



SUFFOLK UNIVERSITY

MADRID CAMPUS

SCI 112 M1 – STRUCTURE OF THE UNIVERSE

Instructor Information:

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Course Information:

Catalog Description: This course introduces non-science majors to modern astronomy. It presents a broad view of astronomy suitable for students who may have taken their last science and math course several years ago. Together with the laboratory component (SCI-L112), this course aims to give those students a flavor of how researchers think, how they experiment, and how they form a view of the physical world. The ambition of this course is to make students realize that they can take part in this scientific enterprise provided they learn some techniques and adopt a scientific approach to analyzing the universe. Topics covered in this course range from the study of stars to galaxies, and cosmology. Other characteristics of this course are heavy use of audio-visual materials often including computer animations and simulations, and intensive use of astronomy and astrophysics related INTERNET-based resources.

Prerequisites: MATH-128 or higher and SCI-L112 concurrently.

Credit Hours: 3

This course follows the US Federal Government's Credit Hour definition: "An amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutional established equivalence that reasonably approximates no less than:

- (1) One hour of classroom or direct faculty instruction and a minimum of two hours of out of class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or
- (2) At least an equivalent amount of work as required in paragraph (1) of this definition for other academic activities as established by the institution including laboratory work, internships, practice, studio work, and other academic work leading to the award of credit hours."

For full up-to-date statement:

https://cihe.neasc.org/sites/cihe.neasc.org/files/downloads/POLICIES/Pp111_Policy_On_Credits-And-Degrees.pdf

To complete this course, students will need to dedicate, at a minimum, the following amount of time to the listed activities:

Assignments/Activities	Engagement Estimate	Engagement Hours
Review Power Points	7 PP x 30 minutes	3.5
Course Readings	268 pages x 8 minutes	36
Homework	7 x 30 minutes	7.5

Assignments/Activities	Engagement Estimate	Engagement Hours
Research Project	20 hours preparation	30
Quizzes Preparation	6 hours preparation	6
Midterm Exam Preparation	6 hours preparation	6
Final Exam Preparation	6 hours preparation	6
Class Attendance	3 hours x 15 weeks	45
TOTAL		140 HOURS

Textbook/Course Materials:

E. Chaisson & S. McMillan, Astronomy, a beginner's guide to the Universe, 8th ed., Pearson, 2016.

Course Goals & Learning Objectives:

Upon successful completion of this course, students will know/understand:	Upon successful completion of this course, students will be able to:	How the student will be assessed on these learning outcomes
<ul style="list-style-type: none"> Understand that the STE disciplines involve a manner of inquiry and a process, and are not just content. 	<ul style="list-style-type: none"> Distinguish between hypothesis driven and inquiry-based research Recognize the flexibility of the discovery process and the scientific method Analyze and solve a problem based upon information from the scientific / technical literature 	<ul style="list-style-type: none"> Collaborative group assignments that present interpretation of scientific data related to, for example, Dark Matter.
<ul style="list-style-type: none"> Know the skills required to locate and understand scientific/technical literature. 	<ul style="list-style-type: none"> Locate scientific or technical literature online and/or in the library Differentiate between factual scientific/technical literature and news/stories/opinions that are intended to persuade or entertain an audience Locate the definition of unknown vocabulary from a credible source and learn its meaning Explain an article from the secondary and tertiary scientific/technical literature Explain scientific / technical ideas in written or oral format 	<ul style="list-style-type: none"> Collaborative assignments that require students to research scientific literature available online or provided by the instructor on topics covered in the course.
<ul style="list-style-type: none"> Understand the relationship between natural science and technology, the implications of scientific discoveries, and the potential of the STE disciplines to address problems of the contemporary world. 	<ul style="list-style-type: none"> Give examples of how the STE disciplines are relevant and applicable to daily life Recognize that as we gather scientific information, our view of the world changes Explain how the application of STE disciplines requires ethical considerations and responsibilities Appreciate that society has a vested interest in STE discoveries 	<ul style="list-style-type: none"> Homework assignments and final project will cover topics like planetary exploration, exoplanets, global warming, and the energy problem, and explore the role of technological revolutions in astronomy in addressing these issues.

Assignments/Exams/Papers/Projects:

The course assignments will include work to be performed both individually and in small groups. Much of the work will involve short essays. Some assignments will require you to utilize current newspapers and technical magazines/journals in addition to web-based resources. One mid-term exam and one final exam are given. The final exam will be comprehensive for students with grades lower than C on the midterm exam. There will be short quizzes (15 minutes) scheduled periodically in addition to the mid-term exam and the final exam. Books and notes will not be used during the exams or quizzes, which will be multiple choice tests.

Communication skills are an essential aspect of professional activities. Students has the chance to prepare individually or in couples a short presentation about a related subject (extra credit).

Grading/Evaluation:

Students will be evaluated in the following areas: Participation 10%, Laboratory performance (in SCI-L112) 10%, Short presentations 15%, Short quizzes 15%, Mid-term exam 25%, Final exam 25%.

There will be curve, and grades will be assigned as follows:

- 100% > A > 93%.
- 93% > A- > 89%.
- 89% > B+ > 86%.
- 86% > B > 82%.
- 82% > B- > 79%.
- 79% > C+ > 76%.
- 76% > C > 72%.
- 72% > C- > 69%.
- 69% > D+ > 65%.
- 65% > D > 60% .
- 60% > F > 0% .

There is no grading on the curve (grade as rank in class). The grade boundaries will not be raised but the instructor may lower them. If they entire class earns 93% or above, the entire class will receive an A. While this is not likely to happen, note that helping your fellow students will not harm your own grade. We are all on the same team.

Collaborative Work:

Scientists and engineers normally work in groups, and social interactions are critical to their work. Most good ideas grow out of discussions with colleagues. In this course, we want you to work with others as much as possible. Study together, help your partners to get over confusions, ask each other questions, and critique each other's homework write-ups. Teach each other! You can learn a great deal by teaching. But do turn in your own assignments. While collaboration is the rule in technical work, evaluations of individuals also play an important role in science and engineering. Exams and quizzes are to be done without help from others. Cheating will not be tolerated and will be penalized in accordance with university regulations noted in the university's academic honesty policy: Suffolk University Academic Honesty Policy

Statement on Technology Services:

Suffolk University provides a variety of resources to support course technology:

- University Help Desk (Mon-Fri, 8:30am – 8pm): 617.557.2000 or helpdesk@suffolk.edu
- For Blackboard and Collaborate assistance, please contact the 24-hour support line at 866.886.4861.
- Step-by-step Blackboard tutorials are accessible within every Blackboard course via the Bb Tutorials menu
- On Demand Knowledge Base provides information on all other technologies that are used in courses, including teaching, learning, research and productivity tools

Course and Classroom Policies:

Food or drink (except water) is not allowed in class. The use of cell phones, laptops, etc. is not permitted during the lectures, except by express instructor request. Students should arrive punctually and remain in the classroom throughout the whole class meeting (except for emergencies). Students arriving more than 10 minutes late are not allowed to enter the classroom. Those arriving later or leaving earlier thus missing that class and will count as an absence.

In this course, the university e-mail is a major means of communication. Each student is responsible for checking his/her Suffolk University e-mail account and reading and responding to all course-related messages. Assignments will be accepted by e-mail.

Participation/Attendance Policy:

The SUMC Student Handbook states the following:

Once a student is registered for a course, attendance at every meeting of every class is expected, including those held in the first week of the semester. A maximum of two unjustified absences is permitted. Each additional absence will cause the final course grade to be lowered by one-third of a letter grade, i.e., from A to A-; A- to B+; B+ to B, etc.

Excessive absences in a course will have a negative effect on the final grade. When a student is absent, the quality of his or her work in a course will deteriorate since material missed in class sessions can rarely be made up satisfactorily, even though the student remains responsible for that work.

Please note that even when a student has a justified reason for missing class, such as illness, the negative academic impact on learning will be the same as if the absence were for spurious reasons.

In this course, any absence due to illness should be justified by a note from the student's physician or other health professional confirming the day(s) on which the student was unable to attend class. A written excuse from a student's host parent or residence supervisor is also acceptable.

In the event that a class meeting is unexpectedly cancelled, students will be expected to continue with readings or other assignments as originally scheduled. Any assignments due or class activities (e.g., a quiz, exam or presentation) planned for such a cancelled class are due at the next class meeting unless other instructions are communicated

All students are strongly urged to attend every class, and to do so punctually. Students are also expected to participate in class discussions and to ask questions. Students who miss classes are responsible for keeping themselves informed about class proceedings.

Attendance is required for quizzes and exams. If you know that you will miss an exam due to an excused absence, you must notify me in advance so that alternative arrangements can be made.

A mandatory trip to the Teide Observatory at Canary Islands constitutes the laboratory section of the course (see syllabus of SCI L112 – Astronomy II Laboratory).

Disability Statement:

If you anticipate issues related to the format or requirements of this course, please meet with me. I would like us to discuss ways to ensure your full participation in my classroom.

If formal, disability-related accommodations are necessary, it is very important that you be registered with the Office of Disability Services (ODS) at the main Campus in Boston so that I am notified of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations. Check the ODS web site at www.suffolk.edu/disability for information on accommodations.

Student Resources:

SUMC provides a range of student services, both academic and personal. To learn more about course-related tutorials and academic workshops, refer to the SUMC Student Handbook, Section 2 "Academic Policies and Services". Section 5, "Living in Madrid", contains information on the medical and mental health resources, including an English-speaking therapist, available to you.

Midterm Review:

At midterm, around week 6, you will be given a midterm grade based on your progress to date and performance on assignments, quizzes and midterm exam. Midterm grades of C- or below will be reported to the Madrid Campus Academic Standing Committee, with an explanation of what I believe

has contributed to that grade: excessive absences, poor time management or study skills, lack of effort, difficulty with the course material or with writing or language skills, etc. The Academic Standing Committee or I may contact you to suggest strategies for addressing these difficulties. I strongly encourage you to visit me during my office hours so we may discuss how you can be successful in this class.

Academic Misconduct:

www.suffolk.edu/about/mission-history/policies-procedures/academic-misconduct-policy

Suffolk University expects all students to be responsible individuals with high standards of conduct. Students are expected to practice ethical behavior in all learning environments and scenarios, including classrooms and laboratories, internships and practica, and study groups and academic teams. Cheating, plagiarism, unauthorized collaboration, use of unauthorized electronic devices, self-plagiarism, fabrication or falsification of data, and other types of academic misconduct are treated as serious offenses that initiate a formal process of inquiry, one that may lead to disciplinary sanctions.

Student work will be thoroughly examined for academic integrity and may be scanned using plagiarism detection software. A faculty member suspecting academic misconduct will contact the student using the Suffolk email address to schedule a meeting and will make all effort to do so within five business days of detecting the incident. During the meeting, the faculty member will present the documentation that led to suspected academic misconduct. Resolution of the incident will be according to the procedures outlined in the SUMC Student Handbook.

Academic Grievances Policy:

www.suffolk.edu/student-life/student-services/student-handbook/university-policies-for-student-cas-sbs/grievances-academics

Course Schedule:

The schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better student learning.

Week	General Topic of Lesson	Readings or Assignments Due
0	Presentation	
1	The sky	Chap. 0, Sect. 1,2,5
2 - 3	Information from the cosmos Observation trip	Chap. 2 Mons Telescope manual
3 - 4	The inner working of atoms	Chap. 2
4 - 6	Telescopes Midterm exam	Chap. 3
7 - 9	Stars	Chap. 9 - 12
10	Black Holes and Neutron Stars	Chap. 13
11	The Milky Way	Chap. 14
12	The galaxies	Chap. 15, Sect. 1,2,3 / Chap. 16, Sect. 1,5
13	The Big Bang	Chap. 17, Sect. 1,2,5,6,8
	Final exam	