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| <br><b>FLORIDA ATLANTIC UNIVERSITY</b>   | <b>NEW COURSE PROPOSAL</b><br><b>Undergraduate Programs</b>   |   | UUPC Approval <u>3/25/24</u><br>UFS Approval _____<br>SCNS Submittal _____<br>Confirmed _____<br>Banner Posted _____<br>Catalog _____ |
|   | Department Physics<br>College Charles E. Schmidt College of Science<br><i>(To obtain a course number, contact erudolph@fau.edu)</i> |   |   |
| Prefix <b>AST</b><br><br>Number <b>3722</b>   | <i>(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)</i><br><br>Lab Code _____   | Type of Course<br><div style="border: 1px solid black; padding: 2px; display: inline-block;">Lecture</div>  | Course Title<br><b>Techniques of Observational Astronomy</b>  |
| Credits <i>(See Definition of a Credit Hour)</i><br><b>3</b>  | Grading <i>(Select One Option)</i><br>Regular <input checked="" type="radio"/><br>Sat/UnSat <input type="radio"/>                   | Course Description <i>(Syllabus must be attached; see Template and Guidelines)</i><br>An in-depth treatment of how professional astronomers gather, reduce, analyze, and interpret observations mostly focused on the optical/infrared portion of the electromagnetic spectrum. |   |
| Effective Date <i>(TERM &amp; YEAR)</i><br><b>Fall 2024</b>   |   |   |   |
| Prerequisites, with minimum grade*<br><b>AST 2002 and (PHY 2053 or PHY 2048)</b><br>All with "C" or higher  | Corequisites<br><b>(PHY 2053 or PHY 2048)</b>   | Registration Controls <i>(Major, College, Level)</i>  |   |
| <i>*Default minimum passing grade is D-. Prereqs., Coreqs. &amp; Reg. Controls are enforced for all sections of course</i>  |   |   |   |
| WAC/Gordon Rule Course<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to proposal. See <a href="#">WAC Guidelines</a> . |   | Intellectual Foundations Program (General Education) Requirement <i>(Select One Option)</i><br><br>None<br><br>General Education criteria must be indicated in the syllabus and approval attached to the proposal. See <a href="#">Intellectual Foundations Guidelines</a> .    |   |
| <b>Minimum qualifications to teach course</b><br>M.S. in Physics or related field   |   |   |   |
| Faculty Contact/Email/Phone<br><i>Am Sarajedini / esarajedini@fau.edu / 352-281-4286</i>  |   | List/Attach comments from departments affected by new course  |   |
| <b>Approved by</b><br>Department Chair _____<br>College Curriculum Chair _____<br>College Dean _____<br>UUPC Chair <u>Korey Sorge</u><br>Undergraduate Studies Dean <u>Dan Meeroff</u><br>UFS President _____<br>Provost _____      |   | <b>Date</b><br><u>3/11/24</u><br><u>3/13/24</u><br><u>3/13/24</u><br><u>3/25/24</u><br><u>3/25/24</u>   |   |

Email this form and syllabus to [mianning@fau.edu](mailto:mianning@fau.edu) seven business days before the UUPC meeting.

# AST 3722-001 Techniques of Observational Astronomy

MWF 11:00 – 11:50  
3 credits

Semester, Year  
Prof. XXXXX YYYYY  
Office: XXXXXX  
Office hours: MWF 11-12  
Classroom: XXXX  
Telephone: 561-297-XXXX  
Email: [zzzzz@fau.edu](mailto:zzzzz@fau.edu)



|              |                     |
|--------------|---------------------|
| TA name      | xxxxxx xxxxxxxxxxxx |
| Office       | xxxxxxxxx           |
| Office hours | MWF xx:xx – xx:xx   |
| Telephone    | 561-297-xxxx        |
| Email        | xxxxxx@fau.edu      |

## Catalog Description

An in-depth treatment of how professional astronomers gather, reduce, analyze, and interpret observations, mostly focused on the optical/infrared portion of the electromagnetic spectrum.

## Course Description

This course is intended to teach the fundamental principles and techniques used in planning, making, reducing and analyzing modern astronomical observations. It includes classroom lectures and discussion, indoor laboratory work, data analysis and telescopic observations. There will be components that introduce the numerical treatment of observations, CCD imaging, digital imaging processing and astronomical spectroscopy.

## Instructional Method

In-Person. There is no remote option for this course.

## Prerequisites

- AST 2002 and
- (PHY 2053 or PHY 2048)
- All prerequisites with a "C" or higher

## Corequisites

- (PHY 2053 or PHY 2048)
-

## Course Objectives/Student Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Understand and navigate the celestial sphere and point a telescope at celestial objects.
2. Understand how astronomical data are gathered in different wavelength regimes.
3. Reduce, analyze, and interpret imaging observations in the optical and infrared
4. Reduce, analyze, and interpret spectroscopic observations.
5. Design and develop a scientific proposal for a professional observational facility.

## Course Evaluation Method

### Attendance (10%)

### Term-Projects (20%)

Projects will use archival photometric and spectroscopic data to analyze the properties of stars and galaxies.

### Observing Proposal (20%)

Design, develop, and write an observing proposal intended for submission to a professional astronomical observatory.

### Midterm Exam (20%)

Exam will use a combination of multiple choice and short answer responses to cover the material presented in the first half of the semester.

### Final Exam (30%)

Exam will use a combination of multiple choice and short answer responses to cover the material presented during the entire semester with emphasis on the second half of the semester.

## Course Grading Scale

|              |        |       |       |       |       |       |       |       |       |       |       |     |
|--------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| total points | 90-100 | 87-90 | 84-87 | 80-84 | 77-80 | 74-77 | 70-74 | 67-70 | 64-67 | 60-64 | 57-60 | <60 |
| grade        | A      | A-    | B+    | B     | B-    | C+    | C     | C-    | D+    | D     | D-    | F   |

## **Policy on Makeup Tests, Late Work, and Incompletes**

Students are expected to complete all requirements by the specified due dates. If a student misses class or an assignment due to circumstances beyond their control and provides the instructor with timely notification, they will be allowed a reasonable time to make up the missed work. The format of a make-up test/exam will be at the discretion of the instructor.

Students will not be penalized for absences due to participation in University-approved activities, including athletic or scholastics teams, musical / theatrical performances, or debate activities. These students will be allowed to make up missed work without any reduction in the student's final course grade. Reasonable accommodation will also be made for students participating in a religious observance. Also, note that grades of Incomplete ("I") are reserved for students who are passing a course but have not completed all the required work because of exceptional circumstances. A grade of "I" will only be given under certain conditions and in accordance with the academic policies and regulations put forward in FAU's University Catalog. The student must show exceptional circumstances why requirements cannot be met. A request for an incomplete grade must be made in writing with supporting documentation, where appropriate.

## **Policy on the Recording of Lectures**

Because of a new Florida Statute in 2021, the following model language is suggested for inclusion in course syllabi, at the discretion of individual faculty:

Students enrolled in this course may record video or audio of class lectures for their own personal educational use. A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach students about a particular subject. Recording class activities other than class lectures, including but not limited to student presentations (whether individually or as part of a group), class discussion (except when incidental to and incorporated within a class lecture), labs, clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, and private conversations between students in the class or between a student and the lecturer, is prohibited. Recordings may not be used as a substitute for class participation or class attendance and may not be published or shared without the written consent of the faculty member. Failure to adhere to these requirements may constitute a violation of the University's Student Code of Conduct and/or the Code of Academic Integrity.

## **Attendance Policy**

*Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.*

## **Counseling and Psychological Services (CAPS) Center**

*Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to <http://www.fau.edu/counseling/>*

## **Disability Policy**

*In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at [www.fau.edu/sas/](http://www.fau.edu/sas/).*

## **Code of Academic Integrity**

*Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [University Regulation 4.001](#).*

### **Academic Integrity Policy Clarification for this Course:**

In this section I would like to clarify points that may not be obvious in the previous section.

- If I feel that academic irregularity has occurred, we will schedule a meeting. You will have a chance to give your side of the story. If you can convince me that there is not problem, the matter is dropped.
- During this meeting, if you a) admit to offending behavior or b) can't convince me of your innocence, the University Registrar will be contacted to put a mark on your record. There may be additional penalties as well.
- You will follow the guidelines in University Regulation 4.001 to appeal the mark on your transcript (and/or additional penalties) if you feel you are innocent.
- As is listed in (4).(C) of University Regulation 4.001... "a repeat offense, even if the notation of violation of the Code of Academic Integrity from the first offense had been expunged from the official transcript as a result of successful completion of the peer counseling program, the student will be expelled from the University."
- The penalties for cheating and violations of the Code of Academic Integrity escalate quickly and are severe. Do not ignore this warning.

## Required Texts/Readings

“Astronomical Techniques” by C. R. Kitchin (required)

## Course Topical Outline

- Week 1 – Basics of Observational Astronomy
- Week 2 – Coordinate Systems and Time, Planning Observations
- Week 3 – Basic Astronomical Optics
- Week 4 – Basics of Observing Proposals
- Week 5 – Properties of the Earth’s Atmosphere
- Week 6 – Statistics and Error Analysis
- Week 7 – Photometry, Exposures, Filters, CCD Image Acquisition, Calibration 1
- Week 8 – Photometry, Exposures, Filters, CCD Image Acquisition, Calibration 2
- Week 9 - Photometry, Exposures, Filters, CCD Image Acquisition, Calibration 3
- Week 10 – Image Alignment, Mosaicking, Astrometry 1
- Week 11 - Image Alignment, Mosaicking, Astrometry 2
- Week 12 – Spectroscopy 1
- Week 13 – Spectroscopy 2
- Week 14 – Telescopes and Detectors
- Week 15 – Review and Wrap-Up