

Astronomy 111 Observing Project

The *observing project* gives you the opportunity to put classroom learning into practice as you observe and describe select objects in the sky. **Projects are worth 10% of your final grade.**

You will need *planetarium* software, *skychart(s)*, a quadrant (see website under ‘Class Materials’) and **information collected during group & individual outdoor observing sessions.**

Complete projects on the provided pages & submit on VIULearn as a SINGLE, reasonably sized PDF file. Project pages should be well lit, legible, properly oriented, and in the correct order. DO NOT include the introductory pages in your submission.

**** Late projects will NOT be accepted. ****

Planetarium software

Some exercises **require** the use of *planetarium software* - either *Starry Night* (available in the computer lab located in B315-113 or available separately) or *SkySafari* (available as an inexpensive purchase for your iOS and Android phone or tablet). More information and basic tutorials for both are available on the class website on the ‘Class Materials’ page.

Location, Date & Time of Computer Observations

Unless otherwise stated set your program to *Sep 29, 2026 at 10:00 pm (PDT)* in Nanaimo (approx 49° N, 124° W) **for all computer based observations** (MAKE SURE you ‘freeze’ the date/time on these settings as described in the online tutorials). **ANY required change(s) from the above date/time/location will be clearly stated.** CHECK your date/time/location EACH time you begin a new computer observation and (re)set values as needed. If you do NOT set the date/time/location correctly ***your observing results WILL be INCORRECT.***

Group & Individual Outdoor Observing Sessions

Computer observations are supplemented with **mandatory** class & individual outdoor observing as the real sky looks very different from a skychart or program! Group sessions include observing with the naked eye, binoculars, and a telescope and take about 1-2 hours. When attending outdoor observing sessions, dress **WARMLY** (hat, gloves, shoes, etc.), and bring **pen/pencil & paper, skychart**, and a **(red) flashlight**. There are a **limited number** of these sessions per term.

Some portions of the observing project require independent observations to be made on particular days (or within some set period). There should be enough flexibility in these dates to accommodate work, school schedules and the uncertainty of weather conditions, but even so, **DO NOT** leave it until the last moment. **The observing project CANNOT be done entirely on a computer!**

Quadrant

You will need a quadrant (or equivalent); instructions to build a simple one are given on the website.



Describing Positions of Objects

When describing the location of objects in the sky, imagine helping a (non-astronomy) friend find objects while stargazing. Use compass directions (N, SE, WSW, etc.) and approximate height above the horizon (near horizon, near zenith, 1/2 way in-between, etc.) DO NOT use technical descriptions such as declination, right ascension, azimuth, etc.

Detailed Descriptions

In places throughout the observation project, you will be asked to describe objects *in detail*. This means exactly that - imagine 'painting a picture' in words. Things to comment on include (*but are not limited to!*) elements such as size, shape, colour, brightness, and distribution of features & textures. Imagine describing what you are viewing to someone who has never seen the object themselves and who will attempt to draw it based *solely* on your description. ***Poor or incomplete descriptions will result in few or no marks on these types of questions!***

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Constellations & Deep Sky

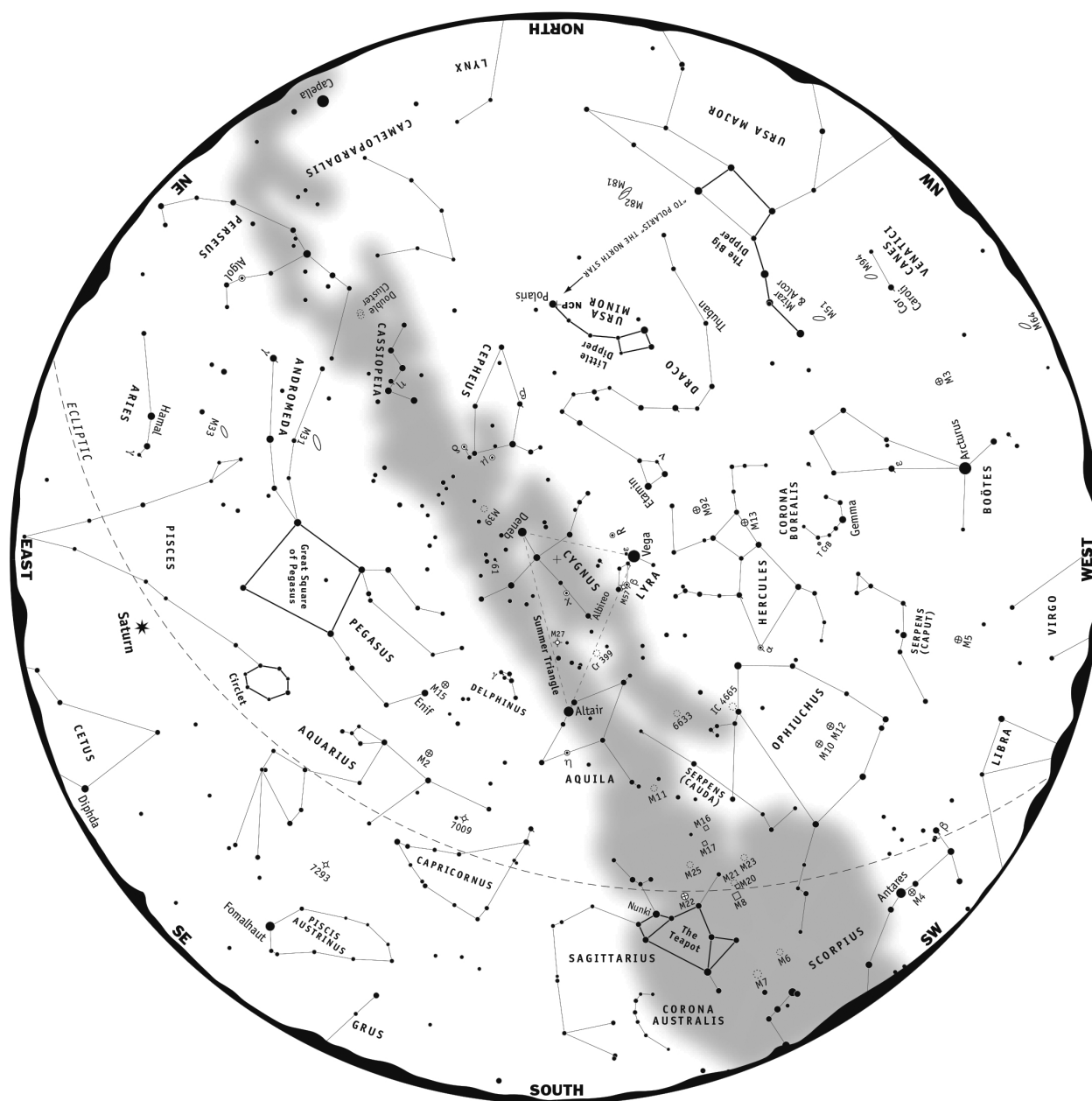
1. [*2 marks*] Perform the following from a *single, fixed location* during a group observation session or on your own after sunset, once Polaris is visible. Find Polaris as discussed in class and use your quadrant to **measure Polaris' angular height above the horizon twice on the same night and from the same location** but at least two hours apart. **Record the date, time, angular height and approximate compass direction in the table below.**

Polaris			
	Date	Time	Height (°) Direction
Observation #1:			
Observation #2:			

Comment on your results. How/why might Polaris be useful for navigation?

2. [5 marks] Perform the following *naked-eye observations* from a *single, fixed OUTDOOR location* (i.e. during a class observing session OR on your own) **within a few weeks of the specified project observation date** (*the skychart provided below should be similar to the ‘real’ sky within a few weeks of that date & a couple of hours of that time*).

Circle AND number the FIVE (5) brightest naked-eye ASTRONOMICAL OBJECTS (eg. stars, planets) **from 1 - 5** (in order of decreasing brightness). **IN ADDITION**, use a **HIGHLIGHTER** to trace out the **FIVE (5) most obvious naked-eye ASTERISMS**; *ONLY highlight those portions of the asterisms that are ‘readily obvious’ to the naked eye*.

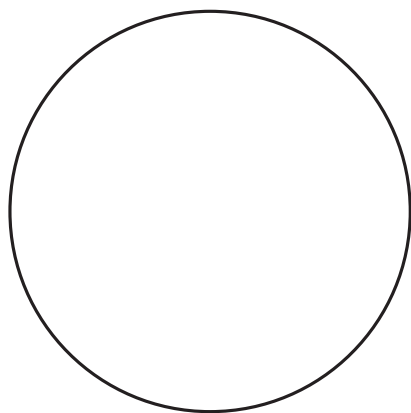


3. [10 marks] Fill in the tables below for the planet *Saturn*.

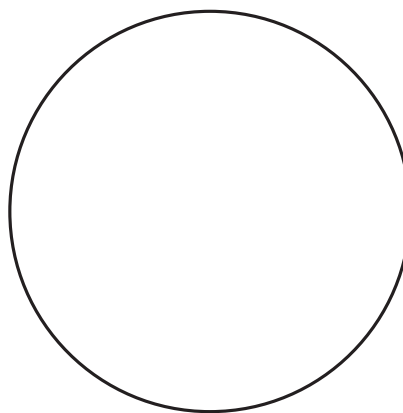
Observing Date	Time	Height ($^{\circ}$)	Direction

Common name(s)	
Type of object:	
Resides in constellation:	

HAND DRAW a *detailed, labeled* view of the object in the circular FOV on the left as viewed through a telescope at an observing session OR (if available) from its image on the VIU Rooftop Observing page (course website under Links). **HAND DRAW a *detailed, labeled, COLOUR* view of the object in the circular FOV on the right** as viewed on the same date/time using planetarium software; *ZOOM IN* so the object fills about HALF the screen.



telescope (“live”)

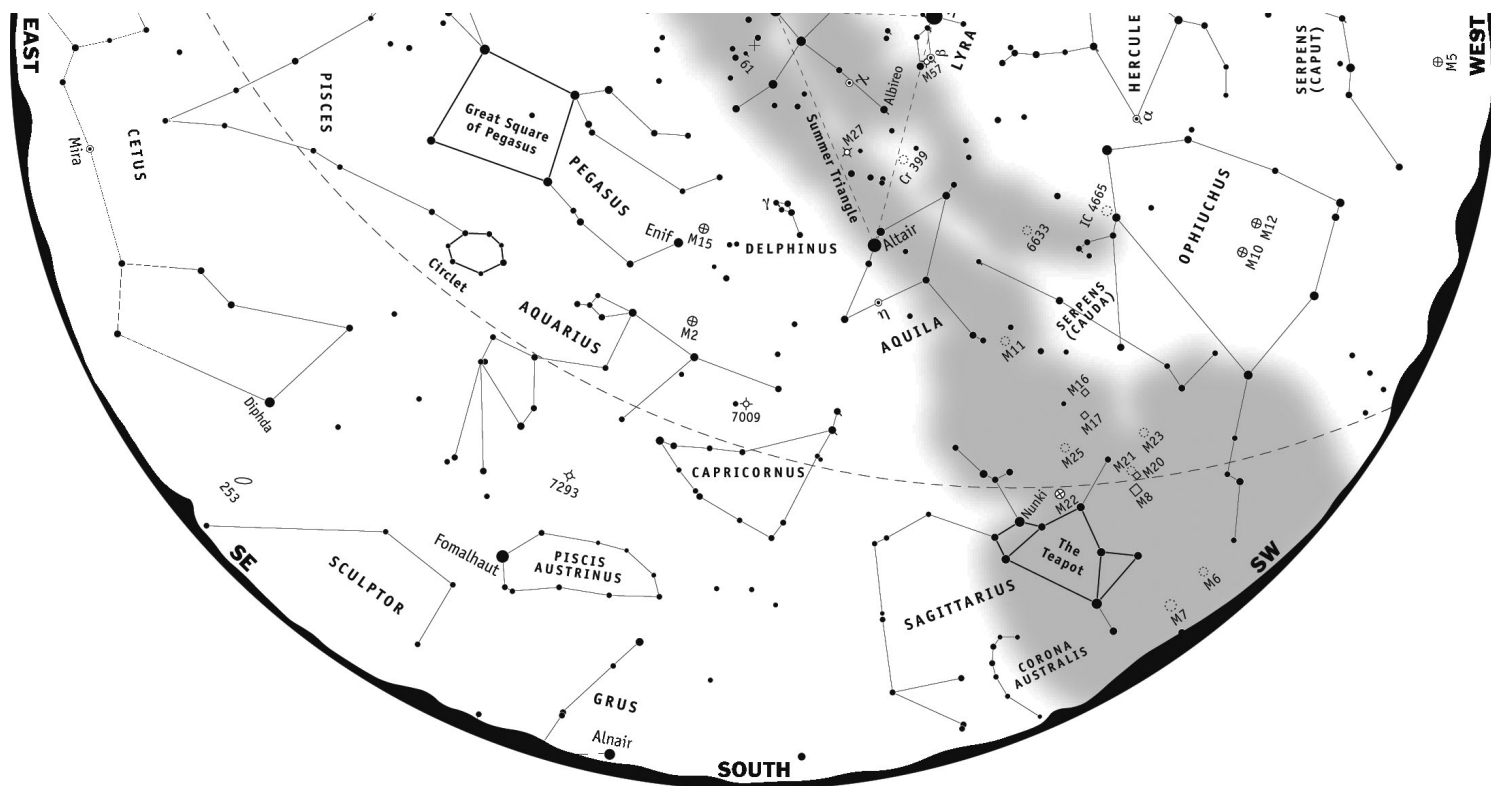


planetarium program (colour)

Describe the object’s appearance *in detail* (as seen both during the outdoor observing session AND using the computer). **Comment on SIGNIFICANT differences between the views.**

The Moon

1. [3 marks] Set your planetarium program's location to Nanaimo and turn ON *constellation lines/figures & constellation labels* (see website tutorials/videos for instructions). **STARTING on Sept 19, 2026 and continuing until Sep 27, 2026, record the POSITION (relative to the stars) & PHASE of the Moon at 9pm every SECOND night on the skychart below.** You MAY need to 'hide horizon' on some days to determine the Moon's position. Mark the Moon's position with a '+' and trace a roughly dime-sized circle around that point; *shade in* the phase (white=lit, black=unlit). Record the date next to each position.



Is the Moon's position & phase changing as *expected* (ie. class discussions)? Explain.

2. [**10 marks**] Set your planetarium program date/time/location as directed at the start of the project and locate the Moon. **Record the Moon's *position* in the sky, the *constellation* it is located in, and its apparent (visual) *phase*.**

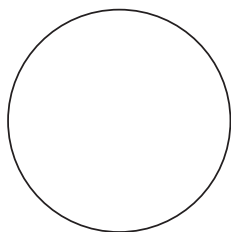
Draw BY HAND how the Moon appears in your *planetarium program* for **three (3) different cases**: *naked eye* (zoom in on the Moon until the *field of view* (FOV) is 10°), with *binoculars* (zoom in on the Moon until the FOV is 2°), and with a *telescope* (zoom in on the Moon until the FOV is 0.5°). **Use the provided circles for each of your drawings.**

Describe the appearance of the Moon IN DETAIL for each view. *Be sure to comment on variations in colour & texture, size & shape of visible features, distribution of surface features, etc.*

Naked Eye View (write your DETAILED description next to your drawing)



Binocular View (write your DETAILED description next to your drawing)



Telescopic View (write a DETAILED description below your drawing; in addition, **label** three (3) specific, uniquely named features **NOT** easily visible in previous views)

