Tompkins Cortland Community College

Master Course Syllabus

Course Discipline and Number: METR 101 **Year: 2020-2021**
Course Title: Introductory Meteorology **Credit Hours: 3**

Attendance Policy: *To maintain good grades, regular attendance in class is necessary. Absence from class is considered a serious matter and absence never excuses a student from class work. It is the responsibility of all instructors to distribute reasonable attendance policies in writing during the first week of class. Students are required to comply with the attendance policy set by each of their instructors. Students are not penalized if they are unable to attend classes or participate in exams on particular days because of religious beliefs, in accordance with Chapter 161, Section 224-a of the Education Law of the State of New York. Students who plan to be absent from classroom activity for religious reasons should discuss the absence in advance with their instructors. See college catalog for more information.*

Services for Students with Disabilities: *It is the College's policy to provide, on an individual basis, appropriate academic adjustments for students with disabilities, which may affect their ability to fully participate in program or course activities or to meet course requirements. Students with disabilities should contact the Coordinator of Access and Equity Services, to discuss their particular need for accommodations. All course materials are available in alternate formats upon request.*

Course Description

A study of the weather around us. Topics include the structure of the atmosphere, heat balance of the earth, air masses, circulations, fronts, cyclones, severe weather, and climate and its change. The laboratory will emphasize mathematical calculations for atmospheric physics and processes, gathering meteorological data, analysis of weather systems, and short-term weather forecasting. METR 101 fulfills the SUNY General Education Natural Sciences requirement. Prerequisites: MATH 095 or equivalent if required by placement testing; prior completion or concurrent enrollment in ENGL 100 and RDNG 116 if required by placement testing. 3 Cr. (2 Lec., 2 Lab.) Fall and spring semesters.

Course Context/Audience

This is a lab science course which may be taken by anyone who meets the basic skills entry requirements. It will fulfill a lab science requirement for all programs. No previous background in meteorology is required.

Basic Skills/Entry Level Expectations

Writing: WC College level writing skills are required. See course description for co-requisites or pre-requisites.
Math: M4 MATH 095 if required by placement testing.
Reading: R3 Course may be taken concurrently with RDNG 116.

Course Goals

1. Students will understand the basic terms and concepts of each of the topics (see objectives/topics below).
2. Students will be able to understand and analyze weather maps.

Course Objectives/Topics

Objective/Topic	# Hours
Introduction to the atmosphere: The student will understand the structure and makeup of the atmosphere.	2 Hours
Solar and terrestrial radiation: The student will understand the concept of radiational energy.	2 Hours

Temperature: The student will be familiar with the general concept of temperature within the atmosphere.	1 Hour
Air pollution: The student will understand the contributing factors to air pollution and how it affects the weather systems.	1 Hour
Moisture and atmospheric stability: The student will understand how moisture affects the stability of the atmosphere.	3 Hours
Forms of condensation and precipitation: The student will be familiar with the various ways in which moisture transforms into the liquid state.	2 Hours
Air pressure and wind: The student will understand how wind is produced as a result of air pressure gradient.	2 Hours
Circulation of the atmosphere: The student will understand the way in which the atmosphere moves over the surface of the earth.	2 Hours
Air masses: The student will be familiar with the different types of air masses and how they interact.	1 Hour
Weather patterns: The student will be familiar with the ways in which weather systems develop and move.	2 Hours
Thunderstorms and tornadoes: The student will understand the mechanisms by which these localized severe weather systems develop.	2 Hours
Hurricanes: The student will be familiar with the process of development of tropical depressions and hurricanes.	1 Hour
Weather analysis and forecasting: The student will be familiar with the methods of gathering and analyzing weather data, and the generation of forecasts.	3 Hours
The changing climate: The student be familiar with some of the factors that affect long term climate changes and also be able to form an educated opinion about how humans are a part of those changes.	2 Hours
World climates: The student will be familiar with the differences in climate over the surface of the earth.	1 Hour
Optical phenomena of the atmosphere: The student will understand the affects of the atmosphere on visual perceptions.	1 Hour
Laboratory sessions	30 Hours

General Education Goals - Critical Thinking & Social/Global Awareness

CRITICAL THINKING OUTCOMES	**HOW DOES THE COURSE ADDRESS THE OUTCOMES** (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
Students will be able to ➢ develop meaningful questions to address problems or issues. ➢ gather, interpret, and evaluate relevant sources of information. ➢ reach informed conclusions and solutions. ➢ consider analytically the viewpoints of self and others.	The student will be required, as part of the lab experience, to gather weather data from various sources and analyze this information. When studying climate change and global warming, students will need to examine opinions and evidence given by scientists and classmates to create a theory they can defend scientifically. The student will be required to apply the scientific method in order to prepare analyses.

SOCIAL/GLOBAL AWARENESS OUTCOMES	HOW DOES THE COURSE ADDRESS THE OUTCOMES (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
➢ Students will begin to understand how their lives are shaped by the complex world in which they live. ➢ Students will understand that their actions have social, economic and environmental consequences.	Students will use several mathematical formulas to discover connections of atmospheric variables. These will range from Gas laws, to Laws of motion and Laws of thermodynamics. Students will also read articles that discuss climate or other environmental issues and give critical analysis of the information presented

Instructional Methods
Lecture should be the primary method of instruction. The instructor should work with groups and individual students during the laboratory sessions.

Methods of Assessment/Evaluation

Method	% Course Grade
Short paper or presentation	0-5%
Exams	35- 45%
Attendance	0-5 %
Lab reports/lab quizzes	25-30%
Quizzes(online)	5-10%
Lab final	5-10%

Text(s)
Required:

Exercises for Weather and Climate, Greg Carbone, 8th Edition, Pearson/Prentice Hall, ISBN-13: 978-0321769657

The Atmosphere: An Introduction to Meteorology, Lutgens and Tarbuck, 12th Edition, Pearson/Prentice Hall, ISBN **13:** 9780321756312

Bibliography
C. Donald Ahrens, Meteorology Today, 9th edition, © 2009,Thomson Brooks/Cole.

Burt Aguado and James e. Edwards, Understanding Weather and Climate, 5th edition, © 2010,Pearson Prentice Hall.

http://www.nytimes.com/2014/05/07/science/earth/climate-change-report.html

http://earthobservatory.nasa.gov/Features/Paleoclimatology_OxygenBalance/

http://www.nature.com/nature/journal/v507/n7491/full/507143d.html

Chris Carroll, National Geographic, August 2005, pg 72, "In Hot Water".

Harvey, Danny , Climate and Global Environmental Change, 2000, Peason Prentice Hall

Victor, David G.,Collapse of Kyoto Protocol and the Struggle to Slow Global Warming, 1st edition, California-Princeton Fulfillment Services

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Other Learning Resources

Audiovisual Photographs, slides and video tapes
Electronic Websites for animation of hurricane tracks, Rich media presentations on web or CDRom from textbook Climate; http://www.etymonline.com/index.php?search=climate&searchmode=none http://www.wxdude.com/page1.html Merlot
Other Various texts, atlases, Newspaper articles