

San José State University
Environmental Studies Department
Solar Home Design ENV5/DSIT 132, Fall 2016
#48191 #49331

Course and Contact Information

Instructor:	Benoit Delaveau, M.S, CEM, BEAP
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Office Hours:	MoWe Noon – 1:00 PM
Class Days/Time:	Fr 12:30AM - 3:15PM
Classroom:	Sweeney Hall 346

Faculty Web Page and MYSJSU Messaging

You are responsible for regularly checking with the messaging system through MySJSU and canvas. Course materials such as the syllabus, assignments, readings, and handouts are posted to canvas: <https://sjsu.instructure.com> Log in with your SJSU One account info. For assistance see: <http://www.sjsu.edu/at/ec/support/>

Course Description

Americans use an inordinate amount of energy to realize the standard of living to which we all have come to enjoy. Not only do we enjoy this standard of living, we expect it. Yet, to live as we do requires a tremendous amount of energy and resources.

The residential sector uses between one-fifth and one-fourth of all energy consumed in the United States. There are many ways to reduce this energy consumption and resource consumption without diminishing our comfort levels or “doing without”. This class will explore ways to live with environmental responsibility and integrity when it comes to our homes with design options ranging from smart architecture and orientation, passive solar options (fenestration, shading, overhang designs) and zero-net energy building options.

Course Goals

At the end of the semester student should demonstrate proficiency in these fields:

1. **PASSIVE HEATING AND COOLING DESIGN FOR HOUSES:** The basics of integral solar home design for heating and cooling, sunspace additions to homes, and direct gain for new construction and remodel.
2. **HOME ENERGY EFFICIENCY:** How to make a home more energy efficient than conventional homes improving heating/cooling systems, the building envelope, lighting, and appliances and working on occupant behaviors. How to decrease our impact on the environment through the way we live in our homes. Each student will perform a level 1 energy audit on his/her family house and write a final 10 pages report with personalized recommendations.
3. **GREEN LIVING:** Using 'green' and recycled building materials for construction and interior living spaces.
4. **HEALTHY HOMES:** Often, indoor air is more polluted than outside air. We will explore ways to prevent this.

Course Learning Outcomes (CLO)

See "Course Goals" above.

Required Texts/Readings

The Solar House: Passive Heating and Cooling. By Daniel D. Chiras, published by Chelsea Green Publishing Company, 2002. Available on Amazon.com (instant download available on Kindle/Kindle apps).

Consumer Guide to Home Energy Savings. 10th edition by Jennifer Thorne Amann, Alex Wilson, and Katie Ackerly, published by New Society Publishers, 2012. Available on Amazon.com (instant download available on Kindle/Kindle apps, hardcopy book strongly recommended)

Other Readings (no need to purchase)

Articles and handouts are posted to canvas: <https://sjsu.instructure.com/>

Residential Energy: cost savings and comfort for existing buildings. 5th edition by John Krigger and Chris Dorsi. Published by Saturn Resource Management, Inc., 2004.

The Home Energy Diet: how to save money by making your house energy smart. By Paul Scheckel, published by New Society Publishers, 2005.

The Homeowner's Guide to Energy Independence: Alternative Power Sources for the Average American. By Christine Woodside, published by The Lyons Press, 2006.

Good Green Homes: Creating Better Homes for a Healthier Planet. By Jennifer Roberts, published by Gibbs Smith, 2003

Library Liaison

Peggy Cabrera, peggy.cabrera@sjsu.edu

Course Requirements and Assignments

Dropping and Adding: Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, ... Refer to the current semester's Catalog Policies section at <http://info.sjsu.edu/static/catalog/policies.html>

Grading: Use the percentages below and your scores to monitor your grade. Real time grade will be available along the semester on Canvas.

Credit-hour statement: This three-unit course requires a minimum of 9 hours per week to complete class-related readings and assignments (roughly 2.5 hours in class and 6.5 hours outside class per week.) Careful time management will help

you keep up with readings and assignments and enable you to succeed in all your classes. More details about student workload can be found in University Policy S12-3 at <http://www.sjsu.edu/senate/docs/S12-3.pdf>

Grading Information – Final Examination

20% Participation: It is expected that you will engage in class discussions as the class is formatted as a seminar. Come to class having completed all of the assigned readings. Every article or chapter from the textbooks we read must be summarized or noted upon on your notebook. Hand written or printed personal notes may be allowed to refer to during exams. Share your thoughts about the readings when prompted, ask questions about lectures, answer discussion prompts. Keeping good notes about the main points or views taken by authors of course readings is a good means to facilitate a sustained discussion, and be successful in passing the quizzes that may or may not start class time. We may have up to 5 quizzes in class this semester. Each quiz grade is 2% of your final grade (participation points). *Current events in building science* Reply to the postings to the canvas website in the discussion section with a short description; and a link to an additional source related to the main article. Prepare a few remarks as we'll want to know more than just the headline. You are expected to reply to at least 5 discussions over the semester to get full online participation points.

20% Field notes. Two field trips (10 points each). Keep notes on all field trips and speakers. Take pictures when applicable. Write down the date, what you saw, what building features were involved, function of the features, significance of the feature, what you learned. Polish and type your notes, turn the final document to your instructor for grading.

30% Exams: One mid-term (15 points) and one final exams(15 points)

Both the midterm and the final exams will be open notebook (your personal typed or handwritten notes). The exams will include short answers and essay questions. Your notebook should contain lecture notes and short annotations on the readings. If you take notes in the margins of your readings, make sure to transfer important ones to your notebook. You must bring a calculator to the examinations. You will not have access to any online electronic devices (other than a calculator). To study for the tests, you should review the readings, course lecture notes, homework, and learning objectives well in advance of the test date. The midterm will include material covered during the first portion of the class. We will include both multiple choice and problems related to the scientific principles of energy, heat, and work. You are encouraged to review the problems sets before the midterm.

30% Your home Energy Audit (level 1):

- 1 - Your home energy use (5 points)
- 2 - Floor plan Assignment (5 points)
- 3 - Direct Gain Assignment (5 points)
- 4 - Your home Energy Use Index and Energy Cost Index (5 points)
- 5 - Your home Energy Audit (5 points)
- 6 - Your home Energy Conservation Plan and final report (5 points)

Determination of Grades

The course grade will be determined based on a total 100 possible points. Accumulated points that fall within the grade scale below determine your semester grade.

A+ 97–100

A 92–96

A- 89–91

B+ 86–88

B 81–85

B- 79–80

C+ 76–78 C 72–76

C- 69–71

D+ 67–68

D 64–66

D- 60–64

F < 60

- NO Extra Credit available (given the work load to deal with in this class).
- Penalty for late or missed work: -10% of the assignment's grade after 1st week of delay. -20% of the assignment's grade after 2nd week of delay. Not accepted after more than 14 days of delay (grade will be null)

Classroom Protocol

You are expected to come to every class on time. Class time starts with attendance check (not reflected in your final grade). However, classroom participation and results on the quizzes will be reflected in your final grade. No cell phone, emailing, or text messaging during class. If you need to make a phone call or send an email, or work on anything else that class material please excuse yourself from class or your instructor will ask you to leave the classroom.

University Policies

Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The [University Academic Integrity Policy F15-7](#) requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. Visit the [Student Conduct and Ethical Development](#) website for more information. See here for other campus wide policies <http://www.sjsu.edu/gup/syllabusinfo/>

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Course Schedule

This schedule is subject to change with fair notice. If necessary, the electronic schedule available on Canvas will be updated along the semester on a week to week basis.

8/26 Introduction – #1 Energy, the big picture, units

Readings: Handouts (article on Negawatts)

9/2 - #2 Passive Solar Home

Readings: Read chapters 1-3 in Chiras

Assignment #1: Your home energy use report due (see example in lecture slides).

9/9 First field trip!

Readings: Handout regarding the home you will be visiting

9/16 - #3 Passive Solar Home (2)

Readings: Read chapter 4-6 in Chiras

Assignment #2: Your home floorplan assignment due (see example in lecture slides).

Field trip #1: Your field note report

9/23 - #4 Overhangs design and efficiency

Readings: Read chapter 1 in A,W,&A

9/30 - #5 Home Performance / Analyzing Utility Data

Readings: Read chapters 2 and 3 in A,W,&A

Assignment #3: Direct gain assignment due. due (see example in lecture slides).

10/7 - #6 Space Heating/cooling

Readings: Read chapters 4 and 5 in A,W,&A

Assignment #4: Your home EUI/ECI due (see example in lecture slides).

10/14 - **Mid-term in-class** Open notebook; bring a calculator! - #7 Sustainable Lighting

Readings: Read chapters 11 in A,W,&A

10/21 - #7 Appliances and Smart controls

Readings: Read chapters 7 to 14 in A,W,&A

10/28 - #8 Home Energy Audits

Readings: Handouts

11/4 - #9 Renewable Energy and Zero net energy buildings

Readings: Read chapters 8 in Chiras

Assignment #5: Your draft home energy audit report due (see example in lecture slides).

11/11- **11/8 election day – NO CLASS (Veteran Day)**

11/18 - **#10 Healthy Homes**

Readings: Handouts

11/25 - **NO CLASS (Thanksgiving)**

12/2 - **# 11 Water use and energy**

Readings: Read chapters 6 in A,W,&A

Assignment #6: Your FINAL home energy audit report with ECP due (see example in lecture slides).

12/9 - **#12 Study session and field trip #2 - Last day of class!**

12/20 - Final Exam **Tuesday, December 20 12:15PM-14:30PM**