Elements of Dialing

October 2025 – April 2026

General Notes:

The course is intended for people who are new to sundialing and who wish to learn some of the basic concepts and a little bit of the history. The course is 'self study' – participants receive lessons by email and study them in their spare time.

As the course proceeds, there are regular but optional online meetings[1], using Zoom. They give participants the opportunity to discuss the course material and ask questions of the instructor. As well, the instructor is available via email to answer inquiries.

Each of the twelve lessons includes a few practice questions, which the participant is encouraged to work. Answers to these practice questions will be emailed before the Zoom discussions. **Participants must send in an answer to the final quiz question in order to receive the next lesson.** There is no 'pass/fail' in this course but sending answers to the quiz questions allows the instructor to be sure that the course is proceeding successfully.

Awareness of general math at high school level is helpful; the first lesson includes a short review of the basic principles of trigonometry, a necessary mathematical tool for dialists.

This is the fifth instance of the course. The course instructor will be Robert Kellogg (rkellogg@comcast.net). **Contact Bob no later than October 25, 2025 for more information or to join the course.**

The course is inspired by, and loosely based on, the original Dutch version created by Frans Maes.

Schedule:

Lesson	Lesson sent out by email		Deadline to send email answer to		NASS solutions to practice questions sent out by email		Office Hours (Zoom) Discussion of Lesson and Quiz	
1	27-Oct-2025	Mon	2-Nov-2025	Sun	4-Nov-2025	Tue	8-Nov-2025	Sat
2	10-Nov-2025	Mon	16-Nov-2025	Sun	18-Nov-2025	Tue	23-Nov-2025	Sun
3	24-Nov-2025	Mon	30-Nov-2025	Sun	2-Dec-2025	Tue	6-Dec-2025	Sat
4	8-Dec-2025	Mon	14-Dec-2025	Sun	16-Dec-2025	Tue	21-Dec-2025	Sun
5	29-Dec-2025	Mon	4-Jan-2026	Sun	6-Jan-2026	Tue	10-Jan-2026	Sat
6	12-Jan-2026	Mon	18-Jan-2026	Sun	20-Jan-2026	Tue	25-Jan-2026	Sun
7	26-Jan-2026	Mon	1-Feb-2026	Sun	3-Feb-2026	Tue	7-Feb-2026	Sat
8	9-Feb-2026	Mon	15-Feb-2026	Sun	17-Feb-2026	Tue	22-Feb-2026	Sun
9	23-Feb-2026	Mon	1-Mar-2026	Sun	3-Mar-2026	Tue	7-Mar-2026	Sat
10	9-Mar-2026	Mon	15-Mar-2026	Sun	17-Mar-2026	Tue	22-Mar-2026	Sun
11	30-Mar-2026	Mon	5-Apr-2026	Sun	7-Apr-2026	Tue	11-Apr-2026	Sat
12	13-Apr-2026	Mon	19-Apr-2026	Sun	21-Apr-2026	Tue	26-Apr-2026	Sun
	Note: The course follows a 2-week cycle, but for the highlighted weeks, an extra week is skipped							
	Note: Officer hours will always start at 3pm Eastern Time. Quiz deadlines are midnight Eastern Time							

[1] Privacy Notice: The Zoom meetings will be recorded and the recordings will be made available to all course participants

Lesson Outline

Lesson	Topic	
1	**Location of the sun in the sky** We introduce sundials as the world's oldest clocks. Then we discuss solar altitude, the local meridian and solar azimuth. Review of basic concepts of trigonometry.	
	Practice Quiz Submitted:	**Sunday 2 Nov 2025**
	Final Quiz Submited:	**Sunday 9 Nov 2025**
2	**Orientation on the Globe** We consider the coverage of sunlight on the globe How to define a location by using geographical coordinates of latitude & longitude	
	Practice Quiz Submitted:	**Sunday 16 Nov 2025**
	Final Quiz Submited:	**Sunday 23 Nov 2025**
3	**The Earth as a Sundial** We look at the rotating earth and pole-sytle sundials, and introduce the solar hour angle and measurement of time using the equatorial sundial. The armillary sphere represents a view of the celestial sphere and the sun's path.	
	Practice Quiz Submitted:	**Sunday 30 Nov 2025**
	Final Quiz Submited:	**Sunday 7 Dec 2025**
4	**Earth and Sun** Some details of the earth's rotation about its axis, the orbit of the earth, and terms to describe where the sun is on the Celestial Sphere. These terms include solar declination, ecliptic, zodiac, declination and date, and declination and solar altitude. A bit more trigonometry and equations for azimuth and altitude are covered. Tables of the sun's declination and the cause of the sun's poor timekeeping are explained, along with how to use the Equation of Time (EoT).	
	Practice Quiz Submitted:	**Sunday 14 Dec 2025**
	Final Quiz Submited:	**Sunday 28 Dec 2025**
5	**Some Sundial Types** We explore seven major dial orientations using the BSS Educational Multi-Dial kit: horizontal dials, direct south and north vertical dials, equatorial dials, polar dials, direct east and west vertical dials; declining vertical dials, inclining dials; pocket dials (Augsburg, Butterfield, diptych); compound dials. A look at small portable timepieces: Butterfield dial, Diptych, and other types; examples of beautiful work from the historical sundial making centers of Augsburg, Nuremburg, and other locations.	
	Practice Quiz Submitted:	**Sunday 4 Jan 2026**
	Final Quiz Submited:	**Sunday 11 Jan 2026**

6	**What is a gnomon** Sundials use a variety of shadow casting devices including vertical poles and slanted gnomons. Wide gnomons have a 'noon gap'. We introduce the concept of the shadow plane and hour plane and learn how to construct the hour lines for polar dials, horizontal dials, direct south-facing vertical dials, and with a bit more complexity, declining vertical dials; shadow plane dials, and what happens when moving a sundial to another location. Measuring wall declination.	
	Practice Quiz Submitted:	**Sunday 18 Jan 2026**
	Final Quiz Submited:	**Sunday 25 Jan 2026**
7	**Date Lines** A nodus, an index point on the gnomon, creates a mark on the shadow that allows us interpret date lines. The most common are the lines for summer and winter solstice and a straight line for the equinox. We look at other date lines, and date lines as they appear on vertical declining dials, Plus the horizon line, altitude, and azimuth lines.	
	Practice Quiz Submitted:	**Sunday 1 Feb 2026**
	Final Quiz Submited:	**Sunday 8 Feb 2026**
8	**Sun and Clocks** Why sundials (usually don't tell clock or civil time The Equation of Time (EoT) is easy to define but hard to compute. We'll look at solar time, mean local time, time zones, the origins of the EoT (with a nod to Johannes Kepler for showing the orbit of the earth is an ellipse). But nothing is easy, and the axis of the earth is tilted relative to the orbital plane, adding a complication to the EoT.	
	Practice Quiz Submitted:	**Sunday 15 Feb 2026**
	Final Quiz Submited:	**Sunday 22 Feb 2026**
9	**Non-Planar Pole-Style Dials** Spherical dials, terrellas, the hollow sphere, polar cylinder dial, cylinder dial without style, vertical cylinder dial, diverse dial faces.	
	Practice Quiz Submitted:	**Sunday 1 Mar 2026**
	Final Quiz Submited:	**Sunday 8 Mar 2026**
10	**Other Types of Sundials** Azimuth dials: analemmatic dial, sun compass, equator projection dial, azimuth dial with fixed gnomon. Altitude dials: cylinder or shepherd's dial, farmer's ring, universal equatorial dial, quadrant, navicula, Regiomontanus dial. Some other types: self-orienting combination, digital dial.	
	Practice Quiz Submitted:	**Sunday 15 Mar 2026**
	Final Quiz Submited:	**Sunday 29 Mar 2026**

11	**Historical Development** Antique hours from Babylonia, altitude dial from Egypt, the Arab connection. Dials from Medieval times: canonical dial. The Renaissance and later: equal hours, meridian lines, Babylonian and Italian hours, heliochronometers, bifilar dials, monofilar dials.	
	Practice Quiz Submitted:	**Sunday 5 Apr 2026**
	Final Quiz Submited:	**Sunday 12 Apr 2026**
12	**Miscellaneous Sundials** Special sundials: reflection dials. Sundials in art: sundials carried by figures, the sun pointer. Moon dials and nocturnals. Accuracy of sundials: constructive accuracy, reading accuracy, disappearing shadows; atmospheric effects: refraction, twilight. Mottoes and other dial furniture.	
	Practice Quiz Submitted:	**Sunday 19 Apr 2026**
	Final Quiz Submited:	**Sunday 26 Apr 2026**