Name(s): _____ _____

_____ _____

Date: _____ Course/Section: _____

Grade: _____

Image Analysis

Learning Objectives:

Students will work together to learn how to process astronomical images. By the end of the lab, students will understand the difference between true color and false color images, create their own color images in Maxim DL, and provide qualitative information regarding their observations.

Checklist:

- ☐ **Complete the pre-lab quiz with your team (if required).**
- ☐ **Compile a list of resources you expect to use in the lab.**
- ☐ **Work with your team to complete the lab exercises and activities.**
- ☐ **Record your results.**
- ☐ **Share and discuss your results with the rest of the class.**
- ☐ **Determine if your team's answers are reasonable.**
- ☐ **Submit an observation request for next week (if required).**

Pre-Lab Quiz

1.
2.
3.
4.

Part 1: Making RGB images and Measuring the Height of Danforth Chapel

1. Determine the mixing ratio of your red, green, and blue filter images that produces the most realistic color image. Explain how you judged whether the colors were "realistic". You will need to change the contrast of the image by using the screen stretch tool (ctrl+h).

Red:		Green:		Blue:	

2. How many pixels tall is the Danforth Chapel in your image?

3. What is the angular size of the chapel from top to bottom? Explain how you determined this. Give your answer in degrees and radians.

4. Determine the height of the Danforth chapel in meters and in feet. Show your work.

Height (meters):		Height (feet):	

Part 2: Identifying the Moons of Jupiter

1. For each of the images of Jupiter and its moons, record when the observations were taken from the FITS (ctrl+F) header window in MaxIm DL.

2. For each image, make a sketch of Jupiter and the moons that you can see. You may need to change the contrast (ctrl+H). Then use Stellarium to identify the moons in your sketches.

3. Examine your sketches of Jupiter and its moons. What happened to Io on 2015/04/20/02:50:02 UTC?

Part 3: Animating Images of the asteroid 3 Juno

1. Open one image from each observation of 3 Juno (folder 105 or 106), and determine when the observations were taken from the FITS header window. You should record the observation dates for both sets of images.

2. What is the RA and Dec of 3 Juno on each day?

3. Open the remaining images of 3 Juno in one of the folders and follow the directions on the lab website to learn how to animate your images.

4. Why is it important to align your images to the star field?

5. What constellation was 3 Juno in during these observations?

6. The semi major axis of 3 Juno's orbit is 2.67 AU. How long does it take to complete one orbit around the Sun?

Part 4: Team Image Analysis

Using the techniques you've learned in MaxIm so far, analyze a set of images.

Object:

RA and Dec:

Telescope Used:

Date of Observations:

Filters Used:

Exposure Times: