculate rate constants and half-life based on experimental data.
- Calculate the equilibrium concentration of chemicals in solution involved in precipitation, and acid-base and reactions.
- Predict spontaneous reactions based on enthalpy and entropy considerations.
- Determine the electrochemical potential of redox reactions.

MATH 205: Calculus I (4 credits)

<http://windward.hawaii.edu/courses/MATH205/>

Basic mathematical concepts, topics in differentiation, and introductory integration of algebraic and trigonometric functions. Applications of differentiation and integration will be demonstrated.(4 hours lecture)

Pre-Requisite(s): Grade of "C" or better in MATH 140 or equivalent, satisfactory math placement test score, or consent of instructor.

Student Learning Outcomes:

- Understand and use the formal and intuitive definitions of limits and apply them in limit calculations and in determining continuity.
- Demonstrate proficiency in determining derivatives and apply different interpretations of the derivative.
- Utilize precise mathematical language and symbols to effectively communicate mathematics in written and/or oral form.
- Use calculus techniques to analyze and solve applied problems.
- Use derivatives to analyze and sketch graphs and/or to solve related problems.
- Demonstrate proficiency in determining antiderivatives and integrals.
- Utilize integration in applied problems.

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,

Recommended Preparation: Student should have taken high school chemistry, CHEM 100, or CHEM 151.

Student Learning Outcomes:

- Use the mole concept in solving stoichiometry problems involving solids, liquids, gases and solutions.
- Balance chemical equations, classify reactions, identify and analyze the role of the chemicals involved in chemical reactions.
- Predict the behavior of gases while undergoing changes in volume, pressure, temperature and quantity.
- Manipulate thermochemical equations and calculate the amount of energy involved in chemical reactions.
- Predict physical and chemical properties of elements based on electronic structure and location in the Periodic Table.
- Predict physical and chemical properties of compounds based on chemical bonding, geometry and intermolecular interactions.

CHEM 161L: General Chemistry Laboratory I (1 credit)

<http://windward.hawaii.edu/courses/CHEM161L/>

Laboratory experiments illustrating fundamental principles of chemistry.(3 hours laboratory) Pre-Requisite(s): Credit for or registration in CHEM 161.

Student Learning Outcomes:

- Apply laboratory safety procedures and respond to hazards.
- Use molecular and crystal models, perform common laboratory techniques competently and computer-based experiments to verify chemistry laws on stoichiometry, thermochemistry, behavior of gases and liquids.
- 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.
- Make and record precise measurements, calculate results using significant figures, standard deviations and identify sources of error in laboratory experiments.
- Use computer competently, word-processing, spreadsheet and graphing.
- Prepare chemical solutions, perform dilutions, calculate solution concentrations and generate a calibration curve.

CHEM 162: General Chemistry II (3 credits)

<http://windward.hawaii.edu/courses/CHEM162/>

Second course of a two-course sequence designed to meet the one-year General Chemistry requirement for pre-med, science and engineering majors. Topics include thermochemistry, kinetics, acid-base equilibrium, solubility equilibrium and electrochemistry. Emphasis on problem solving.(3 hours lecture)

Pre-Requisite(s): A grade of "C" or better in CHEM 161, credit for or registration in MATH 135, or consent of instructor.

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 (3 credits)

<http://windward.hawaii.edu/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.(3 hours lecture)

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): PHYS 272L.

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.

MATH 231: Calculus III (3 credits)

<http://windward.hawaii.edu/courses/MATH231/>

Vector-oriented study of functions of several variables; partial differentiation and line integrals; multiple integrals. (3 hours lecture)

Pre-Requisite(s): Grade of "C" or better in MATH 206 or equivalent or consent of instructor.

Student Learning Outcomes:

- Analyze and apply principles, concepts, and properties from algebra, geometry, trigonometry, and calculus to solve problems.
- Apply concepts and calculus properties of Cartesian space coordinates and vectors.
- Apply principles and concepts from calculus to multivariable functions.
- Use various strategies from this course to solve problems.
- Utilize precise mathematical language and symbols and effectively communicate in written and/or oral form.

MATH 232: Calculus IV (3 credits)

<http://windward.hawaii.edu/courses/MATH232/>

Math 232 is the fourth course in the calculus sequence. Topics include multiple integrals, line integrals, Green's Theorem, surface integrals, Stokes' Theorem, Gauss' Theorem and differential equations. (3 hours lecture)

Pre-Requisite(s): "C" or better in Math 231 or equivalent or consent of instructor.

Student Learning Outcomes:

- Compute multiple integrals in various coordinate systems.
- Use multiple integrals or vector calculus techniques to solve application and/or theoretical problems.
- Solve basic differential equations and applications.
- Utilize precise mathematical language and symbols and effectively communicate in written and/or oral form.

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

This course is a study of equilibrium of rigid bodies under the action of forces and the application of the principles of mechanics to solve static problems in engineering. (3 hours lecture)

Pre-Requisite(s): Physics 170; credit for or registration in Math 231 or consent of instructor

Student Learning Outcomes

- Solve problems involving forces, resultant and static equilibrium and their application to rigid bodies.
- Analyze equilibrium of rigid bodies in two and three dimensions.
- Solve problems involving center of gravity, centroids, couples, and moments of inertia.
- Analyze engineering structures subjected to concentrated loads, distributed loads, and frictional forces.
- Utilize abstract thinking and analytical reasoning in the analysis of word problems dealing with mechanical structures.
- Apply calculation techniques to dynamic problems in engineering.

EE 211: Basic Circuit Analysis I (4 credits)

<http://windward.hawaii.edu/Courses/EE211/>

This is an introductory course covering linear passive circuits, time domain analysis, transient and steady state responses, phasors, impedance and admittance, power and energy, frequency responses, and resonance. (3 hours lecture, 3 hours laboratory)

Pre-Requisite(s): Pre-Requisite(s): Credit for or registration in MATH 231 or higher, credit for or registration in PHYS 272, or consent of instructor.

Student Learning Outcomes

- Analyze and assemble basic circuits.
- Describe and analyze the basic functionality of the components of a basic circuit.
- Describe the rudiments of electric power production.

iv. Description of demand and social value of the program

The existing AS degree in Natural Science has both a Biological Science concentration and a Physical Science concentration. Enrollment data show that a majority of students in the Physical Science Concentration intend to pursue an engineering degree. The addition of this new concentration will provide a focused pathway for these students.

WinCC is a member of the Engineering Consortium. One of the goals of this group is to improve the transfer of the pre-engineering students from the CCs to the College of Engineering. Both KapCC and LeeCC ASNS (Pre-Engineering) have transfer agreements with UH Manoa, which provide automatic acceptance for students graduating with the AS NS degree at UH Manoa. The intent is that WCC will also provide this type of guided pathway for its students. Graduates of the WCC AS degree in Natural Science with a concentration in Pre-Engineering will be on track to enter the College of Engineering at UH Manoa. This may also help increase the graduation rate at the College.

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

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 (1 credit)

<http://windward.hawaii.edu/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.(3 hours laboratory

Pre-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.

EE 160: Programming for Engineers (4 credits)

<http://windward.hawaii.edu/curriculum/Details.php?Alpha=EE&Number=160>

Introductory course on computer programming and modern computing environments with an emphasis on algorithm and program design, implementation and debugging. Designed for engineering students, this course includes a hands-on laboratory to develop and practice programming skills.(3 hours lecture and 3 hrs lab)

Pre-Requisite(s): Credit for or registration in Math 140 or consent of instructor

Student Learning Outcomes

- Explain the steps involved in the programming process.
- Solve simple problems and express those solutions as algorithms.
- Use the fundamental techniques of selection, looping, assignment, input, and output to describe the steps the computer takes to solve a problem.
- Write algorithms and code in a top-down manner.
- Work with arrays in searching and sorting applications.
- Work with structures and unions types.
- Write, test, and debug small programs.
- Write functions and use pointers.
- Work with characters and strings.
- Work in text based environment like UNIX.
- Interface with text base using a GUI interface.

*CE 270: Applied Mechanics I (3 credits)

<http://windward.hawaii.edu/curriculum/Details.php?Alpha=CE&Number=270>

Review of Windward Community College Program

Program Name: Associate of Science in Natural Science
(Concentration in Pre-Engineering)

1. Proposer Leticia Colmenares, PhD
2. Department Chair L. Colmenares 4/10/14
Department Chairperson Date
3. Division [Signature] 4/10/14
Dean of Academic Affairs Date
4. Curriculum Committee Review Approved / Disapproved
[Signature] 4/9/14
Curriculum Committee Chairperson Date
5. Faculty Senate Review Approved / Disapproved
[Signature] 4/15/14
Faculty Senate Chairperson Date
6. Vice Chancellor for Academic Affairs Approved / Disapproved
[Signature] 5/2/14
Vice Chancellor of Academic Affairs Date
7. Chancellor Approved / Disapproved
[Signature] 5/2/14
Chancellor Date

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

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

A fulltime physics instructor qualified to teach pre-engineering physics and engineering courses. Currently, WCC relies on part-time lecturers for these classes. To insure the sustainability of this program, a fulltime instructor is essential.