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# Physics 471H

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Astrophysics: 1 Credit

Instructor – Dr. Mark Conde



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## Overview

### Description

This course is a quick survey of topics of interest in astrophysics. The brief 4-week period will limit both the scope and depth of the material covered. Topics to be discussed include:

- Astrophysical Tools
- Stellar Astrophysics
- The Milky Way Galaxy
- The Nature of Galaxies
- Large Scale Structure of the Cosmos (if time permits)

### Course goals and student learning outcomes

Upon completion of this course students will:

- Be familiar with a range of topics from astrophysics
- Be able to solve simple quantitative problems relating to these phenomena.

My goal as an instructor is to provide every student with maximum possible opportunity for success. This means that I try to be as flexible as possible with the course requirements, to avoid creating needless hurdles. Nevertheless, some penalties for missed or late work are necessary; my policies in this regard are outlined below.

### Instructor information

|                   |                                                                                                                                                                                                                                                     |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Instructor:       | Dr. Mark Conde                                                                                                                                                                                                                                      |
| Office locations: | Reichardt room 110 & 113 and Elvey room 706C.                                                                                                                                                                                                       |
| Office Phone:     | 474-7741                                                                                                                                                                                                                                            |
| Email:            | <a href="mailto:mgconde@alaska.edu">mgconde@alaska.edu</a>                                                                                                                                                                                          |
| Office hours:     | I do not intend to establish fixed office hours for this small class. I will always be available immediately after lectures, or at other times by arrangement. If you need to see me, speak to me after class or send me an email, to setup a time. |
| Office Manager:   | Liya Billa: Email: <a href="mailto:lkBILLA@alaska.edu">lkBILLA@alaska.edu</a><br>Office: Reichardt room 102.<br>Phone: 474-7339                                                                                                                     |

### Approximate schedule

| Week | Dates           | Notes                | Lectures | HW Assigned | Hw Due |
|------|-----------------|----------------------|----------|-------------|--------|
| 1    | Oct 03 - Oct 07 |                      | 1-3      | 1           |        |
| 2    | Oct 10 - Oct 14 |                      | 4-6      | 2           | 1      |
| 3    | Oct 17 - Oct 21 |                      | 7-9      | 3           | 2      |
| 4    | Oct 24 - Oct 28 | Exam assigned Friday | 10-12    |             | 3      |

## Course components and instructional methods

### Instructional materials

Material for this course will be prepared electronically and will be available *over the web* via the “Blackboard”<sup>1</sup> system at <http://classes.uaf.edu>. Material to be posted this way includes:

- Course syllabus (this document)
- Lecture notes (see comments below)
- Homework problem sets
- Supplementary handouts
- Online student grades

Note that I will not be distributing homework or exam solutions to the web.

### Lectures

Lectures will be held face-to-face, on Monday, Wednesday, and Friday from 1:00 pm to 2:00 PM in Reichardt room 165.

I will be presenting lectures using both computer slides and a whiteboard. I intend to post printable versions of the electronic lecture notes online ahead of time. It is recommended that you read the online lecture notes beforehand, and take notes during the lecture. The emphasis in the lectures will be on clarification of the key concepts in the book, rather than lengthy mathematical derivations.

### Homework

There will be three homework sets for this course. Homework will be assigned during the Friday lecture and will be due the following Friday. Homework must be submitted using Gradescope. I will discuss how to do this during our first lecture, and will also post the relevant link on the Blackboard site for this class. Electronic submission requires that you either write your homework on a computer, or else hand-write and scan it to a pdf document. A number of apps for smartphones are available that can “scan” handwritten work to a multi-page pdf using the phone’s camera.

You are encouraged to work with others, but you are prohibited from simply copying other’s work. Homework will count heavily toward your final grade, as well as provide me with feedback regarding your understanding of the material.

Problems assigned in this class can often be solved in several ways, with each solution involving a number of steps. So please be aware that even if you submit a correct solution to a problem, I may not recognize it as correct if it’s poorly presented. While I will accept almost any work that you turn in, it is unlikely that I’ll award many points for a homework or exam solution unless it:

- Is neatly laid out
- Is largely free from crossing out and over-writing

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<sup>1</sup> All students should have access to Blackboard. Please let me know if you have difficulties with this.

- Is accompanied by **descriptions in words of what you are doing at each step**

Homework will count heavily toward your final grade, as well as provide me with feedback regarding your understanding of the material.

## Exams

There will be one take-home final exam. I will distribute the final exam paper at the end of our last lecture, which is on Friday October 28. The exam responses will be due at 6 pm on the following Monday, October 31. You should thus have plenty of time to do the problems and submit your responses. As with homework, your exam answers should be submitted using Gradescope. Complex formulae and physical constants will be provided for exam problems that require them.

## Course requirements

### Prerequisites

PHYS F220, PHYS F301, or permission of instructor.

### Textbooks

I will be posting fairly comprehensive lecture notes online. I expect some students may find these notes alone to be adequate for this course. I will be drawing on numerous text books and published articles, but the following is recommended for detailed reading:

- "An Introduction to Modern Astrophysics", by Bradley W. Carroll and Dale A. Ostlie, Second Edition Addison Wesley 2007.

### Technology Requirements

Course materials will be delivered via Blackboard. This means all students will require a suitable computer and a reliable internet connection. Most material will be delivered in PDF format, so that students will need access to Adobe Acrobat Reader or other third-party equivalent software.

Calculators will be permitted (and required) during exams. There will be no need for anything elaborate; an easy-to-use scientific calculator with trigonometric, exponential, and logarithmic functions is all that you will need. Remember that it is much more important to present the correct formulae and reasoning for solving a problem than it is to arrive at the correct numerical value. Please, explain your reasoning when presenting solutions to homework and exam problems. I will award partial points for correct reasoning, if presented, even if the final answer is incorrect or incomplete.

In general, it is better to work with algebraic variables whenever possible; numerical values should not be substituted in until absolutely necessary.

## Course policies

### Grading

The course grade will consist of the following components

- One take-home final exam: 40%
- Three homework sets: 60% (20% per set)

I will post all grades online, using the UAF's "Blackboard" system (<http://classes.uaf.edu>). All registered students have access to this system for checking their grades. Please do check that I have posted all your grades correctly, and let me know if you think there is an error. Also, please retain all work returned after grading, in case an error does appear. Returned graded work is proof of your scores.

Final grades will be returned as letter grades with plus/minus modifiers. These will be derived from your overall percentage grade. The approximate conversions for each letter grade will be as follows. A: >90%; B: 75% to 90%; C: 60% to 75%; D: 50% to 60%; F: <50%. Plus/minus modifiers will subdivide each main grade into three equally spaced sub levels.

### Consequences of Low Grades

It is important to understand the implications of receiving a letter grade of "C" or below for this course. The following table<sup>2</sup> describes UAF regulations with regard to grades of 'C' and below:

| Grade / Grade Points            | Definition and academic implications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C+ (2.3)<br>C (2.0)<br>C- (1.7) | <p>"C" (including C+ and C-) indicates a satisfactory level of acquired knowledge and performance in completion of course requirements.</p> <p><b>C- (1.7) is the <u>minimum</u> acceptable grade that undergraduate students may receive for courses to count toward the major or minor degree requirements, or as a prerequisite for another course. A minimum grade of C (2.0), however, MAY be required by specific programs for prerequisite and / or major / minor courses. Please consult specific program listings in the UAF Catalog.</b></p> <p><b>C- (1.7) is the <u>minimum</u> acceptable grade required for all Core (X) Courses.</b></p> |
| D+ (1.3)<br>D (1.0)<br>D- (.7)  | <p>"D" (including D+ and D-) indicates a minimal level of acquired knowledge and minimal performance in completion of course requirements. This grade does not satisfy requirements for courses in the major, minor, Core, or graduate programs.</p>                                                                                                                                                                                                                                                                                                                                                                                                    |

Table updated 5/21/2013

<sup>2</sup> Taken from [http://www.uaf.edu/files/uafgov/Info-to-Publicize-C\\_Grading-Policy-UPDATED-May-2013.pdf](http://www.uaf.edu/files/uafgov/Info-to-Publicize-C_Grading-Policy-UPDATED-May-2013.pdf)

Needless to say, a grade of “F” represents a failure. Zero grade points will be awarded, and the course must be re-taken to receive credit.

## **Attendance**

UAF policies<sup>3</sup> include statements that:

- “you must begin attending classes on the first day of instruction or you may lose your place, regardless of whether or not you have paid tuition and fees”
- “you are expected to adhere to the class attendance policies set by your instructors”

In general, I expect at least 90% attendance from all students. Extended periods of consistent absence may lead to a penalty in your overall grade, depending on circumstances.

## **Class participation**

There is no requirement for you to participate actively in class by asking questions or joining discussions, and there is no grade component based on this. Nevertheless, you are of course free to ask questions at any time during the lectures. Because we have a large amount of material to cover, I may defer answering lengthy or numerous questions until after class.

## **Missed or late work**

In the case of documented illness, clash with another UAF commitment, or other emergency, a make-up exam may be given, at the discretion of the instructor. An unexcused absence for the exam will lead to 0 points earned on that exam.

Problem sets will generally not be accepted after the due date, without documented evidence of illness, conflict with other commitment, or genuine emergency. Students having documented clashes with other UAF commitments may pre-arrange alternate homework submission deadlines with me. All decisions regarding late homework or alternate deadlines will be at the discretion of the instructor.

## **Student conduct and academic honesty**

It is the responsibility for each student to be informed about the policies for student conduct and safety at the University of Alaska. You are encouraged to read these policies at <https://www.uaf.edu/student-affairs/student-resources/conduct.php#condu>. It should go without saying that students are expected to do their own original work for all assignments. Any deviation from this may be considered academic misconduct and may result in a failing grade and referral to university authorities for possible disciplinary action.

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<sup>3</sup>See <http://catalog.uaf.edu/academics-regulations/attendance/> and <https://www.uaf.edu/register/services.php#attend>

## Support services

### Complaints and concerns

You are always welcome to discuss your concerns with me. However, if you have a concern that you feel cannot be resolved by discussion with me, you may wish to contact the Physics Department chair, Dr. Truffer. If your concern cannot be resolved at the department level, you may also discuss the matter with the Dean of the College of Natural Science and Mathematics.

### Student Health and Counseling Center

The University provides health and counseling services through its Student Health and Counseling Center, which is located at 612 N. Chandalar Drive, on the 2nd floor of the Whitaker Building (the same building as Fire and Police, across from the bus turn around.) Their web site is at <http://www.uaf.edu/chc/>. The center will see students on an appointment basis. The number to call for an appointment is 474-7043. It is best to do so at 8:00 AM in the morning, because they are scheduled daily on a first come first serve basis.

### Disabled students

Disability services are provided free of charge, and are available to any student who qualifies as a person with a disability. Student seeking special accommodations for a disability must first discuss their needs with Disability Services. Call 474-5655 to schedule an appointment.

UAF Disability Services is located in the Whitaker Building, room 208. Extensive support is available, as described at <http://www.uaf.edu/disability/>

As needed, I am happy to work with you, disability services, veterans' services, rural student services, etc. to find reasonable accommodations for all students' needs.

**Effective communication:** Students who have difficulties with oral presentations and/or writing are strongly encouraged to get help from the UAF Department of Communication's Speaking Center (907-474-5470, [speak@uaf.edu](mailto:speak@uaf.edu)) and the UAF English's Department's Writing Center (907-474-5314, Gruening 8th floor), and/or CTC's Learning Center (604 Barnette Street, 907-455- 2860).

### Sexual Harassment and Discrimination

Students at this university are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. Please be aware that if I notice or am informed of certain types of misconduct, then **I am required to report it** to the appropriate authorities. For more information on your rights as a student and the resources available to you to resolve problems, please go the following site: [www.uaf.edu/handbook/](http://www.uaf.edu/handbook/).

UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: <https://alaska.edu/nondiscrimination/>.

## **Emergency Notification Plan**

Students will receive emergency notifications via phone or email. Please check your UAOnline account to confirm your emergency notification settings. For more information, please refer to the Student Handbook. In cases where you do not have access to your devices, as your instructor, I will take responsibility to relay any emergency notifications.

## **Extended Absence Policy**

The university of Alaska Fairbanks recognizes that students may need to miss more classes than allowed by a particular instructor as specified in course policies. Extended absences are defined as missed classes or course work by students beyond what is permissible by the instructor's written course policies. Students may need to miss class and/or course work for a variety of reasons, including, but not limited to:

- Bereavement
- Personal illness or injury
- Serious illness of a friend, family member or loved one
- Military obligations
- Jury service

Other emergency or obligatory situations For more information, go to the Students Hand book or the Center for Students Rights and Responsibilities.

## **Additional Support Services**

- Speaking Center: 907-474-5470, [speak@uaf.edu](mailto:speak@uaf.edu), Gruening 507.
- Writing Center: 907-474-5314, [uaf-writing-center@alaska.edu](mailto:uaf-writing-center@alaska.edu), Gruening 8th floor.
- UAF Math Services: [uafmathstatlab@gmail.com](mailto:uafmathstatlab@gmail.com), Chapman 305 (for math fee paying students only)
- Developmental Math Lab: Gruening 406
- The Debbie Moses Learning Center at CTC: 907-455-2860, 604 Barnette St., Room 120.
- For more information and resources, please see the Academic Advising Resource List: [https://www.uaf.edu/advising/lr/SKM\\_364e19011717281.pdf](https://www.uaf.edu/advising/lr/SKM_364e19011717281.pdf).

## **Syllabus Addendum**

UAF requires all syllabi to include the following addendum. It specifies UAF's official position with regard to a number of important issues. Should there be any inconsistencies between this addendum and the course-specific syllabus presented above, the policies described in the addendum are the ones that will apply.



## Syllabus Addendum (Revised 8/22/2022)

**COVID-19 statement:** Students should keep up-to-date on the university's policies, practices, and mandates related to COVID-19 by regularly checking this website:

<https://sites.google.com/alaska.edu/coronavirus/uaf?authuser=0>

Further, students are expected to adhere to the university's policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

**Student protections statement:** UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site:

<https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/>.

**Disability services statement:** I will work with the Office of Disability Services to provide reasonable accommodation to students with disabilities.

**ASUAF advocacy statement:** The Associated Students of the University of Alaska Fairbanks, the student government of UAF, offers advocacy services to students who feel they are facing issues with staff, faculty, and/or other students specifically if these issues are hindering the ability of the student to succeed in their academics or go about their lives at the university. Students who wish to utilize these services can contact the Student Advocacy Director by visiting the ASUAF office or emailing [asuaf.office@alaska.edu](mailto:asuaf.office@alaska.edu).

### Student Academic Support:

- Speaking Center (907-474-5470, [uaf-speakingcenter@alaska.edu](mailto:uaf-speakingcenter@alaska.edu), Gruening 507)
- Writing Center (907-474-5314, [uaf-writing-center@alaska.edu](mailto:uaf-writing-center@alaska.edu), Gruening 8th floor)
- UAF Math Services, [uaf-traccloud@alaska.edu](mailto:uaf-traccloud@alaska.edu), Chapman Building (for math fee paying students only)
- Developmental Math Lab, Gruening 406
- The Debbie Moses Learning Center at CTC (907-455-2860, 604 Barnette St, Room 120, <https://www.ctc.uaf.edu/student-services/student-success-center/>)
- For more information and resources, please see the Academic Advising Resource List ([https://www.uaf.edu/advising/lr/SKM\\_364e19011717281.pdf](https://www.uaf.edu/advising/lr/SKM_364e19011717281.pdf))

### Student Resources:

- Disability Services (907-474-5655, [uaf-disability-services@alaska.edu](mailto:uaf-disability-services@alaska.edu), Whitaker 208)
- Student Health & Counseling [**6 free counseling sessions**] (907-474-7043, <https://www.uaf.edu/chc/appointments.php>, Gruening 215)
- Center for Student Rights and Responsibilities (907-474-7317, [uaf-studentrights@alaska.edu](mailto:uaf-studentrights@alaska.edu), Eielson 110)
- Associated Students of the University of Alaska Fairbanks (ASUAF) or ASUAF Student Government (907-474-7355, [asuaf.office@alaska.edu](mailto:asuaf.office@alaska.edu), Wood Center 119)

**Nondiscrimination statement:** The University of Alaska is an affirmative action/equal opportunity employer and educational institution. The University of Alaska does not discriminate on the basis of race, religion, color, national origin, citizenship, age, sex, physical or mental disability, status as a protected veteran, marital status, changes in marital status, pregnancy, childbirth or related medical conditions, parenthood, sexual orientation, gender identity, political affiliation or belief, genetic information, or other legally protected status. The University's commitment to nondiscrimination, including against sex discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement of nondiscrimination available at [www.alaska.edu/nondiscrimination](http://www.alaska.edu/nondiscrimination). For more information, contact:

UAF Department of Equity and Compliance

1692 Tok Lane, 3rd floor, Constitution Hall, Fairbanks, AK 99775

907-474-7300

[uaf-deo@alaska.edu](mailto:uaf-deo@alaska.edu)

Additional syllabi statement for courses including off-campus programs and research activities:

University Sponsored Off-Campus Programs and Research Activities

We want you to know that:

1. UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: [www.alaska.edu/nondiscrimination](http://www.alaska.edu/nondiscrimination).
2. Incidents can be reported to your university's Equity and Compliance office (listed below) or online reporting portal. University of Alaska takes immediate, effective, and appropriate action to respond to reported acts of discrimination and harassment.
3. There are supportive measures available to individuals that may have experienced discrimination.
4. University of Alaska's Board of Regents' Policy & University Regulations (UA BoR P&R) 01.02.020 Nondiscrimination and 01.04 Sex and Gender-Based Discrimination Under Title IX, go to: <http://alaska.edu/bor/policy-regulations/>.
5. UA BoR P&R apply at all university owned or operated sites, university sanctioned events, clinical sites and during all academic or research related travel that are university sponsored.

For further information on your rights and resources [click here](#).