

Hawaii Community College  
Architectural, Engineering CAD Technologies  
Course Syllabus, Fall 2012

Course: AEC 118, Construction Materials

Credits: 3 lec/lab

Location: Manono Campus, Building 380, Rm. 30

Class Times: TWR 12:30-2:20

Instructor: D. DeLuz      Office: Building 380, Rm. 31  
Phone No.: 934-2682  
Email: deluz@hawaii.edu  
Office Hours: MW 2:30-3:30, TR 7:00-8:00

Course Description:

A broad survey of materials and products used in the building industry including concrete, masonry, wood, metals, electrical and mechanical systems and other topics based on the CSI (Construction Specification Institute) format. Emphasis on materials and construction in Hawaii including their nature, characteristics, variety and uses will be introduced.

Recommended preparation:

Mechanical drawing and computer keyboarding. Student must be able to access the internet because much of the readings, research and course materials will be researching products and materials over the WEB.

Specific course objectives: Upon completion of this course, the student should be able to:

1. Navigate through the "Sweet's Catalog", "Directory", and "Index" files.
2. Identify at least two types of construction documents.
3. Explain and describe cut and fill excavation.
4. Identify and describe at least four different types of retaining walls.
5. Identify and describe at least two types of building foundations.
6. Describe the types and proportioning of concrete mixtures.
7. Explain concrete curing, its process and time frame.
8. Explain the steps in constructing a slab-on-grade.
9. Explain the process of two concrete strength tests.
10. Define the term "masonry".
11. Describe concrete block walls, its installation process, and its reinforcing.
12. Explain the purpose of mortar and/or grout in masonry work.
13. Define common lumber and select lumber in reference to grading and species of wood.
14. Explain the differences between hardwood and softwood.
15. Explain the difference between nominal size and dressed size lumber.

16. Explain the process of wood pressure treating and preservatives.
17. Draw and explain at least four structural wood beams.
18. Explain the differences in characteristics between three different types of plywood.
19. Explain and give an example of a reconstituted wood product.
20. Draw, name, and explain three different truss designs.
21. Explain the meaning of R-value.
22. Identify and describe three different types of insulation materials.
23. Draw and explain valley flashing, two-part flashing, counter flashing, drip edge flashing, and cap flashing.
24. Identify and explain at least four different roofing materials and the steps involved in the installation of each.
25. Explain the construction of gypsum board, how it is installed in a residence, and how it is prepared to hide its joint.
26. Explain the construction steps for installing plaster or stucco.
27. Identify and describe at least two drywall accessories.
28. Research at least three flooring materials.
29. Describe and explain parquet, strip, and plank hardwood flooring.
30. Explain the steps involved in installing terazzo and ceramic floor tile.
31. Identify and explain at least two resilient flooring materials.
32. Explain how sound is transmitted between areas.
33. Identify and explain two acoustical materials or devices.
34. Explain the difference in exterior and interior paints.
35. Identify wood finishing products such as stains, fillers, and clear finishing materials.
36. Explain decorative finishes such as “textured”.
37. Give two examples of fire-retardant coatings.
38. Identify and explain a type of fireplace.
39. Give the meanings and identify on the drawings “flue”, “combustion chamber”, “smoke chamber”, “smoke shelf”, “hearth”, “mantel”, and “damper”.
40. Explain what is updraft and downdraft in the operation of a fireplace.
41. Design research on metal and wood casework, window treatment, blinds, shades, shutters, drapery, curtain hardware, and other furnishings.
42. Identify and explain elevator, escalator, moving ramp, and moving walk building transportation systems.
43. Identify any three pipe materials and its most typical method of joint preparation and fitting of each of those materials.
44. Explain how a septic tank, distribution box, and drainage field works.
45. Identify and explain on a given drawing breaker panel, service drop, outlet, breaker switch, masthead, meter, GFCI, ground, and special purpose outlet.
46. Draw and explain single pole switch, three-way switch and four-way switch.
47. Draw and categorize all electrical symbols.
48. Draw and organize all circuitry to electrical panel.

F. Text and materials: Sweet's General Building & Renovation Catalog Files, Sweet's (provided in class), Desktop Index, The Directory by: Sweet's Group, McGraw-Hill (provided in class) Construction Information Group.

\* **Materials required: Memory Card, Steel Toe shoes, Safety Glasses, Hard**

**Hat**

G. Reference materials (provided): Uniform Building Code, Architectural Graphic Standards, Architectural Drawing & Light Construction(from AEC 80), and handouts.

H. Auxiliary materials: Sweet's Catalog, Hawaii AIA Standards, County of Hawaii and State of Hawaii Standard Details, and handouts.

Note: Researching materials could be done on the Internet. The entire Sweet's Group McGraw-Hill Construction Information Group can be accessed at <http://www.sweets.com>

I.	Evaluation:	Assignments:	25%	Attendance:	25%
		Exams/Quiz	25%	Attitude	25%
	90-100	A	80-89	B	
	70- 79	C	60-69	D	
	<60	F			

J. Method of instruction: Lecture/Lab format. Internet research.

\*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.

\*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 Karen Kāne, Counselor for the Ha`awi Kokua Program **934-2725**, [kkane@hawaii.edu](mailto:kkane@hawaii.edu) 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.

### **Institutional Learning Outcomes (ILOs):**

1. Our graduates will be able to communicate effectively in a variety of situations.
2. Our graduates will be able to gather, evaluate and analyze ideas and information to use in overcoming challenges, solving problems and making decisions.
3. Our graduates will develop the knowledge, skills and values to make contributions to our community in a manner that respects diversity and Hawaiian culture.

### **Program Learning Outcomes (PLOs):**

1. Field and manual dexterity.
2. Construction methodology.
3. CAD and related technologies.
4. Design and code comprehension.
5. The “Kauhale” concept, where students study across the disciplines/cultures/generations, while taking to heart Hawaii Island’s culture multi-mixed and rich in traditions from many lands.
5. Sound work ethics and values in the spirit of “E Imi Pono”, where students are encouraged to develop their knowledge to the maximum potential.

### **Student Learning Outcomes (SLO):**

1. Demonstrates entry-level skills for accuracy in drawing geometric shapes, axonometric pictorials, orthographic projections, and identify the relationship of features to demonstrate visualization proficiency.
2. Identify or describe the characteristics and uses of construction materials, building products and systems, and research these materials for use based on a prescribed design project requirement.
3. Use with reasonable competence our two-dimensional and three-dimensional CAD programs to create architectural and engineering drawing documents for use in the Construction Technology Capstone DHHL Model Home Project.
4. Use with reasonable competence our surveying had tools/equipment, theodolite, total stations, GPS Garmin’s safely on campus and at the DHHL Model Home Project site.
5. Formulate, design, revise, and construct projects of knowledge and comprehension based on design criteria requiring recall of past courses/experiences and be able to defend, explain, and discuss designs.
6. Demonstrate communication, critical thinking, research, and problem-solving skills.
7. Understanding the balance between cultures, community, and the environment.
8. Demonstrate computation and reasoning skills.