

Tompkins Cortland Community College

Master Course Syllabus

Course Discipline and Number: METR 101

Year: 2025-2026

Course Title: Introduction to Meteorology

Credit Hours: 3

I. Course Description: This course is 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 Knowledge and Skills Area and is a laboratory science. Prerequisites: Prior completion of, or concurrent enrollment in, MATH 120 or equivalent; prior completion of, or concurrent enrollment in, ENGL 100. 3 Cr. (2 Lec., 2 Lab.) Fall semester.

II. Additional Course Information:

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| 1. METR 101 uses Open Educational Resources (OER) – students need not purchase a text. |
| 2. Online lab work is required. |
| 3. Some group work is expected. |

III. Student Learning Outcomes

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

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| 1. Describe the structure of the atmosphere and heat balance of the earth and define meteorological terms |
| 2. Observe and gather meteorological data, analyze basic weather systems, create synoptic weather maps, and make short-term weather forecasts. |
| 3. Do mathematical calculations for atmospheric physics and processes using meteorological data and draw inferences from weather and climate forecasting models which use such data. |
| 4. Explain the greenhouse effect and its connection to global warming and climate change, with consideration of authority, validity, and bias of information sources, and discuss their own impacts on the environment and how they may change those impacts. |

IV. Tompkins Cortland Institutional Learning Outcomes; Program Learning Outcomes; SUNY General Education Competencies and Knowledge and Skills Areas

Tompkins Cortland ILOs - N/A

Complete this section for “service” courses only (e.g., courses that are required of all students; courses that are not program specific but satisfy liberal arts requirements; or commonly used in multiple academic programs to meet non-program-specific requirements). Check only Institutional Learning Outcomes (ILOs) that are meaningfully developed and assessed in this course. For each ILO chosen, include the SLO to which it aligns.

Students will:

☐ Communicate effectively, in oral and written forms, taking into consideration audience and purpose.

- ☐ Apply principles and methods of scientific inquiry and quantitative reasoning appropriate to their discipline.
- ☐ Use information, critical thinking, and the creative process to solve problems and reach conclusions.
- ☐ Use technology appropriate to their discipline.
- ☐ Describe the ways in which social, economic, or environmental sustainability depends on their own and the collective contributions of a diversity of ideas and people.

Program Learning Outcomes - N/A

Complete this section for program-specific courses (e.g., those that share the same discipline code as the academic program or satisfy requirements in related programs). List the academic program(s) here and note which Student Learning Outcomes align to specific Programmatic Learning Outcomes. Please see the MCS Instructions for more details.

SUNY General Education Competencies- N/A

If this course assesses a SUNY GEN ED Competency, check all that apply and indicate which course outcome(s) address each checked item:

☐ **CRITICAL THINKING & REASONING-** Students will:

- a. clearly articulate an issue or problem;
- b. identify, analyze, and evaluate ideas, data, and arguments as they occur in their own or others' work; acknowledge limitations such as perspective and bias; and
- c. develop well-reasoned (logical) arguments to form judgments and/or draw conclusions.

☐ **INFORMATION LITERACY -** Students will:

- a. locate information effectively using tools appropriate to their need and discipline; evaluate information with an awareness of authority, validity, and bias; and demonstrate an understanding of the ethical dimensions of information use, creation, and dissemination.

☒ **SUNY GENERAL EDUCATION KNOWLEDGE AND SKILLS AREA(s):**

Natural Sciences (and Scientific Reasoning)

For courses that are approved to meet one (or more) of the ten SUNY General Education Knowledge and Skills Areas, indicate which area the course fulfills, and which outcome(s) are aligned with the SUNY outcomes for that area:

SUNY SLO:

- an understanding of the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of data analysis or mathematical modeling; and;

Course SLOs

1. Describe the structure of the atmosphere and heat balance of the earth and define meteorological terms.
2. Observe and gather meteorological data, analyze basic weather systems, create synoptic weather maps, and make short-term weather forecasts.
3. Do mathematical calculations for atmospheric physics and processes using meteorological data and draw inferences from weather and climate forecasting models which use such data.
4. Explain the greenhouse effect and its connection to global warming and climate change, with consideration of authority, validity, and bias of information sources, and discuss their own impacts on the environment and how they may change those impacts.

SUNY SLO:

- application of scientific data, concepts, and models in one of the natural (or physical) sciences.

Course SLOs

2. Observe and gather meteorological data, analyze basic weather systems, create synoptic weather maps, and make short-term weather forecasts.
4. Explain the greenhouse effect and its connection to global warming and climate change, with consideration of authority, validity, and bias of information sources, and discuss their own impacts on the environment and how they may change those impacts.

☐ This course does not address any of the above Tompkins Cortland ILOs, PLOs, or SUNY General Education Competencies or Knowledge and Skills Areas.

V. Essential Topics/Themes

1.	Structure of the atmosphere and solar and terrestrial radiation
2.	Atmospheric Moisture and Stability, Condensation, Deposition and Forms of Precipitation
3.	Circulation, air pressure changes, air masses, formation of fronts and weather patterns
4.	Thunderstorms, Tornadoes and Hurricanes formation and forecasting
5.	Weather map analysis forecasting and world climates and climate change evidence and forecasting

VI. Methods of Assessment/Evaluation

Method	% Course Grade
1. Lab reports/lab-specific quizzes	25-35%
2. Exams	35-45%
3. Short paper or presentation	0-5%
4. Quizzes (online)	0-10%
5. Lab final	5-10%
6. Attendance/Participation	0-5 %

VII. Texts – ☐ Required ☒ Recommended ☐ Used for more than one course (list courses)

High school instructors may consult with staff in the CollegeNow office for additional information and guidance.

	OER
1. https://www.weather.gov/jetstream/atmos_intro	☒
2. www.weather.gov	☒
3. https://scied.ucar.edu/earths-energy-balance	☒
4. METEO 3: Introductory Meteorology METEO 3: Introductory Meteorology (psu.edu)	☒
5. Earth's Albedo and the Sun's Brightness Affect Climate Center for Science Education (ucar.edu) ☐	☒

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| 6. <u>The Atmosphere: An Introduction to Meteorology</u> , Lutgens and Tarbuck, 14th Edition, Pearson/Prentice Hall, ISBN 13: 978-0134758589 | ☐ |
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Editions listed are current as of date of syllabus. More recent editions may be used.

VIII. Bibliography of Supplemental Materials

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| 1. Tiefenbacher, John P. <i>Global Warming and Climate Change</i> . IntechOpen, 2020. https://suny-tcc.primo.exlibrisgroup.com/permalink/01SUNY_TCC/1d984ol/alma994994284004859 |
| 2. https://suny-tcc.primo.exlibrisgroup.com/permalink/01SUNY_TCC/1c7laie/cdi_oapen_doabooks_78782 <i>Lower Atmosphere Meteorology</i> . MDPI - Multidisciplinary Digital Publishing Institute. 2022, https://doi.org/10.3390/books978-3-0365-2961-5 . |
| 3. https://suny-tcc.primo.exlibrisgroup.com/permalink/01SUNY_TCC/1c7laie/cdi_oapen_doabooks_77099 <i>Air Pollution Meteorology</i> . MDPI - Multidisciplinary Digital Publishing Institute, 2021, https://doi.org/10.3390/books978-3-0365-2552-5 . |

IX. Other Learning Resources

Audiovisual: None specified

Electronic:

- *JetStream – An Online Weather School*. National Weather Service, weather.gov/Jetstream. Accessed 8 Dec. 2022.
- *Earth Observatory*. NASA, <https://earthobservatory.nasa.gov/global-maps>. Accessed 8 Dec. 2022.
- *The Intergovernmental Panel on Climate Change (IPCC)*, <https://www.ipcc.ch>. Accessed 8 Dec. 2022.
- *National Hurricane Center and Central Pacific Hurricane Center*. NOAA, <https://www.nhc.noaa.gov/>. Accessed 8 Dec. 2022.

Other: None specified

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 academic adjustments. All course materials are available in alternate formats upon request.

Academic Integrity: Every student at Tompkins Cortland Community College is expected to act in an academically honest fashion in all aspects of his or her academic work: in writing papers and reports, in taking examinations, in performing laboratory experiments and reporting the results, in clinical and cooperative learning experiences, and in attending to paperwork such as registration forms. Any written work submitted by a student must be his or her own. If the student uses the words or ideas of someone else, he or she must cite the source by such means as a footnote. Our guiding principle is that any honest evaluation of a student's performance must be based on that student's work. Any action taken by a student that would result in misrepresentation of someone else's work or actions as the student's own — such as cheating on a test, submitting

for credit a paper written by another person, or forging an advisor's signature — is intellectually dishonest and deserving of censure.

Several degree programs offer student learning opportunities (such as internships, field work, and clinical experiences) outside the standard classroom setting. As part of the learning process, students must understand and engage in conduct that adheres to principles guiding employment within the professional workplace. These behaviors include, but are not limited to, academic integrity, accountability, reliability, respect, use of appropriate language and dress, civility, professional ethics, honesty, and trustworthiness. Disciplinary action may be initiated for inappropriate conduct occurring while participating in any course-related project or event.