

CVEN303 ENGINEERING MEASUREMENT

Lecture 10 – Compass & Magnetic Bearings (Sec. 4.12)

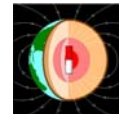
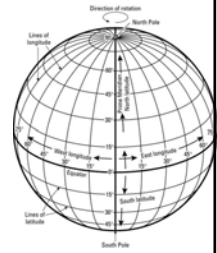
2013

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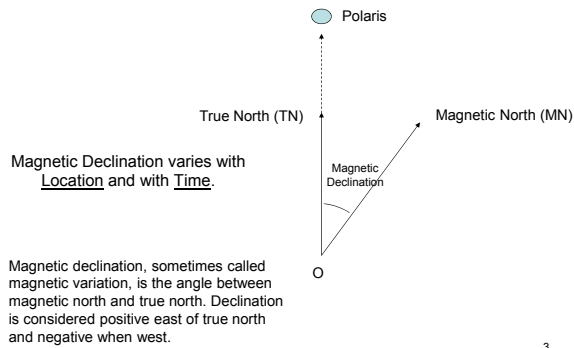
Commonly-Used Meridians

- True north (astronomic north)— through the geographic poles about which the Earth rotates. This is fixed (doesn't change with time).
- Magnetic north — the direction of the earth's magnetic lines of force. This varies with date, time and locality.
- Grid north — A true north is established for one point in a particular zone. All other points in that zone use the same line of direction as north.
- Arbitrary (or assumed) meridian — a direction adopted for a particular project for convenience.



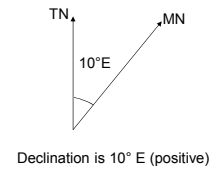
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Magnetic Declination



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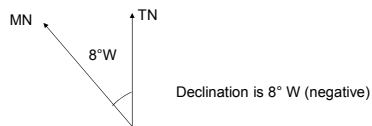
Magnetic Declination Example 1



If Magnetic North is east of True North, the declination is E (East) Declination.

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Magnetic Declination Example 2



If Magnetic North is west of True North the declination is W (West) Declination.

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Determining True North by Using a Compass and the Magnetic Declination

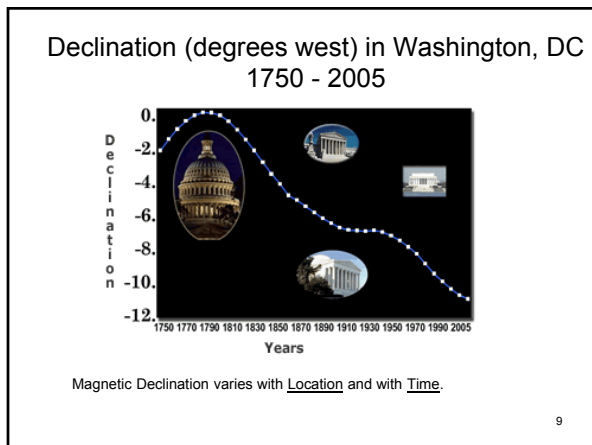
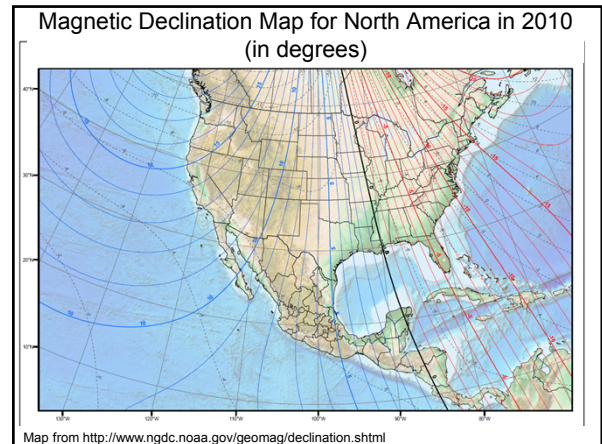
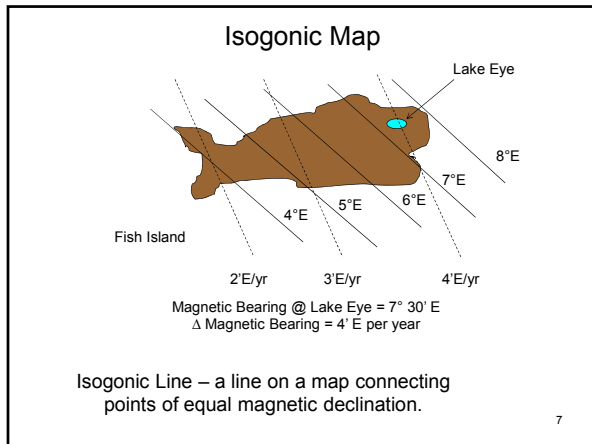
If the Magnetic Bearing of line AB is 32° and the declination is 8°E, what is the True Bearing of line AB?

Draw a sketch showing true north, magnetic north, and line AB.

To be solved in class.

Answers: Magnetic Bearing = N32°E; True Bearing = N40°E

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Examples

- On Feb 1, 2013
 - Magnetic Declination = 17°15'E
 - Rate of Change = 15'W per year
- What is the Magnetic Declination on Feb 1, 2012? and what will it be on Feb 1, 2014?

To be solved in class.

Answers: Magnetic Declination on Feb 1, 2012 = 7°30' E;
 Magnetic Declination on Feb 1, 2014 = 7°00' E

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National Geophysical Data Center <http://www.ngdc.noaa.gov/geomag-web/#declination>

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Finding Magnetic Declination <http://www.ngdc.noaa.gov/geomag-web/#declination>

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Example Surveying Problem

- A map from the fall of 1865 shows the true bearing of line CD as $S13^{\circ} 45'W$. On 2/1/13, you are asked to verify this true bearing. How will you do that?
- On 2/1/13, Magnetic Declination = $9^{\circ} 50' W$

To be solved in class