Syllabus: AST 484: Observational Astronomy Capstone

Course Title: AST 484: Observational Astronomy Capstone

Semester: Fall 2024

Instructor: Dr. Karen Mitchell

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Office Hours: Fridays 2:00-4:30 PM OR by appointment

Class Time & Place: Tuesday or Thursday 3:00-4:15 PM in SANCA 405

Course Description:

This capstone course focuses on the design and execution of an observational astronomy project. Students will collect and analyze data from telescopes to study celestial objects, culminating in a presentation of their findings at the Innovation Showcase. The course includes the development of a project proposal, observing strategy, data reduction, and a final report.

Course Objectives:

Design and conduct an observational astronomy project using telescopes.

Reduce and analyze observational data to study celestial objects.

Interpret the data and test hypotheses about observed phenomena.

Effectively present the project at the Innovation Showcase.

Learning Outcomes:

Gain expertise in observational astronomy and data analysis.

Develop practical skills in telescope use and data reduction.

Improve communication skills through written reports and presentations.

Enhance the ability to manage astronomy projects from conception to completion.

Group Project and Required Subtasks:

The group project for this course will involve designing and conducting an observational astronomy project using ground-based or space-based telescopes. The project will be broken down into the following subtasks:

1. **Project Proposal (Week 3):**
   - Create a proposal detailing the observational goals, the celestial objects being observed, and the anticipated outcomes. Include a timeline and assign roles to team members.

2. **Observing Strategy and Data Collection (Weeks 4-6):**
   - Develop an observing strategy, including the selection of instruments and scheduling of observations. Collect data using ground-based or space-based telescopes.

3. **Data Reduction and Analysis (Weeks 7-10):**
   - Reduce the observational data to remove noise and artifacts. Analyze the data to extract meaningful information about the observed celestial objects.

4. **Interpretation and Hypothesis Testing (Weeks 11-12):**
   - Interpret the results of the data analysis and test hypotheses about the observed phenomena.

5. **Final Report and Presentation (Weeks 13-15):**
   - Document the entire research process, including challenges, solutions, and outcomes in a final report.
   - Prepare a presentation and poster for the Innovation Showcase that highlights the key aspects of the project.

Groups are expected to collaborate closely, meeting regularly to discuss progress and resolve any

issues. Instructor check-ins will be scheduled to provide guidance and feedback.

Evaluation:

Class meetings (5): 20 points

Individual meetings (3): 12 points

Project Proposal: 10 points

Observing Strategy and Data Collection: 15 points

Data Reduction and Analysis: 18 points

Interpretation and Hypothesis Testing: 10 points

Final Report: 10 points

Presentation: 5 points

Poster: 10 points

Total: 100 points

Course Policies:

Attendance and Participation: Regular attendance and active participation are crucial for success in this course. Students are expected to attend all scheduled class meetings and individual sessions. If a student is unable to attend a class, they should inform the instructor in advance and arrange to complete any missed work.

Academic Integrity: All students must adhere to ASU's academic integrity policy. Any form of academic dishonesty, including plagiarism, will be reported and may result in severe penalties, including a failing grade for the course.

Accommodations: Students with disabilities or special needs should contact the ASU Disability Resource Center to arrange appropriate accommodations and notify the instructor as soon as possible.

Important Dates:

Class Week 1: Introductions & Project Brainstorming (Aug 26)

Individual Meeting #1: Discuss Ideas and Readings (Sep 4)

Class Week 2: Proposal Presentation & Group Feedback (Sep 18)

Individual Meeting #2: Proposal Feedback & Methods Discussion (Oct 2)

Class Week 3: Revised Proposal Presentation & CERTT Tour (Oct 23)

Individual Meeting #3: Data Analysis & Progress Review (Nov 13)

Class Week 4: Professional Development & Project Discussion (Nov 27)

Innovation Showcase: Final Presentations & Poster Display (Dec 6)