UNIVERSITY OF NEVADA, LAS VEGAS
School of Architecture

F 2019

LAND 330 Design with Climate

Instructor:

Office:
Phone:
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Office Hours:

Grad. Assistant:

Office: Phone:

E-mail:

Office Hours:

Class Time: Thursdays from 8:30 to 11:15

Description: **LAND 330 Design with Climate (3 credit hours)**
Explanation of the effects of climate on thermal comfort. Comprehensive coverage of basic climatic design principles. Emphasizes integrating available solar and renewable energies in design.

Prerequisites: LAND 282.

Cities around the world are facing an ever-increasing variety of challenges that seem to make a more sustainable urban future elusive. A 2007 report from the United Nations Intergovernmental Panel on Climate Change (IPCC) stated that "warming of the climate system is unequivocal."[1] Experts predict that the increase in the Earth's temperature, if left unchecked, will have devastating effects such as: "sea level rise; increased spread of diseases; extensive species extinction; drought and wildfires; mass human, animal and plant migrations; and resource wars over shrinking amounts of potable water."[2] Solutions are needed today if our cities and the world are to have any hope of a more sustainable and resilient future. As these issues vary and range across multiple scales, landscape architecture is rightly positioned to examine and propose solutions that address these ecosystems in flux. This course offers an examination of the effects of climate on human comfort and wellbeing, and how we as designers can offer solutions that adapt, mitigate and are resilient to climatic challenges.

1 IPPC Climate Change 2007 Synthesis Report. p. 30

2 IPPC Climate Change 2007 Synthesis Report. p. 48

UNLV Policies:

A. ADA Accommodations

For all accommodation determinations allowed under the Americans with Disabilities Act (ADA), please contact the Compliance Office, https://www.unlv.edu/compliance/ada, located in Frank and Estella Beam Hall (BEH), Room 555, 702-895-4055.

B. Disability Resource Center (DRC)

The UNLV Disability Resource Center (SSC-A, Room 143, https://www.unlv.edu/drc, 702-895-0866) provides resources for students with disabilities. Students who believe that they may need academic accommodations due to injury, disability, or due to pregnancy should contact the DRC as early as possible in the academic term. A Disabilities Specialist will discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours, so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

C. Classroom Guidelines

Per UNLV General Counsel, instructors determine what is and what is not acceptable behavior in the classroom (e.g., late arrival, use of electronic devices). Instructors have the authority to determine who can be present during a class period, including whether visitors are allowed. Instructors should clearly communicate their expectations to the students at the start of the semester.

D. Classroom Conduct

Students have a responsibility to conduct themselves in class and in the libraries in ways that do not interfere with the rights of other students to learn or of instructors to teach. Use of electronic devices such as pagers, cellular phones, or recording devices, or potentially disruptive devices or activities, are only permitted with the prior explicit consent of the instructor. The instructor may rescind permission at any time during the class. If a student does not comply with established requirements or obstructs the functioning of the class, the instructor may initiate an administrative drop of the student from the course.

E. Academic Misconduct

Academic integrity is a legitimate concern for every member of the Campus community; we all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility, and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy, and are encouraged to always take the ethical path whenever faced with choices. Students enrolling at UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's educational mission. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another person, from the Internet or any other source without proper citation of the sources. See the Student Conduct Code, https://www.unlv.edu/studentconduct/student-conduct.

F. Copyright

The University requires all members of the University Community to familiarize themselves with, and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The University will neither protect nor defend you, nor assume any responsibility for employee or student violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional copyright policy information is available at http://www.unlv.edu/provost/copyright.

G. Auditing Classes

Auditing a course allows a student to continue attending the lectures and/or laboratories and discussion sessions associated with the course, but the student will not earn a grade for any component of the course. Students who audit a course receive the same educational experience as students taking the course for a grade, but they will be excused from exams and any other evaluative measures that serve the primary purpose of assigning a grade.

H. Missed Classwork

Any student missing class, quizzes, examinations, or any other class or laboratory work because of observance of religious holidays will be given an opportunity during that semester to make up the missed work. The make-up opportunity will apply to the religious holiday absence only. It is the responsibility of the student to notify the instructor within the first 14 calendar days of the course for Fall and Spring courses of their intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit the Policy for Missed Work, under Registration Policies, on the Academic Policies webpage, https://catalog.unlv.edu/content.php?catoid=6&navoid=531.

In accordance with the policy approved by the Faculty Senate regarding missed class time and assignments, students who represent UNLV in any official extracurricular activity will also have the opportunity to make up assignments, provided that the student provides official written notification to the instructor no less than one week prior to the missed class(es).

The spirit and intent of the policy for missed classwork is to offer fair and equitable assessment opportunities to all students, including those representing the University in extracurricular activities. Instructors should consider, for example, that in courses which offer a "Drop one" option for the lowest assignment, quiz, or exam, assigning the student a grade of zero for an excused absence for extracurricular activity is both contrary to the intent of the Faculty Senate's policy, and an infringement on the student's right to complete all work for the course.

This policy will not apply in the event that completing the assignment or administering the examination at an alternate time would impose an undue hardship on the instructor or the University that could reasonably have been avoided. There should be a good faith effort by both the instructor and the student to agree to a reasonable resolution. When disagreements regarding this policy arise, decisions can be appealed to the Department Chair/Unit Director, College/School Dean, and/or the Faculty Senate Academic Standards Committee.

For purposes of definition, extracurricular activities may include, but are not limited to: fine arts activities, competitive intercollegiate athletics, science and engineering competitions, liberal arts competitions, academic recruitment activities, and any other event or activity sanctioned by a College/School Dean, and/or by the Executive Vice President and Provost.

I. Incomplete Grades

The grade of "I" (Incomplete) may be granted when a student has satisfactorily completed three-fourths of course work for that semester/session, but cannot complete the last part of the course for reason(s) beyond the student's control and acceptable to the instructor, and the instructor believes that the student can finish the course without repeating it. For undergraduate courses, the incomplete work must be made up before the end of the following regular semester. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the period indicated, a grade of "F" will be recorded, and the student's GPA will be adjusted accordingly. Students who are fulfilling an Incomplete grade do not register for the course, but make individual arrangements with the instructor who assigned the "I" grade.

J. Final Examinations

The University requires that final exams given at the end of a course occur on the date and at the time specified in the Final Exam schedule. The general schedule is typically available at the start of the semester, and the classroom locations are available approximately one month before the end of the semester. See the Final Exam Schedule, https://www.unlv.edu/registrar/calendars.

K. Library Resources

Librarians are available to consult with students on research needs, including developing research topics, finding information, and evaluating sources. To make an appointment with a subject expert for this class, please visit the Libraries' Research Consultation website: http://guides.library.unlv.edu/appointments/librarian. You can also ask the library staff questions via chat and text message at: http://ask.library.unlv.edu/.

L. Tutoring and Coaching

The Academic Success Center (ASC) provides tutoring, academic success coaching, and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, please visit the ASC website, https://www.unlv.edu/asc, or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of SSC A, Room 254. Drop-in tutoring is located on the second floor of the Lied Library, and on the second floor of the College of Engineering building (TBE A 207).

M. UNLV Writing Center

One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, https://writingcenter.unlv.edu/, located in the Central Desert Complex, Building 3, Room 301 (CDC 3–301). Walk-in consultations are sometimes available, but students with appointments receive priority assistance. Students may make appointments in person or by calling the Center, 702-895-3908. Students are requested to bring to their appointments their Rebel ID Card, a copy of the instructions for their assignment, and two copies of any writing they have completed on their assignment.

N. Rebelmail

Rebelmail is UNLV's official email system for students, and by University policy, instructors and staff should only send emails to students' Rebelmail accounts. Rebelmail is one of the primary ways students receive official University communications, information about deadlines, major Campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the University.

School of Architecture Policies:

All work produced within the School of Architecture becomes and remains the property of the school for use in documenting work for accreditation. All work must be documented for your personal use prior to its final submittal.

Any course required for a major in which a grade of D+ (C+ for graduate level courses) or less is received must be retaken with an earned grade of C- (B- for graduate level courses) or above. For design studio courses this must be accomplished prior to progressing to the next studio level.

The School of Architecture is a professional school. While in class and in the studio, students are expected to conduct themselves in a professional manner. This means showing respect for property and for other individuals. Actions which might be offensive to another individual are to be avoided. Language and attires should be appropriate for a professional environment. Materials displayed within the classroom, the studio, or on a computer screen should also be appropriate to a professional environment. Please refer to the UNLV School of Architecture Student Handbook for other policies applying to the School of Architecture.

Course Overview

Design with Climate (LAND 330) is a course that addresses the important relationships that exist **between people and the surroundings they inhabit.** Therefore, it combines the study of physical phenomena (heat transfer, light, etc.) that influence people's sense of comfort and wellbeing with the study of ecologically appropriate design techniques and methods to provide optimum outdoor conditions.

Design with Climate combines the three major influences on landscape and environmental design: **aesthetic, social, and technical.** This course is designed to help you to quickly test your design ideas to see if they meet basic comfort and ecological performance criteria; the term project, class exercises, readings, and the material covered in lectures present you these criteria. Although these criteria may be stated in a technical (easy-to-calculate) way, they carry with them significant opportunities for social and aesthetic development.

Some of the most interesting ways in which people interact with the environment involve the luminous, thermal, and acoustic environments as well as the overall air quality. Therefore, landscape designs are often considered "successes" or "failures" in large part by how effectively they provide both the comfort and the inspiration required/desired by our senses of sight, sound, touch, smell, and even taste. All these senses are involved in the landscape/person interaction.

Design with Climate is organized into various units that explore the relationships between climatic conditions, ecological processes and the opportunity for design to interface with these fluctuating systems. For the first half of the semester, each week will be split up between a lecture and a lab component that focuses on climate analysis and representation techniques. Through the use of case studies, analysis mappings, empirical research, and provocative recommendations, students will learn how to recognize a climatic problem and translate solutions from the macro-climatic regional scale to the micro-climatic human scale. Emphasis will be placed on ecological performance, urban resiliency and human comfort.

Lastly, *Design with Climate* also provides you with opportunities to explore innovative solutions that work with natural systems to create climatically appropriate spaces for human activities. This aspect of the course will place you in an advantageous position since the American Society of Landscape Architects and our society as a whole have recognized and embraced the importance of addressing sustainability issues in our landscapes, neighborhoods and cities. I hope that by the end of this semester, *Design with Climate* will have excited you by its richness of design criteria, and its many opportunities for creativity and expression!

Course Objectives

At the end of *LAND 330 - Design with Climate* you are expected to have an:

- *Ability* to document climatic conditions at the site scale.
- *Ability* to document how objects in the landscape affect the climate and create microclimates.
- *Understanding* of appropriate methods for modifying the key variables in a microclimate, including radiation, temperature, air humidity, and wind.
- Ability to generate design proposals that create successful, comfortable spaces under a wide variety of climatic conditions.

Required Texts + Materials

- Design with Microclimate: The Secret to Comfortable Outdoor Spaces
  Robert D. Brown (SB475.9.C55 B75 2010)
- Pilkington's Sun Angle Calculator®
  The Sun Angle Calculator Manual is available for download at: https://www.sbse.org/sun-angle-calculator

School of Architecture Letter Grade Description

A **Superior:** Represents comprehensive excellence. Not only does the work fulfill all requirements in an excellent and professional manner, but goes beyond the given requirements aiming at standards higher than requested. The student is an active and engaged participant in all class activities and intellectual progress and development have been demonstrated by the timely preparation of thoughtful work on a regular basis. This work is of a quality that is instructive to the teacher and exemplary to the rest of the class and sets a standard for the exercise and/or the course.

B **Above Average:** Represents work that can be distinguished as being of truly "good" quality. The work is free of significant flaws, is comprehensive in scope and exceeds all minimum requirements. The student is an active and engaged participant in all class activities and intellectual progress and development have been demonstrated by the timely preparation of work on a regular basis. This work is of a quality that is exemplary for the exercise and/or the course.

C **Average:** Represents satisfactory and average performance. The work is free of major flaws, is comprehensive in scope, and meets all minimum requirements. Intellectual progress and development have been demonstrated by the timely preparation of work on a regular basis. The student and instructor can take "satisfaction" in the average resolution of the exercise and/or course.

D-F ***Failing:*** *Represents substandard work that is not passable. The work has not fulfilled requirements, or has not been completed on time, or does not appropriately address the issues raised by the exercise and/or course and is unacceptable.*

I **Incomplete:** An "incomplete" on a **project** can only be given in exceptional cases in which failure to complete the assignment is a result of illness or injury requiring a visit to a doctor, a death in the immediate family, military or legal obligations, or other equally serious reasons that can be documented in acceptable written form (such as medical records or legal notification). When possible, all outstanding circumstances that might impact the completion of a project should be brought to the instructor's attention in advance of the class(es) that may be missed. In addition, **documentation for excused absences must be provided no later than the third class meeting following the event** or the absence(s) will be counted as unexcused and no *Incomplete* can be given. All incomplete work is subject to late penalties as per the instructor's policy.

An "incomplete" in a course is only given in exceptional cases where there is/was a serious excusable reason for not completing course requirements (see above). The quality of work in the course up to that point has been satisfactory and passing (see Academic Policies section of the Undergraduate Catalog for further details).

Instructors are permitted to assign + or – to grades. However, there is no grade of "A+" within these guidelines.

Grading

As stated on page 4 of this syllabus, School of Architecture policies stipulate that "any course required for a major in which a grade of D+ (or C+ for graduate level courses) or less is received must be retaken with an earned grade of C- (or B- for graduate level courses) or above." The grading criteria for this course are explained in detail on the following two pages:

Your Basic Grade:

Your "basic grade" is determined as follows:

Five Team Exercises	25 points (5 points each)
Term Project	35 points
Midterm Exam	20 points
Comprehensive Final Exam	20 points
	100 points

Grading Scale:

The university +/- grading scale will be used in this course. The following standard cutoffs will be used to determine your final "basic grade":

93.3 + …….	A
90.0 + …….	A-
86.7 + …….	B+
83.3 + …….	B
80.0 + …….	B-
76.7 + …….	C+
73.3 + …….	C
70.0 + …….	C-
66.7 + …….	D+
63.3 + …….	D
60.0 + …….	D-
< 60 …….	F

Team Exercises:

The five team exercises will be graded based on completeness and accuracy of the proposed solution. In order to obtain the 25 points assigned to these assignments you have to:

- Turn in all assignments *completely finished*, with *all requirements accurately and correctly answered*, and with graphic content *neatly presented* by the **beginning** of the class in which the assignments are due. Late submissions (within 24 hrs. of due date) will result in a grade reduction of 2 points per assignment. Submissions made after 24 hours of the due date will not be accepted and will receive a "0" grade.
- Graded assignments can be resubmitted with corrections for ½ of all missed points and must be turned in at the beginning of the following class in which they were returned. **No late submissions will be accepted on corrections.**
- Turn in your five exercises in a binder with a CD containing the digital files (PDF only). **Failure to submit the binder at the end of the semester will result in a final grade reduction of 10 points.**

Term Project:

The term project will be done in teams of 3-4 students over the course of the semester. The term project will produce an urban heat island map of a specific area of the Las Vegas Metropolitan Area. Much of the field work for this project will have to be done right after sunset and will also require driving through various neighborhoods.

The process and grading criteria for the term project will be discussed in detail when this project is assigned. To obtain the 35 points assigned to the term project, the work will have to be completely finished, with all requirements accurately and correctly addressed, and with all graphic content neatly and professionally presented.

Exams:

The following information applies to the midterm and **comprehensive final exam**:

- Exams will be given on a scheduled basis; make-ups will not be provided except in the case of a valid medical condition or any of the situations described in the "UNLV Policies" section of this syllabus.
- Exams will cover **all** assigned readings, lecture presentations and class exercises.
- Exams **will NOT be open book/open notes**. An 8½ " x 11" study guide (one-sheet, both sides) individually prepared by each student will be permitted and must be turned in with the exam.
- Exams will have a multiple-choice format.

Your Modified Grade:

Your basic grade may be raised or lowered depending on your performance and participation in the course. Please read all the rules described below, as they can affect your final grade!

A. You can raise your basic grade:

- By doing **remarkably good work** in the five assignments. If an assignment goes above and beyond the stated requirements, or demonstrates mastery on the integration of class content, the assignment will receive **up to two additional points**. Notice that by doing exceptionally good work in all your assignments you could raise your final "basic grade" **ten points** (e.g. you can raise your grade from a "C-" to "B-"). Keep in mind that typically, less than 5% of the assignments receive this extra credit. These additional points will only be available on the original submission, not the make-up submission.

- By submitting **5 reading journal entries** corresponding to the five readings assigned on page 9 of this syllabus. The reading journals **must be submitted at the beginning of the class corresponding to the week in which a reading is to be completed**. The purpose of these reading journals is to assess your understanding of the readings. The reading journal provides you with an opportunity to not only summarize the information contained in the reading, but also to record your thoughts, reactions, and questions about the material read. Thoughtful questions are those that do not have one correct answer, but rather provide an opportunity for discussion. For example: "What is the LEED rating system?" versus "How successful has the LEED rating system been in reducing greenhouse gas emissions of the building sector?" The first question is trivial and not thought-provoking; whereas the second one opens up a variety of interpretations on the role played by the LEED rating system during the development of the green building movement. **For every well-crafted, grammatically correct, reading journal** submitted on time you will receive **up to one additional point**. Notice that by doing an excellent job in all five reading journals, you could raise your final "basic grade" **five points**.

B. You can lower your basic grade:

- By having **two** unexcused absences to the class, in this case your final "basic grade" will drop **1/3 of a letter grade** (e.g., from "C-" to "D+").

- By having **three** unexcused absences to the class, in this case your final "basic grade" will drop by **one whole letter grade** (e.g., from "C" to "D").

C. You can fail this class by any of the following reasons:

- Having **more than three** unexcused absences to the class.

- **Missing any of the exams** without a legitimate reason acceptable to the instructor.

Course Materials on Reserve at the Architecture Studies Library:

The following books are fundamental references for this course. For your convenience, they have been placed on two-hour reserve at the Architecture Studies Library:

1. Design with Microclimate: The Secret to Comfortable Outdoor Spaces
   Robert D. Brown (SB475.9.C55 B75 2010)

2. Sun, Wind and Light: Architectural Design Strategies
   G.Z. Brown and Mark DeKay (NA2542.3 .B76 2013)

3. Design with Climate: Bioclimatic Approach to Architectural Regionalism.
   Victor Olgyay and Aladar Olgyay (NA2540 .O44)

4. Sitescapes: Outdoor Rooms for Outdoor Living
   Gregory M Pierceall (SB472 .P543 1990)

5. Utilizing Green and Bluespace to Mitigate Urban Heat Island Intensity
   Gunawardena, K.R., Wells, M.J. and Kershaw, T. (Elsevier ScienceDirect Journals Complete)

6. Sustainable Communities: A New Design Synthesis for Cities, Suburbs, and Towns
   Edited by Sim Van der Ryn & Peter Calthorpe (HN90.C6 S93 1991)

7. The Green Studio Handbook: Environmental Strategies for Schematic Design
   Alison G. Kwok and Walter T. Grondzik (TH880 .K87 2018)

Required and Recommended Readings:

DWM (Design with Microclimate: The Secret to Comfortable Outdoor Spaces)

Readings should be completed before coming to lecture on the week indicated.

WEEK 2: **DWM** Chapter 1 – Experiential (pp. 1-23)

WEEK 3: **DWM** Chapter 2 – Vernacular (pp. 25-41)

WEEK 5: **DWM** Chapter 3 – Components (pp. 43-97)

WEEK 7: **DWM** Chapter 4 – Modification (pp. 99-141)

WEEK 8: **DWM** Chapter 5 – Principles and Guidelines (pp. 143-161)

The five chapters of DWM should be studied in preparation of the Midterm Exam

WEEK 15: Review all materials in preparation for the Comprehensive Final Exam.

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WEEK	DATE		OTHER EVENTS & INFORMATION	LECTURE PRESENTATIONS	EXERCISES & TASKS
1	M	26-Aug			
	T	27-Aug			
	W	28-Aug			
	U	**29-Aug**		**Introduction + Climate Context**	
	F	30-Aug	Last day to withdraw (100% refund)		
2	M	2-Sep	**Labor Day Recess**		
	T	3-Sep			
	W	4-Sep			
	U	**5-Sep**		**Thermal Comfort + Climate Data Sources**	**Ex. 1 + Term Project Assigned**
	F	6-Sep			
3	M	9-Sep			
	T	10-Sep			
	W	11-Sep			
	U	**12-Sep**		**Representing Climate Part 1: Temperature and Humidity**	**Ex.1 Due / Ex. 2 Assigned**
	F	13-Sep			
4	M	16-Sep			
	T	17-Sep			
	W	18-Sep			
	U	**19-Sep**		**Representing Climate Part 2: Wind**	**Ex. 2 Due / Ex. 3 Assigned**
	F	20-Sep			
5	M	23-Sep			
	T	24-Sep			
	W	25-Sep			
	U	**26-Sep**		**Representing Climate Part 3: Solar Radiation + Shading Calendar**	**Ex. 3 Due / Ex. 4 Assigned**
	F	27-Sep			
6	M	30-Sep			
	T	1-Oct			
	W	2-Oct			
	U	**3-Oct**		**Site Analysis + Solar Access Study**	**Ex. 4 Due / Ex. 5 Assigned**
	F	4-Oct	Last day to withdraw (50% refund)		
7	M	7-Oct			
	T	8-Oct			
	W	9-Oct			
	U	**10-Oct**		**Urban Challenges + Heat Island Effect**	
	F	11-Oct			
8	M	14-Oct			
	T	15-Oct			
	W	16-Oct			
	U	**17-Oct**		**MIDTERM EXAM (20% of your final grade)**	
	F	18-Oct			
9	M	21-Oct			
	T	22-Oct			
	W	23-Oct			
	U	**24-Oct**		**Green Infrastructure + Wildlife Habitats & Corridors**	**Ex. 5 Due**
	F	25-Oct	**Nevada Day**		
10	M	28-Oct			
	T	29-Oct			
	W	30-Oct			
	U	**31-Oct**		**Term Project Work Session 1 (Data Processing)**	
	F	1-Nov	Last day to withdraw		
11	M	4-Nov			
	T	5-Nov			
	W	6-Nov			
	U	**7-Nov**		**Renewable Energy Opportunities**	
	F	8-Nov			
12	M	11-Nov	**Veterans Day Recess**		
	T	12-Nov			
	W	13-Nov			
	U	**14-Nov**		**Term Project Work Session 2 (Data Mapping)**	
	F	15-Nov			
13	M	18-Nov			
	T	19-Nov			
	W	20-Nov			
	U	**21-Nov**		**Term Project Student Presentations**	**Term Project Due**
	F	22-Nov			
14	M	25-Nov			
	T	26-Nov			
	W	27-Nov			
	U	**28-Nov**	**Thanksgiving Recess**		
	F	29-Nov			
Study	M	2-Dec			
Week	T	3-Dec			
	W	4-Dec			
	U	**5-Dec**		**Final Exam Review Session**	
	F	6-Dec			
Exam	M	9-Dec			
Week	T	10-Dec			
	W	11-Dec			
	U	**12-Dec**		**COMPREHENSIVE FINAL EXAM (20% of total grade)**	
	F	13-Dec			