Self Study Results


Survey of Agriculture Students in 2013 (184 responses)

1. Please briefly list what should be the priorities for improvement in the College of Agriculture, Forestry, and Natural Resource Management (CAFNRM)?
- ☐ Opportunities for real-life work                                6%
- ☐ Improve diversity of class offerings                            6%
- ☐ Reduce classes on Saturday & time conflicts, etc               39%
- ☐ Improvement of facilities & supplies                           23%
- ☐ Improve professors                                              4%

2. Please briefly list what CAFNRM does well.
- ☐ Hands-on, field trips, labs, etc                               30%
- ☐ Good faculty                                    25%
- ☐ Good facilities                                 20%

3. Are you considering switching to a major other than one of the agricultural specializations
offered in CAFNRM?
- ☐ No                                              74%
- ☐ Yes                                             8%

4. Are the University of Hawai'i at Hilo General Education (GE) requirements meeting your expectations in terms of cultural literacy/awareness and overall preparation for lifelong learning?
- ☐ Yes                                             52%
- ☐ No                                              23%.

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Student Retention - According to the following report

Ramos, C. (chair), K. Harmon, P.Hart, T. Jalbert, B. Mathews, C. Lauer, J. Kunimot, and F. Mishina. 2015 Report of the task force on advising or UH Hilo.

"When CAFNRM was able to have an embedded advisor from 2002 through 2004, it had ist highest retention rates ever."

Summaries (by semester) of Student Course Evaluations are in Appendix 5. The key question is "Overall, how would you evaluate this course?" CAFNRM does better the the entire campus.

Teaching Quality - Student Response to Query

Overall, how would you evaluate this course? (max = 4.00)

| Semester | Year | CAFNRM | Total Campus |
|----------|------|--------|--------------|
| Fall | 2008 | 3.52 | 3.50 |
| Spring | 2009 | 3.68 | 3.57 |
| Fall | 2009 | 3.68 | 3.49 |
| Spring | 2010 | 3.71 | 3.50 |
| Fall | 2010 | 3.58 | 3.52 |
| Spring | 2011 | 3.63 | 3.52 |
| Fall | 2011 | 3.67 | 3.54 |
| Spring | 2012 | 3.65 | 3.55 |
| Fall | 2012 | 3.66 | 3.57 |
| Spring | 2013 | 3.61 | 3.59 |
| Fall | 2013 | 3.48 | 3.53 |
| Spring | 2014 | 3.58 | 3.53 |
| Fall | 2014 | 3.62 | 3.52 |
| Spring | 2015 | 3.65 | 3.56 |

## Proposed Learning Outcomes for UH-Hilo Bachelor of Science in Agriculture

**Learning Outcome 1: Acquire, integrate, and apply knowledge of science and technology to managed agricultural systems**
Goal 1. Use multiple sources, including current and older literature, to find, evaluate, organize and manage information related to diverse agricultural systems.
Goal 2. Demonstrate competence with both laboratory and field-based techniques used in modern agricultural systems.
Goal 3. Understand how global issues including climate change, energy use, chemical use, water availability and food safety impact sustainability of agricultural systems.

**Learning Outcome 2: Synthesize and demonstrate interdisciplinary knowledge and competence in managing and improving crop and/or animal production systems**
Goal 1. Apply concepts of biology, chemistry, nutrition, pest control, diseases, ecology and genetics to manage and improve plants and (or) animal systems and their products
Goal 2. Anticipate and recognize problems and make recommendations for addressing the problems using appropriate techniques and skills.
Goal 3. Develop, identify and employ best management practices that lead to sustainable solutions and outcomes.
Goal 4. Apply principles of business, marketing and management to an agricultural enterprise in developing the various components of a business plan.

**Learning Outcome 3: Appreciate and communicate the diverse impacts of agriculture on people**
Goal 1: Communicate effectively with various audiences using oral, written, and visual presentation skills, and contemporary networking/social media technologies.
Goal 2: Describe and assess the influence of crop and (or) animal production systems and its management on environmental sustainability and restoration.

**Learning Outcome 4: Demonstrate professionalism and proficiency in skills that relate to agriculture**
Goal 1: Demonstrate leadership and professionalism, and the ability to collaborate and work in teams
Goal 2. Plan, engage, and learn from actions that demonstrate civic responsibility to community and society.

**Note: More specific goals for the different specialties will be listed in the class syllabi**

# Examples of Scientific and Quantitative Reasoning Outcomes in CAFNRM

**AGEC 330 Farm Management**

Outcomes

Ability to conduct economic and financial analyses for short and long term farm business profitability, which include calculation of demand and income elasticity; marginal cost and marginal revenue analysis; estimate economic potential of a market through forecasting methods; calculate production costs, gross revenue, profit, break-even unit and price, operating, cash flow and capital expenditure budgets; and prepare balance sheets and profit and loss statements.

Measures

Students collect secondary data by performing various economic and financial calculations to produce a farm business plan. Homework and exams include questions that require financial calculations and estimates.

**ANSC 321 Feeds & Feeding**

Outcomes

Ability to calculate nutritional parameters such as nutrient digestibility, biological value, nitrogen balance, metabolizable energy, net energy, and total digestible nutrients for nutritional assessment. Ability to formulate ration for various species in different physiological stages in order to meet nutrient requirements for optimal productive performance.

Measures

Hands on laboratories where students obtain raw data and perform the appropriate calculations of 1) nutrient contents as-fed or dry-matter basis, 2) nutrient requirements based on body weight, growth rate, lactation output, stage of pregnancy, and energy expenditure, and 3) ration formulation based on nutrient requirements and estimated intake using Pearson's Square or solving simultaneous equations. Exams with embedded questions where calculations of nutrient requirements, ration formulation as well as nutritional parameters are performed.

**ANSC 445 Animal Breeding and Genetics**

Outcomes

Ability to calculate phenotypic & genotypic frequencies, gene frequencies, confidence level of detecting carrier sires, expected rate of genetic change, expected progeny differences, percent hybrid vigor, and inbreeding coefficients.

Measures

In homework assignments students have the opportunity to calculate phenotypic and genotypic frequencies, gene frequencies, confidence level of detecting carrier sires, expected rate of genetic change, expected progeny differences, percent hybrid vigor, and inbreeding coefficients.

Exams contain embedded questions where students calculate these parameters.

**AQUA 352 Culture of Fishes**

Outcomes

Ability to evaluate the biological, technical and environmental aspects that affect the success of the diverse methods applied in freshwater and marine fish culture.

Measures

Interpretation of tables and graphs with fish production variables under optimal and sub-optimal conditions in exam questions and in-class exercises.

**AQUA 425 Water Quality and Aquatic Productivity**

Outcomes

Integration of knowledge in water chemistry and its relationship with relevant environmental factors that affect aquatic productivity. Ability to develop a water quality monitoring program, sample collection and determination of temperature, salinity, pH, dissolved oxygen, ammonia and other relevant water quality parameters determination in the field, data analysis and interpretation in the lab.

Measures

Interpretation of water quality variables provided in tables and graphs in exams and description of their significance on aquatic plant and animal productivity. Laboratory reports.

**AQUA 466 Fisheries Science**

Outcomes

Ability to use mathematical models to calculate break even curves, length at first capture and other fisheries variables; ability to understand and differentiate between the mathematical models used in the calculation of maximum sustainable yields of exploited fish stocks and other important indexes for decision-making in fisheries management.

Measures

Exercises in computer spreadsheets with tabulated raw data where equations are solved and results graphed. Exams with questions where identification and description of differences of model inputs and outputs are made.

**ENTO 374 - Insect Pest Control**
**Outcomes**
Ability to accurately quantify the pest status of an insect on a crop through analysis of control costs vs product yield and value, ability to properly calculate dilution and application rates of pesticides, ability to estimate densities of insects via varieties of sampling techniques, ability to judge the effectiveness of a pest management action by comparing data of insect number and crop effects.
**Measures**
Laboratory written calculation assignments demonstrating steps of obtaining data relating to identification and quantity of a pest, calculating differences between treatments and estimates of damage, and applying the results to management recommendations. Hands-on laboratory collection of data relating to numbers of insects and damage to crops in a crop field setting. A homework assignment calculating dilution rates and application rates of pesticides using real world examples. A homework assignment showing calculations needed to estimate insect population growth rates and sampling estimation of total insect density. A written report and PowerPoint presentation detailing a literature review and thorough understanding of a current crop pest in Hawaii and thoroughly describing a management action already recommended and a theoretical new management action supported with a scientific framework for assessment of the effectiveness of the new management action. Exams will test ability to recall and use appropriate calculations for pest management, and the ability to critically analyze pest management recommendations for reliable outcomes.

**FOR 202 Forestry & Natural Resources**
Outcomes
Ability to conduct forest measurement including DBH, tree height, leaf area index, mortality rate, growth rate and calculate stand volumes, etc.
Measures
 Field laboratories for forest measurement and obtaining raw data to perform the appropriate calculations of measured objectives. Exams with embedded questions on techniques/tools used in Forestry.

**HORT 264 Plant Propagation**
Outcomes
Ability to quantify vegetative and seminal plant propagation responses
Measures
Technical lab reports, student presentations, and embedded exam questions where propagation material responses are evaluated through visual ratings and calculation of rooting rate, total % rooting, germination rate, and total % germination.

**HORT 303 Plant Tissue Culture, HORT, 304 Plant Tissue Culture Acclimatization and HORT 450 Advanced Plant Tissue Culture**
Outcomes
Ability to identify problems and provide remedial actions for the following areas: contamination, oversterilzation, disinfectants, vitrification, undesirable compounds, in vitro media related problems, rhizogenesis, caulogenesis, callus development, bud dormancy, endogenous hormones, inorganic salts, carbon and energy compounds, vitamins, amino acids, plant growth regulators, solidifying compounds and gas exchange.
Measures
Hands on laboratories where students engage in empirical activities. Experience is obtained in relation to collecting data, collating and summarizing data and writing reports. Graph construction and power point presentations are also introduced skills.

**NRES 420 Hydrology and Watershed Management**
Outcomes
Ability to delineate watersheds on a topographic map, to calculate watershed capacity using precipitation and runoff data and to measure water quality including nutrients, hardness, alkalinity, etc.
Measures
Hand on laboratories for watershed delineation and water quality measurements. Students perform appropriate calculations for water quality measurements in their lab reports. Exams with embedded questions on techniques/tools used in watershed management and water quality control.

**NRES 430 GIS Application in Natural Resource Management**
Outcomes
Ability to use ArcView software in managing forests and natural resources. Students can visualize, manage, and analyze GIS data.
Measures
Hand on laboratories for using GIS managing tools (ArcMap, Location Analytics, Developer tools, etc.). Students perform appropriate geospatial processing analyses in their lab reports. Exams with embedded questions on GIS techniques/tools used in natural resource management.

**SOIL 304 Tropical Soils**
Outcomes
Ability to calculate soil textural class, effective cation exchange capacity, fertilizer and soil amendment requirements per unit land area, etc.
Measures
Hands on laboratories where students obtain raw data and perform the appropriate calculations for their lab reports. Exams with embedded questions where the calculations are performed.

CAFNRM Contribution General Education

| Course Alpha | Number | Basic Requirements | | | | Area Req. | | Integrative Requirement | | | |
| | | QR | | WC | | NSCI | | HPP | | GCC | |
| | | START | END | START | END | START | END | START | END | START | END |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **General Education Approved List 2011 - 2013** | | | | | | | | | | | |
| AG | 100 | | | 2013 | 2018 | 2011 | 2016 | | | | |
| AG | 230 | | | 2011 | 2016 | 2011 | 2016 | | | 2011 | 2016 |
| AGBU | 110 | 2012 | 2017 | | | 2012 | 2017 | | | | |
| ANSC | 175 | | | | | 2011 | 2016 | | | | |
| AQUA | 262 | | | | | 2012 | 2017 | 2012 | 2017 | 2012 | 2017 |
| HORT | 262 | | | | | 2012 | 2017 | | | 2012 | 2017 |