ATMOSPERIC SCIENCES (ATM SCI)

ATM SCI 100 Survey of Meteorology
3 cr. Undergraduate.
Concepts and principles of meteorology; cyclones, fronts, thunderstorms, tornadoes, air pollution, and climate. Interpretation of weather maps, charts, and forecasts. 2 hrs lec, 2 hrs lab-dis.
Prerequisites: none.
Course Rules: Counts as repeat of 3 cr Atm Sci 100 taken for 4 cr.
General Education Requirements: NS+
Last Taught: Spring 2018, Fall 2017, Spring 2017, Fall 2016.
Current Offerings: http://uwm.edu/schedule

ATM SCI 106 Principles and Forecasting of the Weather
3 cr. Undergraduate.
What makes the weather, general circulation of the atmosphere, analysis of meteorological data and their use in predicting the weather.
Prerequisites: none.
General Education Requirements: NS
Current Offerings: http://uwm.edu/schedule

ATM SCI 108 Rain and Snow
3 cr. Undergraduate.
Study of precipitation properties and processes in the atmosphere. Structure of precipitating systems ranging from small to large scale.
Prerequisites: none.
General Education Requirements: NS
Current Offerings: http://uwm.edu/schedule

ATM SCI 109 Thunderstorms, Tornadoes and Hurricanes
3 cr. Undergraduate.
The study of basic processes that lead to dry and moist convection. Characteristic atmospheric structure and cloud microphysical processes that produce thunderstorms, tornadoes and hurricanes.
Prerequisites: none.
General Education Requirements: NS
Current Offerings: http://uwm.edu/schedule

ATM SCI 240 Introduction to Meteorology
3 cr. Undergraduate.
Quantitative approach to understanding fundamental concepts in meteorology. Radiation, heat balance of the atmosphere, thermodynamics, horizontal motion, general circulation, atmospheric observations, clouds, weather map analysis.
Prerequisites: Physics 209(P) & 214(P); Math 232(C).
Course Rules: Not open for cr to students with Atm Sci 201.
Current Offerings: http://uwm.edu/schedule

ATM SCI 289 Internship in Atmospheric Sciences, Lower Division
1-6 cr. Undergraduate.
Application of basic knowledge of Atmospheric Sciences in business, organizational, educational, political or other appropriate setting.
Prerequisites: soph st.; 2.50 gpa; cons supervising faculty member.
Course Rules: One cr earned for academic work based on 40 hrs in internship. May be retaken to 6 cr max.
Last Taught: Spring 2015, Fall 2013, Fall 2012, Fall 2011.
Current Offerings: http://uwm.edu/schedule

ATM SCI 297 Study Abroad:
1-12 cr. Undergraduate.
Designed to enroll students in UWM sponsored program before course work level, content, and credits are determined and/or in specially prepared course work.
Prerequisites: acceptance for Study Abroad Prog.
Course Rules: May be retaken w/chg in topic.
General Education Requirements: NS
Current Offerings: http://uwm.edu/schedule

ATM SCI 299 Ad Hoc:
1-6 cr. Undergraduate.
Course created expressly for offering in a specified enrollment period. Requires only dept & assoc dean approval. In exceptional circumstances, can be offered in one add1 sem.
Prerequisites: none; add1 prereqs may be assigned to specific topic.
Course Rules: May be retaken w/chg in topic.
Last Taught: Fall 2013, Fall 1994, Fall 1992, Fall 1990.
Current Offerings: http://uwm.edu/schedule

ATM SCI 194 First-Year Seminar:
3 cr. Undergraduate.
Specific topics are announced in the Schedule of Classes each time the class is offered.
Prerequisites: none.
Course Rules: Open only to freshmen. Students may earn cr in just one L&S First-Year Sem (course numbers 192, 193, 194).
General Education Requirements: NS
Last Taught: Fall 2016, Fall 2014, Fall 2012, Fall 2008.
Current Offerings: http://uwm.edu/schedule

ATM SCI 199 Independent Study
1-3 cr. Undergraduate.
For further information, consult dept chair.
Prerequisites: 2.5 gpa; writ cons instr, dept chair, & asst dean for SAS.
Course Rules: May be retaken to 6 cr max.
Last Taught: Fall 2016, Fall 2014, Fall 2012, Fall 2008.
Current Offerings: http://uwm.edu/schedule

ATM SCI 289 Internship in Atmospheric Sciences, Lower Division
1-6 cr. Undergraduate.
Application of basic knowledge of Atmospheric Sciences in business, organizational, educational, political or other appropriate setting.
Prerequisites: soph st.; 2.50 gpa; cons supervising faculty member.
Course Rules: One cr earned for academic work based on 40 hrs in internship. May be retaken to 6 cr max.
Last Taught: Spring 2015, Fall 2013, Fall 2012, Fall 2011.
Current Offerings: http://uwm.edu/schedule

ATM SCI 297 Study Abroad:
1-12 cr. Undergraduate.
Designed to enroll students in UWM sponsored program before course work level, content, and credits are determined and/or in specially prepared course work.
Prerequisites: acceptance for Study Abroad Prog.
Course Rules: May be retaken w/chg in topic.
General Education Requirements: NS
Current Offerings: http://uwm.edu/schedule

ATM SCI 299 Ad Hoc:
1-6 cr. Undergraduate.
Course created expressly for offering in a specified enrollment period. Requires only dept & assoc dean approval. In exceptional circumstances, can be offered in one add1 sem.
Prerequisites: none; add1 prereqs may be assigned to specific topic.
Course Rules: May be retaken w/chg in topic.
Last Taught: Fall 2013, Fall 1994, Fall 1992, Fall 1990.
Current Offerings: http://uwm.edu/schedule
ATM SCI 330 Air-Pollution Meteorology
3 cr. Undergraduate/Graduate.
Pollutant sources and sinks, fundamental pollutant chemistry, monitoring techniques, averaging boundary layers and turbulence, diffusion theories, diffusion models, regional and global-scale pollution problems.
Prerequisites: Atm Sci 240(P); Chem 102(P); stats course recom.
Last Taught: Fall 2017, Fall 2015, Fall 2013, Fall 2011.
Current Offerings: http://uwm.edu/schedule

ATM SCI 350 Atmospheric Thermodynamics
3 cr. Undergraduate/Graduate.
Radiant energy, sensible heat, and atmospheric thermodynamics; the gas laws; hydrostatic and psychrometric equations; dry and moist convection; clouds and their physical and energy relations. Optional field exercise.
Prerequisites: jr st; Physics 210(P); Math 232(P); Atm Sci 240(P).
Last Taught: Fall 2017, Fall 2015, Fall 2013, Fall 2011.
Current Offerings: http://uwm.edu/schedule

ATM SCI 351 Dynamic Meteorology I
3 cr. Undergraduate/Graduate.
The role of dynamics in atmospheric physics; equations of motion; symmetric circulation models; gravity waves; Rossby waves, quasi-geostrophy; introduction to instability of atmospheric flows.
Prerequisites: jr st; Atm Sci 351(P); Math 233(P).
Last Taught: Fall 2016, Fall 2014, Fall 2012, Fall 2010.
Current Offerings: http://uwm.edu/schedule

ATM SCI 352 Dynamic Meteorology II
3 cr. Undergraduate/Graduate.
Circulation, vorticity, potential vorticity, shallow water equations: Poincare, Kelvin, and Rossby waves, energy and enstrophy, quasi-geostrophy for a stratified atmosphere; barotropic and baroclinic instability.
Prerequisites: jr st; Atm Sci 351(P); Math 233(P).
Current Offerings: http://uwm.edu/schedule

ATM SCI 360 Synoptic Meteorology I
4 cr. Undergraduate/Graduate.
Fundamental principles; synoptic-scale structure and dynamics; equivalent barotropic model; vertical motions; introduction to and application of quasi-geostrophic theory.
Prerequisites: jr st; Math 232(P); Physics 210(P); Atm Sci 240(P).
Last Taught: Fall 2016, Fall 2014, Fall 2012, Fall 2010.
Current Offerings: http://uwm.edu/schedule

ATM SCI 361 Synoptic Meteorology II
4 cr. Undergraduate/Graduate.
Extension of quasi-geostrophic theory to Q-vectors; isentropic potential vorticity applied to mid-latitude weather systems; fronts and jets.
Prerequisites: jr st; Atm Sci 360(P).
Current Offerings: http://uwm.edu/schedule

ATM SCI 381 Honors Seminar
3 cr. Undergraduate.
Selected topics.
Prerequisites: soph st; Honors 200(P); cons Honors College dir.
Course Rules: May be retaken w/chg in topic to 9 cr max.
General Education Requirements: NS
Last Taught: Spring 2018, Fall 2007, Fall 1990, Fall 1989.
Current Offerings: http://uwm.edu/schedule

ATM SCI 405 Atmospheric Science for in-Service Teachers
1-3 cr. Undergraduate/Graduate.
Basic, advanced or new topics in atmospheric sciences for in-service teachers.
Prerequisites: in-service teacher; add'l prereqs depending on topic.
Course Rules: May be retaken w/chg in topic to 9 cr max.
Current Offerings: http://uwm.edu/schedule

ATM SCI 460 Mesoscale Circulations
3 cr. Undergraduate/Graduate.
Theory, analysis and forecasting of mesoscale flows, including convective systems, polar lows, terrain and surface-forced flows, jet streams and hurricanes.
Prerequisites: jr st; Atm Sci 360(R) or cons instr.
Last Taught: Spring 2017, Spring 2015, Fall 2012, Fall 2009.
Current Offerings: http://uwm.edu/schedule

ATM SCI 464 Physical Meteorology: Cloud Physics
3 cr. Undergraduate/Graduate.
Interactions of clouds with their environment, simple cloud microphysics, formation of cloud droplets, droplet growth by condensation, formation of ice crystals, precipitation processes, weather radars, cloud models.
Prerequisites: Atm Sci 351(P) or 360(P).
Current Offerings: http://uwm.edu/schedule

ATM SCI 470 Tropical Meteorology
3 cr. Undergraduate/Graduate.
Prerequisites: Atm Sci 351(P) or 360(P).
Current Offerings: http://uwm.edu/schedule

ATM SCI 471 Advanced Synoptic Meteorology
3 cr. Undergraduate/Graduate.
Advanced topics in synoptic meteorology. Anticyclonic, cyclonic, and mixed flow regimes; monsoons; jet streams and hurricanes.
Prerequisites: jr st; Atm Sci 360(R) or cons instr.
Last Taught: Spring 2017, Spring 2015, Fall 2012, Fall 2010.
Current Offerings: http://uwm.edu/schedule

ATM SCI 480 The General Circulation and Climate Dynamics
3 cr. Undergraduate/Graduate.
Historical overview, the zonally symmetric circulation, momentum, heat and water budgets, stationary waves, the El Nino Southern oscillation, global warming, interpentadal variability in the North Atlantic.
Prerequisites: jr st; Atm Sci 351(P).
Current Offerings: http://uwm.edu/schedule

ATM SCI 497 Study Abroad
1-12 cr. Undergraduate/Graduate.
Designed to enroll students in UWM sponsored program before course work begins. Content, credits determined and/or in specially prepared course work.
Prerequisites: jr st; acceptance for Study Abroad Program.
Course Rules: May be retaken w/chg in topic.
General Education Requirements: NS
Current Offerings: http://uwm.edu/schedule

ATM SCI 499 Ad Hoc
1-6 cr. Undergraduate.
Course created expressly for offering in a specified enrollment period. Requires only dept & assoc dean approval. In exceptional circumstances, can be offered in one add'l sem.
Prerequisites: jr st; add'l prereqs may be assigned to specific topic.
Course Rules: May be retaken w/chg in topic.
Current Offerings: http://uwm.edu/schedule
ATM SCI 500 Statistical Methods in Atmospheric Sciences
3 cr. Undergraduate/Graduate.
Mathematical and statistical tools applicable to the investigation of
atmospheric problems; the nature and treatment of atmospheric data.
**Prerequisites:** jr st; Atm Sci 240(P) or 350(P), & Math 232(P) or cons instr.
**Last Taught:** Fall 2017, Fall 2015, Fall 2013, Fall 2009.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 505 Micrometeorology
3 cr. Undergraduate/Graduate.
Surface energy budget; radiation balance and heat transfer; boundary-
layer profiles of wind, temperature and moisture; turbulence and
boundary-layer fluxes; evapotranspiration; special topics.
**Prerequisites:** jr st; Atm Sci 351(P) & 330(P).
**Last Taught:** Fall 2016, Fall 2014, Fall 2012, Spring 2010.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 511 Seminar in Atmospheric Radiation and Remote Sensing
3 cr. Undergraduate/Graduate.
Basic laws of radiation, absorption and scattering, weather radar, retrieval
of soundings, remote sensing and climate, weather satellites.
**Prerequisites:** jr st; Math 232(P); Atm Sci 350(P) & Physics 210(P).
**Last Taught:** Spring 2018, Spring 2016, Spring 2014, Spring 2012.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 520 Advanced Dynamic Meteorology
3 cr. Undergraduate/Graduate.
Properties of atmospheric sound, gravity, Rossby waves. Baroclinic
instability, cyclogenesis, frontogenesis, and the general circulation.
Introduction to numerical prediction.
**Prerequisites:** jr st; Math 234(P), Atm Sci 350(P) & 351(P) or equiv.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 599 Capstone Experience
1 cr. Undergraduate.
Student writes a paper under supervision of an advisor on an approved
topic not covered in the student's regular course work.
**Prerequisites:** sr st; cons instr.
**Course Rules:** May be retaken w/chg in topic to 2 cr max.
**Last Taught:** Spring 2018, Fall 2017, Spring 2017, Spring 2016.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 690 Seminar in Atmospheric Sciences:
1-3 cr. Undergraduate/Graduate.
Intensive topical studies of currently active problem areas.
**Prerequisites:** jr st; cons instr.
**Course Rules:** May be retaken w/chg in topic to 9 cr max. Satisfies L&S Seminar req.
**Last Taught:** Fall 2016, Spring 2016, Spring 2015, Spring 2013.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 695 Internship in Atmospheric Sciences, Upper Division
1-6 cr. Undergraduate.
Application of advanced principles of atmospheric sciences in a
business, organizational, educational, political or other appropriate
setting.
**Prerequisites:** jr st; 300-level or above course in atm sci; 3.0 gpa in the
major; cons supervising faculty.
**Course Rules:** One cr earned for 40 hrs work. May be retaken to 6 cr max.
**Last Taught:** Fall 2017, Spring 2017, Fall 2016, Fall 2015.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 699 Advanced Independent Reading
1-3 cr. Undergraduate.
Independent meteorological study.
**Prerequisites:** jr st, 2.5 gpa, & writ cons instr, dept chair, & asst dean for SAS.
**Course Rules:** May be retaken w/chg in topic to 3 cr max.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 705 Air Pollution Modeling
3 cr. Graduate.
Computational techniques for determining surface fluxes of heat and
momentum. Numerical methods for solving advection and diffusion
problems; statistical diffusion modeling.
**Prerequisites:** grad st; cons instr.
**Last Taught:** Fall 2016, Fall 2014, Fall 2012, Fall 2010.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 711 Cloud Dynamics
3 cr. Graduate.
Atmospheric applications of turbulent flow theory. Nonprecipitating
clouds: structure of individual cumulus clouds, stratocumulus and
cumulus boundary layers. Precipitating clouds: thunderstorms, squall
lines, hurricanes.
**Prerequisites:** grad st; cons instr.
**Last Taught:** Spring 2017, Spring 2015, Spring 2013, Spring 2011.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 725 Remote Sensing of the Environment
3 cr. Graduate.
Remote sensing technology, data processing, and analysis in
meteorology, with application to oceanography and geology. Radar
and acoustic sounding. Erts, sms/goes, thermal scanner, conventional
weather satellites.
**Prerequisites:** grad st in Physics, Math, Geog, Geo Sci, Engr, or Atm Sci.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 750 Nonlinear Time Series Analysis
3 cr. Graduate.
Phase space reconstruction; singular spectrum analysis; prediction;
dimension estimation; application of nonlinear time series analysis
techniques to selected data sets.
**Prerequisites:** grad st; cons instr.
**Last Taught:** Fall 2013, Spring 2012, Spring 2010, Spring 2008.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 760 Advanced Cloud, Aerosol & Precipitation Principles,
Processes & Interactions
4 cr. Graduate.
(3 hr lc, 2 hr la). Theoretical & experimental look at cloud & precipitation
formation, interaction & dissipation microphysics & chemistry aerosol
physics & chemistry, & their application.
**Prerequisites:** grad st; Atm Sci 464(C) or cons instr.
**Current Offerings:** http://uwm.edu/schedule

ATM SCI 761 Advanced Synoptic/Mesoscale Meteorology
3 cr. Graduate.
Advanced analysis techniques for synoptic/mesoscale diagnoses, case
studies of relevant circulation systems; role of planetary, synoptic, and
mesoscale flows in system development.
**Prerequisites:** grad st; cons instr.
**Last Taught:** Fall 2017, Fall 2015, Fall 2013, Fall 2011.
**Current Offerings:** http://uwm.edu/schedule
ATM SCI 888 Candidate for Degree
0 cr. Graduate.
Available for graduate students who must meet minimum credit load requirement.
Prerequisites: grad st.
Course Rules: Fee for 1 cr assessed.
Current Offerings: http://uwm.edu/schedule

ATM SCI 943 Seminar: Hydrology:
3 cr. Graduate.
Prerequisites: grad st.
Course Rules: Retakable w/chg in topic to 9 cr max.
Current Offerings: http://uwm.edu/schedule

ATM SCI 950 Seminar on Topics in Atmospheric Sciences:
3 cr. Graduate.
Selected topics in atmospheric dynamics, satellite meteorology, atmospheric & oceanic convection, air & water pollution, numerical prediction remote sensing, & others.
Prerequisites: grad st in physical sciences or engineering. Retakable w/chg in topic to 9 cr max.
Last Taught: Spring 2018, Fall 2017, Spring 2016, Fall 2015.
Current Offerings: http://uwm.edu/schedule

ATM SCI 990 Master's Thesis
1-8 cr. Graduate.
Prerequisites: grad st; cons instr & completed thesis proposal.
Current Offerings: http://uwm.edu/schedule

ATM SCI 997 Doctoral Externship
1-12 cr. Graduate.
Prerequisites: grad st; admis to candidacy for the PhD.
Current Offerings: http://uwm.edu/schedule

ATM SCI 998 Doctoral Dissertation
1-12 cr. Graduate.
Prerequisites: grad st; admis to candidacy for PhD.
Last Taught: Spring 2016, Fall 2015, Summer 2015, Spring 2015.
Current Offerings: http://uwm.edu/schedule

ATM SCI 999 Advanced Independent Reading
1-4 cr. Graduate.
Independent meteorological study.
Prerequisites: grad st & cons instr.
Course Rules: Retakable to 4 cr max.
Last Taught: Spring 2018, Fall 2017, Spring 2017, Fall 2016.
Current Offerings: http://uwm.edu/schedule