



Course Information

Duration: 2 days (or equivalent)

Facilitated by: Meteorologists from the Bureau of Meteorology Training Centre

Pre-requisites: Nil; limited science knowledge assumed

Course Overview

The Introduction to Meteorology course will equip you with a broad understanding of the driving forces in our atmosphere, how it is observed and how a range of phenomena are forecast.

In the first half of the course we explore the role of the sun in driving the weather via the global circulation. The big picture of meteorology (referred to as synoptic-scale meteorology) is then explained using the mean sea level pressure chart and features depicted on these charts as the basis. You will begin to develop predictive skills by relating synoptic-scale meteorology to the resulting weather phenomena. This extends to predicting wind direction and speed, temperature, cloud types and precipitation to name a few. Observation systems such as satellite, radar and surface observations are explained alongside these weather phenomena. Day one (or equivalent) concludes with a description of the forecast process used by Bureau weather forecasters.

The second day (or equivalent) begins with learning how to correctly interpret precipitation forecasts and how they're put together. You will then learn about thunderstorms and severe weather in Australia, including what causes thunderstorms and how severe thunderstorm warnings and severe weather warnings differ. The rest of the course will focus on specific forecasting services provided by the Bureau. You can choose from our electives which include tropical cyclones, climate outlooks and seasonal predictions, fire weather and heatwaves, flood, marine, tsunami and aviation weather services. There is not enough time to cover all these topics during the day, so you are encouraged to complete the pre-course survey to indicate your elective preferences. The course will focus on the most popular electives.

If delivered face-to-face, the course will include morning, lunch, and afternoon tea each day. If you have a tablet or laptop, feel free to bring it along so you can access our website and complete activities as we cover the different topics. The face-to-face course runs from 9am till 4:30pm each day, leaving some time at the end of the day for questions if you wish to remain a bit longer.

If delivered online, we will assume you have access to a computer or laptop, along with a fast, stable internet connection. The virtual course typically runs from 9am till 12:30pm AEST each day over four days to support learning retention from the virtual environment.

Details of the topics covered, and broad learning outcomes, are shown over page.



Learning Outcomes – Core Sessions

Core Session	Learning Outcomes
Global Circulation <i>Our restless globe</i>	<ul style="list-style-type: none">• Explain the role of the sun in driving the weather and seasons• Outline the vertical structure and properties of the atmosphere• Describe how the atmosphere redistributes heat around the globe• Explain how dry and wet areas of the planet are related to the global circulation
Synoptic-scale Systems <i>Highs, Lows and Fronts</i>	<ul style="list-style-type: none">• Forecast general wind direction, wind strength, rainfall and temperature conditions using the synoptic weather chart• List the major surface and upper weather systems that influence Australia• Describe the seasonal movement of these systems• Explain the seasonal rainfall patterns of Australia
Watching the Weather <i>Understanding today's weather to predict tomorrow's</i>	<ul style="list-style-type: none">• Describe how wind, temperature and rain are observed• Identify the major cloud types and their associated weather• Interpret satellite imagery using the Bureau's Himawari-8 viewer• Interpret radar imagery and outline the limitations of radar technology
Weather Forecast Process <i>Dispelling the "crystal ball" myth</i>	<ul style="list-style-type: none">• Describe the process meteorologists use to produce forecasts and warnings
Understanding Rainfall Forecasts <i>Probabilities and Percentages</i>	<ul style="list-style-type: none">• Develop an understanding of rainfall probabilities• Develop an awareness of how rainfall is forecast• Clarify understanding of rainfall amount and probability forecasts• Explain how meteorologists approach uncertainty
Thunderstorms and Severe Weather	<ul style="list-style-type: none">• Describe how thunderstorms develop and evolve• Explain thunderstorm ingredients, structures and types• List threats posed by Severe Thunderstorms• Outline thunderstorm forecast and warning services• Outline Severe Weather phenomena and thresholds• Explain the difference between severe weather warnings and severe thunderstorm warnings

Learning Outcomes – Elective Sessions

The second day (or equivalent) of the Introduction to Meteorology course focuses on the basic science and forecast/warning services provided by the Bureau. There is insufficient time to cover all these topics during the day, so you are encouraged to complete the pre-course survey to indicate your elective preferences. The course will focus on the most popular electives. Each elective's learning outcomes are presented below.

Elective Session	Learning Outcomes
Aviation	<ul style="list-style-type: none">• Obtain an overview of the Bureau's aviation forecasts and warnings• Understand the role of the Bureau in Australian commercial aviation• Explore impacts of weather hazards on surface and in-flight aviation operations
Climate Drivers and Outlooks	<ul style="list-style-type: none">• Explain the difference between weather and climate• Outline the key influences upon the Australian climate• Identify and use climate monitoring tools• Locate and interpret climate information available from the Bureau, including ENSO and seasonal climate forecasts
Fire Weather and Heatwaves	<ul style="list-style-type: none">• Describe weather conditions conducive to fires• Outline the Bureau's fire weather services• Recognise typical weather patterns that lead to increased fire danger• Define a heatwave and describe associated weather patterns
Floods	<ul style="list-style-type: none">• Define different types of floods• Describe the riverine Flood Forecasting & Warning Service• Explain the difference between a flood watch and warning• Describe key flood forecasting uncertainties• Use environmental information to make your own flood forecast
Marine	<ul style="list-style-type: none">• Describe key characteristics of a set of waves• Describe the generation and propagation of wind-generated waves• Identify the difference between seas and swell• Locate and interpret the marine forecast and warning services
Tropical Cyclones	<ul style="list-style-type: none">• List the key features of a tropical cyclone (TC)• Outline where, when and how often TCs occur• Describe the hazards associated with TCs and how they can vary from one TC to the next• Access and interpret TC warnings and information
Tsunami	<ul style="list-style-type: none">• Describe the generation, propagation and impact of tsunamis, including observation and modelling techniques• Describe the Australian Tsunami Warning System products