Weather and Climate

SC120 **Brian Cacchiotti**
Spring 2010 **4 Credits**

Course Information

Section 01:
Meeting Times: Monday, 8:30 am – 11:00 am
Wednesday, 8:30 am – 10:20 am

Section 02:
Meeting Times: Monday, 12:00 pm – 2:30 pm
Wednesday, 10:30 am – 12:20 pm

Class time will consist of lecture, class activities, research (independent and groups) and it will include time for some in-class lab activities. Lab components will include in-class, take home and on-line activities and projects.

Instructor

Name: Brian Cacchiotti Phone: *Please email me!*
Office: Adjunct Offices Office Hours: Monday 11:00 am – 12:00 pm
Email: **brianc@primemail.com** or **brian.cacchiotti@marioncourt.edu**
Class Website:
http://www.itsallgeography.com/ **Then follow MCC link!**

I. COURSE DESCRIPTION

This course will examine the elements and controls of weather on the earth's surface including the extent and composition of the atmosphere; atmospheric heating and cooling; pressure and winds; and moisture and precipitation. An introduction to weather forecasting techniques and a descriptive analysis of world climate regions and an introduction to maps and basic topics in physical geography will also be provided. Required laboratory.

II. COURSE OUTCOMES

Upon completion of this course, students will be able to:

Connect the course material to broader aspects of human experience, including:

- Existing or increased curiosity about the physical world, and in particular, the atmosphere and its related weather and climate;
- How geographers study the physical environment;

- Improved understanding of weather forecasts on TV, radio, internet, or in newspapers;
- The influence of pollution on the atmosphere and our environment; and
- Global climates and how the Earth's climate is changing;

Employ the technical skills and analytical tools of physical geography, including:

- Use of the scientific method in problem solving and inquiry;
- Analysis of maps in order to understand current weather and climate conditions and to predict future events;
- Analysis and creation of tables and graphs to organize scientific data and to determine trends;
- Calculation of atmospheric moisture, relative humidity, and intensity of incoming solar radiation;
- Determination of climates, given temperature and moisture data; and
- Explanation and prediction of storm activity such as thunderstorms, tornadoes and hurricanes.

Explain the following scientific processes and principles:

- The composition and function of the atmosphere in influencing weather and climate;
- The hydrological cycle (in the context of weather and climate);
- The relationships between temperature, pressure, wind, and frontal activity, in helping to understand and predict weather activity;
- Varying cloud and fog patterns and their associated precipitation; and
- The relationship between solar energy and weather, climate, and most physical cycles on Earth.

III. INSTRUCTIONAL MATERIALS

We will be using both a textbook and a lab manual.

Climate: The Force That Shapes Our World and the Future of Life on Earth, 2005, Hoffman, Jennifer, Tin, Tina and Ochoa, George, Rodale Books

It might also be helpful for you to have a **College World Atlas** in order to better know where in the world we are talking about! It is sometimes bundled with the textbook, sometimes not. I believe it is every student's duty to have an atlas on your shelf even in the age of GoogleMaps! While it is not required, it is a good idea to have an atlas handy if while I am talking about **Austria** you are picturing **kangaroos** in your head!

IV. TEACHING STRATEGIES

I will be using multiple teaching strategies in this course. Primarily our class time together will be spent in a lecture format, using Powerpoint slides and short animations. There will be ample time for questions and

discussion of the topics we are exploring. Students should ALWAYS feel free to ask questions if they are unsure of the material or need to clarify any points during the lecture.

We will also be having a **laboratory component** to this course. Lab materials will be provided (when applicable) and each student will be expected to complete the lab exercise(s) assigned each week. I will give a brief overview of the coming lab during the last 10 minutes of each lecture and collect the previous labs at the start of the next lecture class. I will also make time to be available to discuss any issues you may have with the labs and to assist you in any way. Also, I encourage students to work together in the completion of the labs. I believe that learning how to work effectively in a team environment is very important in most professional environments. Your future employers will need smart effective team players to succeed in the global economy.

There will be several written assignments as well as a short research assignment for this course. I will present an overview here, but the actual detailed assignments will be handed out in class.

Annotated Chapter Outlines and Discussion Leading:

You will each be assigned specific topics within the textbook. You will be required to turn in a typewritten annotated chapter outline covering the major items of importance for each assigned topic (handwritten work will not be accepted unless prior arrangements have been made with me). This will be done in an outline format and should include the more important terms, processes and systems within each section.

These outlines will be between 2-4 paragraphs for each specified topic and will concentrate on the important themes presented in the book. They are NOT to be 'copied' from the book, but rather these should be your own words describing and explaining the important definitions, concepts and mechanisms discussed in each section.

This is to be your own work. You are not required to do any outside research on these topics, but if you do you must follow standard rules for citing your sources – please do not plagiarize. I feel that the skill of learning to find the most important material in a large text is an invaluable one that you will use in both your personal and profession life. It is also a great way for you to earn class credit while doing a task you already need to perform.

The second portion of this assignment is to lead the class in a discussion of this material. Everyone is required to READ the material before the class, but the selected students will be responsible for leading a discussion of these topics (may include graphics when necessary.) It is expected that these discussions will typically be less than 10 minutes but they may exceed this on occasion.

Weather and Climate in the News: This is a semester project where you will be expected to find 4 (four) news stories that have weather and/or climate as the theme. You will write a short synopsis of the article and then explain how this relates to our study of weather and climate.

City Report: As part of the laboratory component, each student will select one world city and one US city from a list, and follow the weather for these places during the course of the semester. There will be three typewritten updates due as well as a final prepared report on the observed weather and the climatic patterns for these two cities.

Climate Presentation: You will be creating a report on one aspect of climate change. The report itself will be approximately 3 pages in length, but it will be presented on a **Poster** that will be **Presented** to the class during the final week of classes.

V. OUTLINE OF THE COURSE

Overview: Weather and Climate are similar but different ideas concerning the state of the atmosphere and the expectations for a certain place on the earth. We will be exploring the major factors that are used to determine both weather and climate, as well as learning the techniques of those scientists whose job it is to understand the atmosphere and its impacts upon all the inhabitants of earth.

After an introduction into the basics of earth systems science and the idea of the interconnected nature of our earth's systems, we will begin to explore the atmosphere as the main area where weather and climate are produced.

We will explore the relationship between the earth and the sun – the driving force behind all weather systems on the planet -- and we will see how 'differential heating' upon the earth, and its major elements, is what brings the vast differences of weather and climate to diverse areas of the world.

Temperature is the most prominent of the weather and climate factors that we will explore and a basic review of states of matter and exo- and endothermic reactions will ensue.

Moisture and humidity are the main paths used by the planet to move large quantities of heat from one place to another. We will look at how and why this occurs and see at multiple scales how these movements affect our lives on a daily basis.

The most noticeable form of moisture is precipitation in its many forms. We will look at how clouds form and how precipitation within them forms and eventually makes its way back to earth's surface.

Wind is a major force of nature and one that has a huge impact on weather and climate prediction and outcome. We will look at where wind comes from and how and why it behaves the way it does.

This will lead us directly into the major circulation patterns within the atmosphere, and at the surface as well in the form of ocean currents. These global pathways

move both hot and cold water and air around to achieve a global temperature balance which is vital to the long term stability of our world.

These circulation patterns create climatic patterns that bring consistent yearly patterns of temperature and precipitation to every place on the earth. These climates are classified to better allow scientists and laypeople to understand the behavior of the atmosphere for any place on the planet.

Air masses and weather patterns create the more local weather conditions we are all familiar with in our daily lives. We will look at the formation of these air masses and how and when they will combine into weather patterns.

The most severe of these weather patterns are thunderstorms, tornadoes and hurricanes. We will spend the remainder of the class discussing these most dangerous and destructive storms – how they form, how we can best confront them, and how scientists are working to better understand and predict these terrible events.

Schedule: Subject to change

		W: 1-20	**Introduction**
M: 1-25	**Introduction**	**W: 1-27**	**Chpt. 1**
M: 2-01	**Chpt. 1**	**W: 2-03**	**Chpt. 1**
M: 2-08	**Lab 1**	**W: 2-10**	**Chpt. 2**
PRESIDENTS DAY		**W: 2-17**	**Chpt. 3**
M: 2-22	**Lab 2**	**W: 2-24**	**Chpt. 3**
M: 3-01	**Chpt. 3**	**W: 3-03**	**Chpt. 4**
M: 3-08	**Film**	**W: 3-10**	**Quiz 1**
SPRING BREAK			
M: 3-22	**Chpt. 5**	**W: 3-24**	**Chpt. 5**
M: 3-29	**Presentations**	**W: 3-31**	**Chpt. 6**
M: 4-05	**Chpt. 6**	**W: 4-07**	**Lab 4**
M: 4-12	**Quiz 2**	**AAG WASHINGTON DC**	
PATRIOTS DAY		**W: 4-21**	**Chpt. 7**
M: 4-26	**Chpt. 7/8**	**W: 4-28**	**Chpt. 8**
M: 5-03	**Lab 6**	**W: 5-05**	**Projects**
M: 5-10	**Projects**	**W: 5-12**	**Projects**

Final Exam Schedule: To be announced in class

VI. REQUIREMENTS

1. ***Attendance policy***
   Regular attendance is vital to your success in this class. Being in class will help you to better understand the material in the textbook and outside readings; it will help you complete the assignments; and it will prepare you for the quizzes. I will be checking attendance throughout the semester and it is expected that students will not miss any classes except for serious emergencies and other college approved absences. If for some reason you must miss a class, it is your responsibility to discover what you missed and to be prepared for the next class session(s). Missing class is not an excuse for not knowing what has taken place in that class. You are responsible for ALL material and information covered during class. I strongly suggest that you find someone to share this information with if either of you should unexpectedly miss class.

2. ***Responsibilities for missed work***
   Students are required to be in class and turn in work on time. If you miss class, you are still responsible for all class activities and announcements. If an in-class assignment is missed it is often impossible to make up this work. I will need to decide this on a case by case basis – but only with a college approved absence.
   Late work will receive a large penalty and in no case will work be accepted after one week's time. It is VITAL that you learn to complete your work on time as this will prove invaluable in your professional careers. In no case will work be accepted more than one week after it is due.

3. ***Assignments and due date policy***
   Late work will receive a large penalty and in no case will work be accepted after one week's time. It is VITAL that you learn to complete your work on time as this will prove invaluable in your professional careers.

4. ***Quizzes/tests***
   I will post a study sheet (not a "guide" per se) that will help you to better see the scope of the quiz. This study sheet will be posted one week before the quiz. **There will be two quizzes**, each covering both class and lab material. You will be permitted to bring in one 4x6 card with anything written on it you like (both sides may be filled.) This will be collected with your quiz at the conclusion of the quiz. I will supply you with all formulae you will need for the quiz and calculators are allowed.
   I will provide a short time in class for questions concerning the quiz during the class before the quiz. I encourage you to come see me during office hours if you have more than a quick question concerning the quiz materials. Quizzes will be a combination of many types of questions, including, but not limited to, true/false, multiple choice,

definitions, short answers, and essay. Material from both lab and lecture will be included in the quizzes.

5. ***Make-up policy for announced and unannounced quizzes/tests***
   It is expected that you will attend all announced quizzes. Dire emergencies and college approved absences will be considered when I consider whether or not to allow a student to take a make-up quiz. Unannounced activities will, in general, not be available for make-up.

6. ***Standards for written assignments***
   Communicating in standard English is expected: use of standard written English is one of the evaluation criteria for written work in this course. If your written work has significant errors in usage, it will be returned, ungraded, for revisions and resubmission, and late penalties will accrue. I might suggest *The Elements of Style* by Strunk and White. An early version (1972) is available free online at **http://books.google.com/books?id=Hd5o74IehyoC&lpg=PA1**

7. ***Classroom etiquette – cell phones, punctuality, etc.***
   My number one rule is RESPECT! I believe that classes, like all other aspects of life, need to be a place where everyone is made to feel welcomed and valued. The best way we can achieve this is through treating each other with respect! I will insist that you treat other students, me, and most importantly YOURSELF with respect… at least while in this class!
   Being punctual is yet another life skill that will serve you well both personally and professionally. It is also one way to show respect to all the members of our classroom community. I too will always strive to be punctual in my dealings with our class. However, at times we all fail to live up to our high expectations and in this case, I strongly urge you to still COME TO CLASS LATE. I will still welcome you and you will gain much more from attending a partial class than from hearing about it afterwards from a classmate.
   Cell phone use is an interesting issue. I understand that cell phones are ubiquitous in our modern society. I have one and probably you have one as well. However, when we are in our classroom setting it is only proper that we all remember to turn off our ringers (and when someone's phone does go off… that is a great reminder to the rest of us) during class time. Now, if your phone does vibrate to tell you of an extremely urgent call, I would expect you to get up and take it in the hall. However, texting during class is not permitted. It shows a serious lack of respect to the teacher as well as the rest of your classmates.

A few other points:

► All assignments handed in late will lose substantial points. No work will be accepted after 1 week and a grade of ZERO will be submitted. Extraordinary circumstances will be considered.

- ► Students are responsible for ALL material found in the required readings, exercises, labs and lectures.
- ► PLEASE ask questions if something is unclear. You may do so during class (within reason) and during my office hours.
- ► Be respectful! Disruptive behavior will not be tolerated.
- ► My primary method of contact (outside of the classroom) is via email. It is VITAL that I have your current email address on file.
- ► **This syllabus is tentative and is subject to change**. Another good reason to come to class!

VII. EVALUATION

A summary of grading for this course is below.

Quiz 1	15%
Quiz 2	15%
Summary & Discussion	10%
News Accounts	5%
Cities Climate Reports	5%
Climate Change Poster	30%
Lab (total of all labs)	20%
Total Score:	**100%**

VIII. RESOURCES AVAILABLE IN THE LIBRARY

Marian Court College is a member of NECCUM (Northeast Consortium of Colleges and Universities in Massachusetts). The purpose of NECCUM is to enhance the experience of students, faculty, and staff through cooperative programs. As a current student, you have opportunities to take courses and use the libraries at nine other colleges in your area as part of your academic program. All you will need to take out books from these libraries is your current Marion Court ID card.

NECCUM Member Institutions: Endicott College, Gordon College, Marian Court College, Merrimack College, Middlesex Community College, Montserrat College of Art, North Shore CC, Northern Essex CC, Salem State College, University of Massachusetts at Lowell

Bibliography for further reading and exploration

Atmosphere, Weather and Climate, Roger Barry and Richard Chorley, 2009, Taylor & Francis

Weather Studies: Introduction to Atmospheric Science*,* Third Edition, by Joseph M. Moran, 2006, AMS

Understanding Weather & Climate, Second Edition, by Edward Aguardo and James E. Burt, 2000, Prentice-Hall

Meteorology for Scientists and Engineers, Second Edition, by Roland

B. Stull, 2000, Brooks/Cole

Websites of Interest:

Online textbooks and publisher websites
The Physical Environment: An Introduction to Physical Geography, Second Edition, by Michael Ritter (2006)
http://www.uwsp.edu/geo/faculty/ritter/geog101/textbook/title_page.html

Prentice Hall website to accompany our textbook (log in page)
http://wps.prenhall.com/wps/media/access/Pearson_Default/6761/6924211/login.html

Prentice Hall website for the 10th edition – no registration required
http://wps.prenhall.com/esm_lutgens_atmosphere_10/

University sites:

Lyndon State College, Lyndonville, VT
Interesting collection of **New England specific** weather resources
http://meteorology.lyndonstate.edu/main/index.php/weather-data

University of Illinois
http://ww2010.atmos.uiuc.edu/(Gh)/wx/home.rxml

Ohio State University: Twister Wx Pages
http://asp1.sbs.ohio-state.edu/

San Francisco State University, California Regional Weather Server
http://virga.sfsu.edu/

UM Weather at University of Michigan
http://cirrus.sprl.umich.edu/wxnet/

Federal Government Sites:

National Weather Service: This is a very comprehensive access to NWS functions including the Severe Storms Lab (NSSL), Climate Prediction Center (CPC), National Hurricane Center (NHC) etc.
http://www.nws.noaa.gov/

National Weather Service: Boston Regional Forecast Offices
http://www.erh.noaa.gov/er/box

Commercial Sites:

Weather Underground
http://www.wunderground.com/

Weather Underground for Swampscott, MA
http://www.wunderground.com/cgi-bin/findweather/getForecast?query=swampscott%20ma&wuSelect=WEATHER

The Weather Channel
http://www.weather.com/twc/homepage.twc

The Weather Channel for Swampscott, MA
http://www.weather.com/weather/local/USMA0416?lswe=swampscott%20ma&from=searchbox_localwx

Unisys (formerly the Purdue University WXP site)
http://weather.unisys.com/

Unisys conditions for Swampscott, MA
http://weather.unisys.com/forecast.pl?Name=01907&Go.x=0&Go.y=0

Intellicast
http://www.intellicast.com/

Intellicast for Swampscott, MA
http://www.intellicast.com/Local/Weather.aspx?location=USMA0416

Weather Tutorials:

Encyclopedia of the Atmospheric Environment
http://www.ace.mmu.ac.uk/eae/english.html

WW2010 at University of Illinois
http://ww2010.atmos.uiuc.edu/(Gh)/guides/home.rxml

Weather Equipment:
http://www.weatherconnect.com

Other Resources:

Basic US Surface Weather Maps:

http://www.weather.com/twc/homepage.twc

http://weather.unisys.com/surface/sfc_map.html

http://weather.unisys.com/satellite/sat_sfc_map.html

Surface Map Animated Loop:

http://weather.unisys.com/images/sat_sfc_map_loop.html

Upper Air Balloon Soundings (Stuve or SkewT plots):

http://weather.unisys.com/upper_air/skew/index.html

http://asp1.sbs.ohio-state.edu/main.php?pageloc=upperair

Upper Air Maps:

http://asp1.sbs.ohio-state.edu/main.php?pageloc=upperair

http://weather.unisys.com/upper_air/index.html

Jet Stream Maps:

http://www.weatherimages.org/data/imag192.html

http://www.nckcn.com/homepage/mhennes/Jetstream.htm

http://virga.sfsu.edu/gif/jetstream_init_00.gif

Satellite Image Products (stills):

http://weather.unisys.com/satellite/sat_ir_west.html

http://weather.unisys.com/satellite/sat_ir_east.html

http://weather.unisys.com/satellite/sat_wv_west.html

http://weather.unisys.com/satellite/sat_wv_east.html

http://weather.unisys.com/satellite/sat_ir_us.html

http://weather.unisys.com/satellite/sat_wv_us.html

Satellite Image Products (loops):

http://weather.unisys.com/satellite/sat_ir_west_loop-12.html

http://weather.unisys.com/satellite/sat_ir_east_loop-12.html

http://weather.unisys.com/satellite/sat_wv_west_loop-12.html

http://weather.unisys.com/satellite/sat_wv_east_loop-12.html

http://weather.unisys.com/satellite/sat_ir_us_loop-12.html

http://weather.unisys.com/satellite/sat_wv_us_loop-12.html

Forecast Models:

http://weather.unisys.com/mos/index.html

http://weather.unisys.com/nam/index.html

http://weather.unisys.com/gfs/index.html

http://weather.unisys.com/gfsx/index.html

http://weather.unisys.com/ruc/index.html

http://weather.unisys.com/ecmwf/index.html

http://asp1.sbs.ohio-state.edu/main.php?pageloc=model

IX. HONOR CODE VIOLATIONS

Marian Court College considers academic integrity to be the foundation of a quality education. The college expects that students will produce and submit their own work in all academic situations. Honor code violations are a serious threat to the academic integrity of the institution.

An honor code violation occurs if a student knowingly gives, receives, uses or attempts to use unauthorized assistance in any academic situation. These situations include, but are not limited to examinations, tests, quizzes, homework, papers, projects, presentations and computer assignments.

Plagiarism is defined in Webster's Dictionary as the appropriation or imitation of the language, ideas, and thoughts of another author, and representation of them as one's original work. Any student who has knowingly offered his or her own work for the purpose of plagiarizing has also committed an honor code violation.

At Marian Court College, an instructor who suspects that an honor code violation has occurred will inform the student and the chairperson of the Academic Review Committee. The Committee will hold a hearing to determine if an honor code violation has occurred. The student may bring to the hearing a member of the faculty, administration or staff to serve as an advocate or support person.

If it is determined that the student has committed an honor code violation, the committee will dispense disciplinary action. The student has the right to appeal the decision of the committee and/ or disciplinary action to the President of the college. If the committee votes to expel a student from the college, the President will review the case before the student is dismissed.

Note: To avoid the possibility of an honor code violation, the proper use of specific course citations should be used when quoting or paraphrasing another author’s work.

List of World Cities and US Cities

World Cities

Algeria: Algiers
Argentina: Buenos Aires
Australia: Melbourne
Australia: Sydney
Bangladesh: Dhaka
Brazil: Rio de Janeiro
Brazil: Sáo Paulo
Canada: Montréal
Canada: Toronto
China: Beijing
China: Guangzhou
China: Hong Kong
China: Shanghai
Colombia: Bogotá
Colombia: Medellin
Côte d'Ivoire: Abidjan
Czech Republic: Prague
Democratic Republic of the Congo: Kinshasa
Denmark: Copenhagen
Dominican Republic: Santo Domingo
Egypt: Alexandria
Egypt: Cairo
El Salvador: San Salvador
Ethiopia: Adis Abeba
France: Paris
Germany: Berlin
Germany: Essen
Germany: Frankfurt
Greece: Athina
Guatemala: Guatemala
Honduras: Tegucigalpa
India: Bangalore
India: Calcutta
India: Delhi
India: Mumbai
Indonesia: Jakarta
Iran: Tehrãn
Iraq: Baghdãd
Ireland: Dublin
Italy: Napoli
Japan: Nagoya
Japan: Õsaka
Japan: Tokyo
Lithuania: Vilnius
Macedonia: Skopje
Mexico: Guadalajara
Mexico: Mexico City
Mexico: Monterrey
Morocco: Casablanca
Mozambique: Maputo
Myanmar: Yangon
New Zealand: Auckland
Nicaragua: Managua
Nigeria: Kano
Nigeria: Lagos
Norway: Oslo
Pakistan: Karachi
Pakistan: Lahore
Papua New Guinea: Port Moresby
Peru: Lima
Philippines: Manila
Poland: Krakow
Poland: Warsaw
Portugal: Lisbon
Russia: Moscow
Russia: St. Petersburg
Saudi Arabia: Riyadh
Singapore: Singapore
South Africa: Cape Town
South Africa: Johannesburg
South Korea: Pusan
South Korea: Seoul
Spain: Madrid
Sudan: Khartoum
Sweden: Stockholm
Switzerland: Zurich
Thailand: Bangkok
The Netherlands: Amsterdam
Turkey: Ankara
Turkey: Istanbul
United Kingdom: London
Venezuela: Caracas
Vietnam: Hanoi
Vietnam: Ho Chi Minh City

US Cities

Montgomery, Alabama
Juneau, Alaska
Phoenix, Arizona
Little Rock, Arkansas
Sacramento, California
Denver, Colorado
Dover, Delaware
Tallahassee, Florida
Atlanta, Georgia
Honolulu, Hawaii
Boise, Idaho
Springfield, Illinois
Indianapolis, Indiana
Des Moines, Iowa
Topeka, Kansas
Frankfort, Kentucky
Baton Rouge, Louisiana
Annapolis, Maryland
Lansing, Michigan
Saint Paul, Minnesota
Jackson, Mississippi
Jefferson City, Missouri
Helena, Montana
Lincoln, Nebraska
Carson City, Nevada
Trenton, New Jersey
Santa Fe, New Mexico
Albany, New York
Raleigh, North Carolina
Bismarck, North Dakota
Columbus, Ohio
Oklahoma City, Oklahoma
Salem, Oregon
Harrisburg, Pennsylvania
Columbia, South Carolina
Pierre, South Dakota
Nashville, Tennessee
Austin, Texas
Salt Lake City, Utah
Richmond, Virginia
Olympia, Washington
Charleston, West Virginia
Madison, Wisconsin
Cheyenne, Wyoming

Contact Information

Name: _____ Phone: _____

Email: _____

Name: _____ Phone: _____

Email: _____

Name: _____ Phone: _____

Email: _____

Name: _____ Phone: _____

Email: _____