**Farm Management, Site Analysis, Crop Selection and Simple Structures**

**Description:**

This course aligns with Program Learning Outcome #s 1,2, & 4

**Methods of Instruction:**

The course will be taught using multiple instructional methods. These methods will include lecture, audio-visual presentations, group discussion and hands-on exercises. Typically, following the lecture presentation, students will receive additional articles from source literature that either illustrates current research into the topic or explores related, relevant or higher concepts.

**Successful Completion:**

A student must attend all sessions, demonstrate hands-on proficiency of skills presented, and complete any additional self-study assignments to receive a certificate.

**Odds-n-Ends:**

All class sessions may involve “hands-on” projects. Safety glasses or other personal protective equipment may be needed for some classes and will be provided. The student is expected to dress appropriately for each class including durable footwear or heavy-duty boots. Long pants and work shirts that cannot be caught on any machine are recommended. Rain gear is highly recommended. Long hair should be secured so as not to hang freely. All jewelry should be removed.

Smoking is not permitted during class – students who need to smoke will be allowed to do so away from other students and away from entrances – we do not have a designated smoking area.

Cell phone use and texting during class is prohibited. Turn them to vibrate or off.

Hawaii Community College’s Student Conduct Regulations, Sexual Harassment and Attendance policies will be enforced in this class.

Every student is expected to be familiar with and abide by the Hawaii Community College Student Conduct Code. The Student Conduct Code states: "impermissible behavior...includes that which directly or indirectly interferes with or disrupts the process of teaching, learning, research, and administration." Refer to the college catalog for more information.

**Academic Accommodations:**

Hawaii Community College is committed to provide equal access to the campus, course information and activities for students who have disabilities.

If you have a documented disability and / or related access need, please contact a counselor for the Ha`awi Kokua Program (**934-2725).**  The office is located on the Manono Campus - Building 388, Room 106.

If you are a student who needs to have an accommodation, please discuss your needs with the disabilities office and make your request in a timely manner.

Hawaii Community College also has generalist counselors available if you have any issues which may have a negative impact on your ability to successfully complete this course, and other courses you are taking.

Call **934-2720** if you have a need to see a generalist counselor.

**Learning Outcome Objectives:**

On successful completion a learner will be able to:

1. Assess and analyze project sites for enterprise suitability
2. Select an appropriate structure for protected culture
3. Design the physical layout of a farm or landscape
4. Construct basic greenhouse/shadehouse/ high tunnel structures safely (part 1)

**Session 1 (hrs 0-4 + self study)**

*Attention Grabber:*

Video*:* 7 Food Forests in 7 Minutes Geoff Lawton: <http://www.youtube.com/watch?v=QG_vRG66wkA>

Video: Moroccan 2000-Year-Old Food Forest Geoff Lawton: <http://www.youtube.com/watch?v=NKIgqa49rMc>

*Introduction:*

Group sharing and discussion of individuals’ interest and goals as related to enterprises or sites they would like to develop.

Discussion and brainstorming: Exploring enterprise feasibility. What forms of feasibility (e.g physical, financial, personal) are important?

*Direct Instruction:*

Enterprise Selection and Suitability

1. Physical Feasibility
   1. Climate
   2. Soil
   3. Pests
   4. Market access
2. Financial Feasibility
   1. Yield
   2. Price
   3. Costs
   4. Demand
3. Personal Preference
   1. Health/physical limitations
   2. Likely IPM requirements vs. personal philosophy
   3. Competition, individual strengths and weaknesses

See:

Hinman, T. (2011). Evaluating a Farming enterprise. *National Center for appropriate Technology, ATTRA, USDA, IP041*. Retrieved from <https://attra.ncat.org/attra-pub/summaries/summary.php?pub=277>

Enterprise Selection for Ag Business

Pdf

Beginning Farmers Project, Cornell University <http://nebeginningfarmers.org/farmers/producing/>

Introduction to site analysis and layout considerations

1. Desirable infrastructure for farms/sites
   1. Common buildings and protected crop culture structures
   2. Water, reservoirs, irrigation
   3. Power (on- or off-grid)
   4. Dedicated roads or pathways and other methods to facilitate movement through a site
2. Resources to assist planning (e.g Web Soil Survey <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>)
3. Slope and its impact on site use; strategies to manage steep slopes
4. Wind and windbreaks

See:

Farm layout and site selection. (n.d.) *National Department of Agriculture and AgriSETA, South Africa.* Retrieved from <http://www.agriseta.co.za/qualifications.aspx?section=7&page=144&displayLM=true>

Shaxson, F. (1999). New concepts and approaches to land management in the tropics with special emphasis on steeplands. *FAO, Italy. Soils Bulletin 75.* Retrieved from <ftp://ftp.fao.org/agl/agll/docs/sb75.pdf>

Wilkinson, K.M., and C.R. Elevitch. 2000. Multipurpose Windbreaks: Design and Species for Pacific Islands. Agroforestry Guides for Pacific Islands #4. Permanent Agriculture Resources, Holualoa, Hawaii, USA. Retrieved from <http://agroforestry.net/pubs/multwind.pdf>

Brandle, J.R., and S. Finch, (n.d.). How windbreaks work. *University of Nebraska, Institute of Agriculture and Natural Resources, EC 91-1763-B.* Retrieved from <http://nac.unl.edu/documents/morepublications/ec1763.pdf>

Nelson, Paul V. 2012. *Greenhouse Operation and Management* (7th Edition). Prentice Hall

Boodley, James W. and Steven E. Newman. 2009. *The Commercial Greenhouse* (3rd Edition). Delmar

Spacing considerations for plants, crops and orchards

1. Plant spacing and its impact on plant growth and quality
2. Crop rows and field layout- designing to maintain soil quality, reduce labor and/or mechanize production
3. Containerized production spacing strategies
   1. Immediate vs. final spacing requirements
   2. Square vs triangular spacing
   3. Shifting containers and spacing
4. Tree spacing and planting strategies for developing an orchard

See:

Plant Spacing Folder for various HILA guidelines

Maynard, Donald N. and George J. Hochmuth. 2007. *Knott’s Handbook for Vegetable Growers, Fifth edition*. John Wiley & Sons, Inc.

McNeal Growers, Square and Triangle Spacing <http://mcnealgrowers.com/pdf/cps.pdf>

TNAU Agritech Portal, Orchard Management <http://agritech.tnau.ac.in/horticulture/horti_orchard%20management.html>

*Activities:*

Individuals begin to develop a layout and design of a complete farm suited to their interests (example components can include: orchards, structures, field crops, pastures, water reservoir etc). Alternatively, individuals can develop an edible, aesthetic and functional landscape plan around a home.

*Additional Independent Study:*

Read and or view supplemental material not covered in class.

Continue work on farm or home design.

View videos of Geoff Lawton discussing permaculture design strategies in greater detail: <http://www.youtube.com/watch?v=JHIYXmGgiuw&list=PL7448FA733195165D>

**Session 2 (hrs 4-8 + self study)**

*Attention Grabber:*

Explore hightunnels.org website and resources

<http://www.hightunnels.org/>

*Direct Instruction:*

Overview of basic power tool use and safety for the session’s activities (Cordless drills and chop saw).

\*\*\*Safety glasses required at all times.\*\*\*

See: Power Tool Institute website and safety videos <http://www.powertoolinstitute.com/pti_pages/safety.asp>

A teacher’s reference guide to power tool safety (n.d.). Power Tool Institute, Ohio. Retrieved from <http://www.powertoolinstitute.com/pti_pdfs/PTI_Teachers_Guide.pdf>

Overview of construction activity 1: Simple hydroponic crop shelter for the homeowners. Review plan, materials and methods.

1. Assemble tank using plywood and 2X4s
2. Cut and assemble legs/roof supports
3. Rafters and optional fascia
4. Bracing
5. Tank drain
6. Lining the tank
7. Roof covering installation (either polycarbonate sheets or poly with wiggle wire)

See:

Kratky, B. A. (2010). A suspended net-pot, non-circulating hydroponic method for commercial production of leafy, romaine, and semi-head lettuce. *University of Hawaii Manoa, CTAHR, Cooperative Extension Service*, *VC-1*. Retrieved from

<http://www.ctahr.hawaii.edu/oc/freepubs/pdf/VC-1.pdf>

Materials and methods of assembly of a simple pvc tunnel.

1. Role of both thin-wall and schedule-40 pvc pipes in the structure
2. Location of holes and use of carriage bolts for attaching ¾ inch pvc hoops to 1 inch (or 1 ½ inch) pvc top and side rails
3. Cutting “C” clamps using thin-wall pipe
4. Anchoring the structure in the absence of soil
5. “Training” multiple structures together to create one long tunnel

*Activities:*

Construct a simple home hydroponic crop shelter.

Construct a simple pvc pipe tunnel structure.

*Additional Independent Study:*

Supplemental materials or videos

**Learning Outcome Objectives:**

On successful completion a learner will be able to:

1. Plan and schedule crops to meet production and rotation needs
2. Draft business communications in a professional manner
3. Use labor and other resources efficiently
4. Understand important planning, record keeping and legal requirements of farm businesses
5. Understand economic principles affecting a farm business
6. Construct basic greenhouse/shadehouse/ high tunnel structures safely (part 2)

**Session 3 (hrs 8-12 + self study)**

*Attention Grabber:*

Video Sunn hemp for soil health and nematode management, Dr. Koon Hui Wang, UH CTAHR <http://www.youtube.com/watch?v=AG_CYsVmqN4>

*Introduction:*

Discussion and Brainstorming. What is needed to develop a crop plan?

*Direct Instruction:*

Principles of crop planning to meet scheduling and production goals

1. Planning needs- continuous vs. seasonal production
2. Production goals- weekly, monthly and seasonal
3. Determining number of plants and seeds to reach production goals
4. Harvestable period of crop and its impact on sowing frequency
5. Determining space requirements
6. Intensive production within a field
7. Transplanting vs. direct seeding of crops
8. Spreadsheets for planning

See:

Unit 4.5 CSA Crop Planning in Teaching Direct Marketing and Small Farm Viability Training Manual. UCSC Center for Agroecology and Sustainable food systems Retrieved from <http://casfs.ucsc.edu/education/instructional-resources/downloadable-pdf-files2>

Crop rotation

1. Why rotate
2. Basics of rotation
3. Planning method
4. Example sequences
5. Intercropping
6. Example cover crops for Hawaii
7. Realities and constraints of crop rotation for disease and pest control

See:

Crop rotation on organic farms : a planning manual / Charles L. Mohler and Sue Ellen Johnson, editors. Natural Resource, Agriculture, and Engineering Service. Cooperative Extension. IV. Series: NRAES (Series) ; 177. Retrieved from <http://www.sare.org/Learning-Center/Books/Crop-Rotation-on-Organic-Farms>

Cover Crops and Green Manures for Hawaii <http://www.ctahr.hawaii.edu/sustainag/Database.asp>

*Activities:*

Develop a crop plan/planting schedule and projected field layout.

Develop a crop rotation plan

*Additional Independent Study:*

SARE Course-Small scale commercial Greenhouse production Steven Newman CSU:

<http://campus.extension.org/course/view.php?id=424>

**Session 4 (hrs 12-16 + self study)**

*Direct Instruction:*

Overview of electrical conduit tunnel construction project

1. Site layout
   1. Batter boards
   2. Mason’s line
   3. Squaring corners and checking diagonals
   4. Marking arch locations within layout
   5. Water level introduction and use
2. Footings and holding support posts for sidewall in place
   1. Depth
   2. Concrete
   3. Concept and importance of plumb
   4. Wet setting vs. jig
3. Technique of bending 3 lengths of conduit to form one arch
4. Cutting and reaming top rail (sleeves and support posts-use water level)
5. Cutting Bracing to length
6. Assembly of arches, bracing and perlins
7. Additional bracing
8. End walls and doorways
9. Wrapping sharp edges
10. Tricks for successful poly covering
11. Wiggle wire fastener and “C” clamps for end walls

See:

Building layout and Foundation, Construction Knowledge. Net. <http://www.constructionknowledge.net/public_domain_documents/Div_6_Woods_Plastics/Partial%20Carpentry%20pdfs/Layout_&_Foundations_Army_FM5-426.pdf>

Conduit Tunnel Plans

*Activities:*

Layout and begin assembly of an electrical conduit tunnel (part 1). This is an involved activity. Depending on nature of the site and length of time the location will be used, the activity can be shortened so students are introduced and gain experience in each of the various project steps but do not assemble a complete greenhouse (e.g. only three arches are assembled and put in place. If the site will be used for some time, the complete greenhouse can be constructed and used to support instruction of other certificates areas.

*Additional Independent Study:*

Read previously distributed or additional materials.

Continue working on enterprise, crop or site plans.

**Session 5 (hrs 16-20 + self study)**

*Direct Instruction:*

Basic record keeping (part 2). Review example templates in publication below:

Recordkeeping Instructions and Templates for Small-Scale Fruit and Vegetable Growers, 2012. *Farmers Legal Action Group, Minn.* Retrieved from http://www.flaginc.org/wp-content/uploads/2013/03/RecordkeepingToolkit2012.pdf

Understanding and calculating cost of production and break-even quantity/price

1. Fixed and variable costs
2. Importance of including individual’s labor in costs
3. Formula for break-even price
4. Formula for break-even quantity
5. Spreadsheets

See:

Cost of production folder for various UH CTAHR spreadsheets and economic analysis of “12 fruits”.

Iton, A., (2012). Cost of production guide. *Caribbean Agricultural Research and Development Institute, University of the West Indies, Trinidad, PSC# HQ/008/11.* Retrieved from <http://www.cardi.org/wp-content/uploads/2011/02/Cost-of-Production-Guide-by-A-Iton-Tech-Bulletin.pdf>

Professional Communication-resumes and correspondence

1. Discussion: value of professional communication skills for the entrepreneur or employee
2. Basic strategies for effective written communication
3. Standard Formatting Characteristics

See:

Folder on resumes and communication. Also, Penn State Unversity: <http://studentaffairs.psu.edu/career/students/resumes.shtml>

Exploring Agricultural Labor

1. Discussion: characteristics of a good employee
2. Working with others effectively
3. Characteristics of an effective supervisor
4. Worker selection processes
5. Preparing for an interview
6. Management practices
7. Training and delegating tasks
8. Wwoofing, internships, volunteers and other forms of labor

See:

Billikopf, G.E., (2003). Labor management in agriculture: cultivating Personnel productivity 2nd edition. *ANR, University of California, CA, publication 3417.* Retrieved from <http://www.cnr.berkeley.edu/ucce50/ag-labor/7labor/001.htm>

Additional files in labor folder

Wwoofing links for discussion:

<http://www.wwoofindependents.org/handbooks/wwoofer.pdf>

<http://wwoofusa.org/Farms/Host_Farm_Welcome_Info>

*Activities:*

Practice calculations for breakeven analysis and cost of production.

Explore and use various spreadsheets for planning or cost of production.

*Additional Independent Study:*

*Create a resume*

Draft a business letter

Read and/or view supplemental material not covered in class.

**Session 6 (hrs 20-24 + self study)**

*Direct Instruction:*

Nursery benches: layouts and designs

1. Materials
2. Bench height
3. Peninsular, longitudinal, and rolling bench efficiency
4. Other types of benches, beds and floors

See:

Greenhouse Beds, Benches and Floors lecture in SARE Course-Small scale commercial Greenhouse production Steven Newman CSU. Retrieved from

<http://campus.extension.org/course/view.php?id=424>

Nelson, Paul V. 2012. *Greenhouse Operation and Management* (7th Edition). Prentice Hall

Boodley, James W. and Steven E. Newman. 2009. *The Commercial Greenhouse* (3rd Edition). Delmar

Electrical conduit tunnel construction project cont’d

1. Site layout
   1. Batter boards
   2. Mason’s line
   3. Squaring corners and checking diagonals
   4. Marking arch locations within layout
   5. Water level introduction and use
2. Footings and holding support posts for sidewall in place
   1. Depth
   2. Concrete
   3. Concept and importance of plumb
   4. Wet setting vs. jig
3. Technique of bending 3 lengths of conduit to form one arch
4. Cutting and reaming top rail (sleeves and support posts-use water level)
5. Cutting Bracing to length
6. Assembly of arches, bracing and perlins
7. Additional bracing
8. End walls and doorways
9. Wrapping sharp edges
10. Tricks for successful poly covering
11. Wiggle wire fastener and “C” clamps for end walls

See:

Building layout and Foundation, Construction Knowledge. Net. <http://www.constructionknowledge.net/public_domain_documents/Div_6_Woods_Plastics/Partial%20Carpentry%20pdfs/Layout_&_Foundations_Army_FM5-426.pdf>

*Activities:*

Continue/complete assembly of conduit tunnel and cover with plastic film (part 2). This is an involved activity. Depending on nature of the site and length of time the location will be used, the activity can be shortened so students are introduced and gain experience in each of the various project steps but do not assemble a complete greenhouse (e.g. only three arches are assembled and put in place. If the site will be used for some time, the complete greenhouse can be constructed and used to support instruction of other certificates areas.

Construct and arrange benches inside tunnel or other location.

*Additional Independent Study:*

Read or view additional materials

This workforce solution was funded by a grant awarded by the U. S. Department of Labor’s Employment and Training Administration. The solution was created by the grantee and does not necessarily reflect the official position of the U. S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.