



SENATE COMMITTEE ON CURRICULAR AFFAIRS
COURSE SUBMISSION AND CONSULTATION FORM

Principal Faculty Member(s) Proposing Course

Name	User ID	College	Department
ANN SCHMIEDEKAMP	ams	Abington College (AB)	Not Available

Academic Home: Abington College (AB)

Type of Proposal: Add Change Drop

Course Designation

(ASTRO 141N) Film and Extraterrestrial Life: Science Fact or Fiction?

Course Information

Cross-Listed Courses:

COMM 151N(CM)

Prerequisites:

Corequisites:

Concurrents:

Recommended Preparations:

Abbreviated Title: Astrobiology Films

Discipline: General Education

Course Listing: Inter-Domain

Special categories for Undergraduate (001-499) courses

Foundations

Writing/Speaking (GWS)

Quantification (GQ)

Knowledge Domains

Health & Wellness (GHW)

Natural Sciences (GN)

Arts (GA)

Humanities (GH)

Social and Behavioral Sciences (GS)

Additional Designations

Bachelor of Arts

International Cultures (IL)

United States Cultures (US)

Honors Course

Common course number - x94, x95, x96, x97, x99

Writing Across the Curriculum

First-Year Engagement Program

First-Year Seminar

Miscellaneous

Common Course

GE Learning Objectives

GenEd Learning Objective: Effective Communication

GenEd Learning Objective: Creative Thinking

GenEd Learning Objective: Crit & Analytical Think

GenEd Learning Objective: Global Learning

GenEd Learning Objective: Integrative Thinking

GenEd Learning Objective: Key Literacies

GenEd Learning Objective: Soc Resp & Ethic Reason

Bulletin Listing

Minimum Credits: 3

Maximum Credits: 3

Repeatable: NO

Department with Curricular Responsibility: Abington College (Pre-Major) (ABAB_ABCOM)

Effective Semester: FA 2018

Travel Component: NO

Course Outline

A brief outline or overview of the course content:

Topics in astrobiology and film studies as applied to recent film works of both nonfiction and fiction

1. Formation and evolution of planet Earth
2. Criteria for evaluating narrative and non-narrative film forms
3. History of life on earth including extinction events and its portrayal in film media
4. Extremophiles and the styles of interview as applied to documentary coverage of scientists
5. Possible locations in the solar system for life and example science fiction films depicting extraterrestrial life inspired by planetary science
6. Development of critical and analytical skills in how to read a film and its application to science fiction works
7. The relationship between style/form and content in fiction and documentary science films
8. Exoplanets and their coverage in film media
9. The Drake Equation and fictional works inspired by its implications

A listing of the major topics to be covered with an approximate length of time allotted for their discussion:

1. Formation and evolution of planet Earth and techniques of presenting these concepts in informative documentary media. (1 week)
2. Extremophiles and emphasis of techniques in interviewing scientists; examples of cinema verite in documentary films; examples of mise en scene (1 week)
3. Examination of the the relationship between style/form and content in fiction and documentary science films; comparison and contrast (1 week)
4. Duration of life on Earth and nonfiction documentary treatment and fictional depictions of mass extinction; analysis of staging of catastrophic events (1 weeks)
5. Necessary conditions for extraterrestrial life and possibilities for life elsewhere in the solar system (1 week)
6. Critical analysis of documentaries depicting life on Mars and other locations in the solar system (1 week)
7. Application of critical analysis skills to science fiction works on life in the solar system (on Mars and other bodies. How to read a film. (3 weeks)
8. Exoplanets and how they are discovered; Habitable zones
Planning a journey to a nearby exoplanet with realistic scientific facts and comparison to fiction works depicting interstellar travel. (1 week)
9. Extraterrestrial intelligence, Drake equation and its documentary representations (1 week)
10. Analysis of a science fiction works according to representations of extraterrestrial intelligence(2 weeks)
11. Culminating project for students to analyze a fiction or non fiction film media work and present to the class. (2 weeks for student presentations)

Course Description:

The search for life beyond planet Earth has been the subject of much interdisciplinary scientific search and has stimulated human imagination. Scientific discoveries of exoplanets (outside of our solar system), of extremophiles (life which can survive in extreme conditions) and the discoveries of conditions on other bodies in our solar system which might be able to support life, has provided progress in answering the question of the existence of extraterrestrial life. Not only have a plethora of fictional work appeared in the film media to depict scenarios of life beyond Earth, but there has also been an abundance of video media created to present the scientific ideas to the wider audience beyond the scientific community. This course intends a critical evaluation of both nonfiction and fictional media works in the educational dissemination of scientific ideas and the effective presentation of concepts. We will analyze techniques in photography, mise en scene, editing, sound, dramatization and writing as they are applied to topics in astrobiology.

The name(s) of the faculty member(s) responsible for the development of the course:

| Name: ANN SCHMIEDEKAMP (ams)

Title: Professor, Physics

Phone: 215-881-7572

Address: 217 Woodland Building

Campus: AB

City: Abington

Fax:

| Name: BELLA FRIESEL (bef10)

Title: SENIOR LECTURER OF FILM

Phone: +1 215 881 7335

Address: 0119 SUTHERLAND BUILDING

Campus:

City:

Fax:

Course Justification

Instructional, Educational, and Course Objectives:

This section should define what the student is expected to learn and what skills the student will develop.

1. Describe the scale of the universe and realistic space travel and critically analyze how time travel is presented in film
2. Describe exoplanets and how we know they exist.
2. Compare documentary treatment of the beginning of the Earth and the formation of life, use of animations
3. Compare fictional works on mass extinction events, dramatization, storylines, integrity of science presented and analyze the different modes of presentation and their effectiveness for different topics.
4. Compare fictional works representing human travel and habitation on Mars and icy moons, and critique on their mise en scene, storylines, dramatization. Compare their realism with respect to scientific accuracy.
5. Compare documentary treatments of the Drake Equation and how they present different factors in the computation. Use the Drake equation to understand the range of probabilities.
6. Compare the the views and representation on extraterrestrial intelligent life in two or more fictional works.

Evaluation Methods:

Include a statement that explains how the achievement of the educational objective identified above will be assessed.

The procedures for determining students' grades should be specifically identified.

1. Group projects to plan an interstellar journey to an exoplanet and compare details with a media example of travel beyond our solar system; written submissions
2. Class discussion about documentaries to present beginning of Earth, tests to evaluate
3. Tests and essay to identify scientific concepts presented in fiction film media and their evaluation with respect to scientific accuracy. Student discussions to identify whether a lack of scientific accuracy is justified on the basis of a lack of artistic license.
4. Compute probabilities from the Drake Equation and debate with peers in the class on the probabilities of extra-terrestrial intelligent life. Assignment to submit calculations and a written argument
5. Final paper and group presentation of selected film media on extraterrestrial intelligent Life.

Relationship/Linkage of Course to Other Courses:

This statement should relate the course to existing or proposed new courses. It should provide a rationale for the level of instruction, for any prerequisites that may be specified, or for the course's role as a prerequisite for other courses.

This course presents some of the scientific concepts in Astro 140 and some coverage of film analysis in Comm 150.

Relationship of Course to Major, Option, Minor, or General Education:

This statement should explain how the course will contribute to the major, option, or minor and indicate how it may function as a service course for other departments.

Integrated course

A description of any special facilities:

none

Frequency of Offering and Enrollment:

once per semester

Alignment with General Education Objectives

EFFECTIVE COMMUNICATION – the ability to exchange information and ideas in oral, written, and visual form in ways that allow for informed and persuasive discourse that builds trust and respect among those engaged in that exchange, and helps create environments where creative ideas and problem-solving flourish.

KEY LITERACIES – the ability to identify, interpret, create, communicate and compute using materials in a variety of media and contexts. Literacy acquired in multiple areas, such as textual, quantitative, information/technology, health, intercultural, historical, aesthetic, linguistic (world languages), and scientific, enables individuals to achieve their goals, to develop their knowledge and potential, to lead healthy and productive lives, and to participate fully in their

community and wider society.

CRITICAL AND ANALYTICAL THINKING – the habit of mind characterized by comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating a conclusion. It is the intellectually disciplined process of conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action.

INTEGRATIVE THINKING – the ability to synthesize knowledge across multiple domains, modes of inquiry, historical periods, and perspectives, as well as the ability to identify linkages between existing knowledge and new information. Individuals who engage in integrative thinking are able to transfer knowledge within and beyond their current contexts.

CREATIVE THINKING – the capacity to synthesize existing ideas, images, or expertise in original ways and the experience of performing, making, thinking, or acting in an imaginative way that may be characterized by innovation, divergent thinking, and intellectual risk taking.

GLOBAL LEARNING – the intellectually disciplined abilities to analyze similarities and differences among cultures; evaluate natural, physical, social, cultural, historical, and economic legacies and hierarchies; and engage as community members and leaders who will continue to deal with the intricacies of an ever-changing world. Individuals should acquire the ability to analyze power; identify and critique interdependent global, regional, and local cultures and systems; and evaluate the implications for people's lives.

SOCIAL RESPONSIBILITY AND ETHICAL REASONING – the ability to assess one's own values within the social context of problems, recognize ethical issues in a variety of settings, describe how different perspectives might be applied to ethical dilemmas, and consider the ramifications of alternative actions. Individuals should acquire the self-knowledge and leadership skills needed to play a role in creating and maintaining healthy, civil, safe, and thriving communities.

What component(s) of the course will help students achieve the General Education Learning Objectives covered in the course? Provide evidence that students in the course have adequate opportunities to achieve the identified learning objectives.

EFFECTIVE COMMUNICATION—Students will investigate how the ideas of science are conveyed in both nonfiction and fiction films. They will be required to investigate a film work and present an analysis to the rest of the class as an assessment. This assessment will include an oral group presentation to the class as a culminating project.

KEY LITERACIES—Students will learn the background principles in astronomy and planetary science that describe distances and size of the universe, solar system, the variety of extremophiles known in biology, the ideas put forth by the Drake equation and the vocabulary of film techniques, animation, mis en scene, storylines and other aspects of film analysis.

INTEGRATIVE THINKING—Students will learn and recognize the aesthetic aspects and formal values and characteristics of the medium of film as it is applied to representing aspects of planetary science, the solar system, representation of conditions on other bodies in our solar system, the ideas of scale in the solar system and the probabilities outlined in the Drake equation.

CRITICAL AND ANALYTICAL THINKING Students will explore the ideas presented in both nonfiction (documentaries) and fictional films. They will analyze the scientific ideas presented and evaluate the presentations in terms of accurate scientific ideas. Students will also evaluate how effectively the films present certain scientific concepts, i.e., do they introduce misconceptions by presenting scientific ideas poorly? How does the artistic approach of the filmmaker enhance the scientific communication by the use of editing, interviews or cinema verite? Does the film communicate a bias or a true scientific evaluation according to the scientific method?

How will students be assessed to determine their attainment of the Learning Objective(s) of General Education covered in this course? This assessment must be included as a portion of the student's overall performance in this course.

KEY LITERACIES: Students will be given exam questions and quizzes over concepts in exoplanets, extremophiles, planetary science, and film analysis terms.

CRITICAL and ANALYTICAL THINKING and INTEGRATIVE THINKING: Students will also be required to do critical analysis of the effectiveness of different techniques in film creation toward the representation of scientific concepts and they will be assessed on their ability to convey comparisons in essay questions on exams and quizzes. Students will be expected to compare and contrast the ways that a scientist presents scientific ideas vs. the way a film creator presents the same ideas.

EFFECTIVE COMMUNICATION: There will be a required small group project involving critical analysis of a documentary or fictional work that was not covered in class. The culminating analysis will be presented to the class via powerpoint and accompanied by example clips of the media presentation to support the evaluation.

For assessment, students will evaluate and compare several films on the same topic. In a culminating final group project, students also will have to critically analyze a new film piece that was not discussed in the course. They will be expected to use the critical analysis skills in analyzing films and apply those in the final project. The syllabus is attached to the proposal. See the assessments in week 2,3,6 (two different documentaries for critical analysis, one chosen because it is poorly constructed),8, 9, 13 and 14 (culminating project).

General Education Domain Criteria

General Education Designation: Inter-Domain

GA Criteria

Explain the methods of inquiry in arts fields and describe how the contributions of these fields complement inquiry in other areas

Demonstrate an expanded knowledge and comprehension of the role that the arts play in various aspects of human endeavor

Demonstrate competence in the creation of works of art and design

Demonstrate competence in analysis, critical thinking and interpretive reasoning through the exploration of creative

works

Identify and explain the aesthetic, historic, social, and cultural significance of important works of art and critically assess creative works, their own or others', through evaluative processes of analysis and interpretation

What components of the course will help students achieve the domain criteria selected above?

Demonstrate an expanded knowledge and comprehension of the role that the arts play in various aspects of human endeavor--Students will analyze how realistic scientific concepts can be conveyed by visual and kinetic animations and portrayals, how photography can show details of the natural world, how interviews with contemporary scientists can elucidate scientific understanding and how editing can be used to both make the concepts clear and entertaining to keep the viewer engaged.

Demonstrate competence in analysis, critical thinking and interpretive reasoning through the exploration of creative works--Students will be required to critically analyze film media in representing ideas in astrobiology. For example, many fictional media depict humans on Mars. Students will be required to critically analyze how effective various aspects of the film are in representing such scenes and compare various film works accordingly.

Identify and explain the aesthetic historic social and cultural significance of important works of art. Students will explore the overall message of a media work, and a trend of cultural optimism that life is found beyond Earth. The significance of film media in its representation of conditions on planets and moons in the solar system can serve to either present realistic or erroneous images. Especially interesting is the representation of extraterrestrial life for which there is a wide range of possibilities. Students will be asked to evaluate the significance of the works presented in this course.

GN Criteria

Explain the methods of inquiry in the natural science fields and describe how the contributions of these fields complement inquiry in other areas

Construct evidence-based explanations of natural phenomena

Demonstrate informed understandings of scientific claims and their applications

Evaluate the quality of the data, methods, and inferences used to generate scientific knowledge

Identify societal or philosophical implications of discoveries in the natural sciences, as well as their potential to address contemporary problems

What components of the course will help students achieve the domain criteria selected above?

- Construct evidence-based explanations of natural phenomena—For example, students will explore evidence from space mission investigation of conditions on Mars and icy moons in the solar system of how liquid water may be present and how liquid water is believed to be necessary for the existence of life
 - Demonstrate informed understandings of scientific claims and their applications—For example, scientific investigation of extremophiles and their great variety shows why scientific claims that extremophile life may be found elsewhere in the solar system and in the universe are reasonable theories.
 - Evaluate the quality of the data, methods, and inferences used to generate scientific knowledge—The discovery of exoplanets uses data and specialized indirect methods of detection. The Drake equation shows scientific inference from mathematical estimation.
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Integrative Studies

Explain how the intellectual frameworks And methodologies of the two Knowledge Domains will be explicitly addressed in the course and practiced by the students.

Students will be required to understand scientific concepts of planetary science, scale of the universe, space travel, extremophile life and simultaneously analyze their depiction in both documentary and fictional film works. Critical analysis of the film media will be required according to considerations of the film techniques employed. Attention will be given to details like editing, storyline, progression, animations, etc.

Demonstrate that each Of the two domains will receive approximately equal attention, providing evidence from course topics, assignments, or other course components, and that students will integrate material from both domains.

The presentation of the scientific material will be simultaneous with examples of presentation in film media and evaluated topic, by topic. Each week both film media and science will be covered.

Briefly explain the staffing plan. Given that each Inter-Domain course is approved for two Knowledge Domains, it will be taught by an instructor (or instructional team) with appropriate expertise in both domains.

I recommend that the course be taught by two faculty members, one with competence in the area of astrobiology and the other, a communications instructor with background in film. At the very least, one of the two faculty should be giving "guest lectures" and writing some of the assessments to match the objectives of the course, if the course is attributed to one faculty as the main instructor. In the development of this proposal, a film instructor was heavily consulted although she chose not to take the responsibility of writing the proposal. She was consulted at many steps in the development and she will team teach the course in its first offering.

Describe the assessments that will be used to determine students' ability to apply integrative thinking.

Assessments will include test questions to probe student critical analysis of scientific ideas presented in various film media works. The culminating group project will require students to apply their critical analysis skills toward a fresh film piece not yet analyzed in class. Students will be required to analyze whether realism or formalism is employed and comment on the style, form and content in quizzes and on a midterm exam.

Campuses That Have Offered () Over The Past 4 Years

semester	AB	AL	BK	BR	BW	CR	DS	ER	FE	GA	GV	HB	HN	HY	LV	MA	NK	PC	SH	SL	UP	WB	WC	WS	XC	XP	XS	YK
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UPLOADED DOCUMENTS FOLLOW:

ASTRO 141N, COMM 151N, Section 001: **The Film and Extraterrestrial Life: Science Fact or Fiction?**

A suggested syllabus

Instructor [Dr. Ann Schmiedekamp](#)
Title Prof. Physics
Office Phone
Office Address
E-mail ams@psu.edu

Instructor [Dr. Bella Friesel](#)
Title Senior instructor, Communications
Office Phone
Office Address
E-mail bef10@psu.edu

Location
Times
Start Date
Course Credits 3

Required Texts

Bennett, Shostak
Life in the Universe, fourth edition, Pearson 2017

Giannetti,
Understanding Movies, 13th edition, Pearson, 2014

Course Description

The search for life beyond planet Earth has been the subject of much interdisciplinary scientific search and has stimulated human imagination. Scientific discoveries of exoplanets (outside of our solar system), of extremophiles (life which can survive in extreme conditions) and the discoveries of conditions on other bodies in our solar system which might be able to support life, has provided progress in answering the question of the existence of extraterrestrial life. Not only have a plethora of fictional work appeared in the film media to depict scenarios of life beyond Earth, but there has also been an abundance of video media created to present the scientific ideas to the wider audience beyond the scientific community. This course intends a critical evaluation of both nonfiction and fictional media works in the educational dissemination of scientific ideas and the effective presentation of concepts. We will analyze techniques in photography, mise en scene, editing, sound, dramatization and writing as they are applied to topics in astrobiology.

Course Objectives

Learning Outcomes After completing the course, the student should be able to

1. Describe the scale of the universe and realistic space travel and critically analyze how time travel is presented in film
2. Describe exoplanets and how we know they exist.
3. Compare documentary treatment of the beginning of the Earth and the formation of life, use of animations
4. Compare fictional works on mass extinction events, dramatization, storylines, integrity of science presented and analyze the different modes of presentation and their effectiveness for different topics.
5. Compare fictional works representing human travel and habitation on Mars and icy moons, and critique on their mise en scene, storylines, dramatization. Compare their realism with respect to scientific accuracy.
6. Compare the style and form of documentaries to fiction
7. Compare documentary treatments of the Drake Equation and how they present different factors in the computation. Use the Drake equation to understand the range of probabilities.
8. Critique fiction film media as to their presentation of extraterrestrial intelligent life. Compare with the SETI effort.

Tentative Schedule

Week 1 Content and scale of the universe, hierarchy and structure of the universe: planetary systems, star clusters, galaxies, galactic clusters, critique of how the scale of the universe was shown in documentary treatments

Powers of Ten

Finding Life beyond Earth,

Origins (Standing Up in the Milky Way, episode 1)

Examples of presenting this in film media, techniques of presenting these concepts in informative documentary media. What do these presentation videos have in common to show scale?

Assessment: Quiz on structure of the universe and its scale

Week 2 Informative Documentary, History of Earth

Formation of solar system and planet Earth, formation of the Moon, heavy bombardment

Geologic evolution, evidence for first life on Earth

Documentary coverage, compare storyline and narrations, Which were more effective? Why?

Excerpts suggested from the following:

Finding Life Beyond Earth, note representations of bodies in the solar system

Origins: segments *Earth is Born, How Life Began*

Assessment: Class discussion on comparison of the narratives and story lines on the formation and evolution of the Earth in the two documentary treatments. Small group discussions and sharing for the class as a whole.

Week 3 Necessary conditions for extraterrestrial life and possibilities for life elsewhere in the solar system, examples of documentary treatment of these ideas

Extremophiles, analysis of interview techniques, mis en scene, editing and transitions, cinema verite, Comparison of interviews in the following suggested documentaries:

Origins—

Life Beyond earth

Finding Life Beyond Earth

Assessment: Classification of extremophile types, critical analysis of the interview.

Week 4 Duration of life on Earth and mass extinctions

Documentary excerpts suggested from:

Cosmos, episode 9, Lost Worlds of Planet Earth

The Mystery of Meteor Crater, Meteor Crater Enterprises

Fireballs from Space—example of a documentary with multiple storylines

Week 5 Assessment Midterm Exam 1

Modern scientific portrait of Mars

Week 6 Mars climate and geology in documentary

Assessment: Compare two documentaries of different quality, evaluation

Suggestions:

Mars and Beyond: Where No Man Has Gone --

Life on Mars- (UFOTV)

Week7 Mars in fiction

Suggested films:

The Red Planet-fiction or ***The Last Days on Mars***-fiction

Reading the film, class discussion on the storylines in these films, elements of the plots, acting, special effects, opinion of the existence of Martian life?

Week 8 Space Missions to Mars compared to possible future realities

Suggested films:

The Martian

National Geographic Mars

Critical analysis of film techniques (mis en scene, transitions, special digital effects to convey convincing realism), use of documentary and fiction together

Assessment: class discussion and/or assignment

Week 9 Icy Moons—habitable zones beyond the terrestrial planets

Suggested fiction film, ***Europa Report***

Assessment: Quiz on icy moons and why they are a possible habitat for life; assignment to compare/contrast *Europa Report* to *National Geographic Mars*

Week 10

Exoplanets and techniques for discovering them; excerpts from documentaries, including scientist interviews; the search for planets like Earth

Interstellar Travel

Group project to create travel proposals, show calculations of resource needs, energy required, number of passengers,

Comparison to fictional films for interstellar travel

Assessment: Presentation of a travel proposals to the class by each group

Week 11

Assessment: Midterm Exam 2

Group proposal for film to be used in final project is due. Instructor approval is required.

Week 12 Drake Equation

Examination of documentaries, how do they explain the Drake Equation?

Excerpts suggested from

Origins

Finding Life Beyond Earth

The Drake Equation: Finding Life Beyond Earth

Assessment: Assignment to calculate your own results from the Drake Equation; analysis of the implications, class discussion

Week 13 The Search for Extraterrestrial Intelligent life, SETI

The science behind the search

Fiction film on SETI, suggestion is **Contact or Arrival**

Week 14 Group project presentations on analysis of a film**Week 15** Group project presentations on analysis of a film**Grading**

Exam 1 25%

Exam 2 25 %

Quizzes and classwork including travel plan to an exoplanet, drake equation estimate 25%

Final project 25%

Academic Integrity

Academic Integrity: Academic integrity is the pursuit of scholarly activity in an open, honest, and responsible manner. Academic integrity is a basic guiding principle for all academic activity at the Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights, and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts. Academic integrity includes a commitment not to engage in or tolerate acts of falsification, misrepresentation, or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

The following practices constitute, for the purposes of this policy, violations academic integrity:

- * Cheating * Submitting previous work
- * Copying on a test * Tampering with work
- * Plagiarism * Ghosting
- * Acts of aiding and abetting * Altering exams
- * Unauthorized possession * Computer program theft

A student caught committing any of these violations will be subject to a sanction ranging from a document official warning to failure of the course. In extreme cases, failure due to violations of academic integrity will be noted on the student's official transcript as an XF and become part of his or her permanent record.

A student has the right to contest an instructor's accusation and/or sanction and may seek a hearing before the College Academic Integrity Committee. For additional details, go to the following website:

<http://www.psu.edu/dept/tlc/events/integrity.html>.

Disability Policy

Disability Services and Accommodations: Penn State encourages academically qualified students with disabilities to take advantage of its educational programs. It is Penn State's policy not to discriminate against qualified persons with disabilities in its admissions policies or procedures or its educational programs, services, and activities.

Students with documented disabilities (learning, physical, or psychological) may be entitled to request reasonable accommodation for their disability. A reasonable accommodation is a modification or adjustment to a course, program, service, job, activity, or facility that provides the qualified individual with a disability with an equal opportunity to attain the same level of performance or to enjoy benefits that are available to students without disabilities.

Respect for a proper academic climate during class is expected of all students. Please turn off cell phones before entering the classroom to avoid disruption.

ASTRO 141N, COMM 151N, Section 001: **The Film and Extraterrestrial Life: Science Fact or Fiction?**

A suggested syllabus

Instructor [Dr. Ann Schmiedekamp](#)
Title Prof. Physics
Office Phone
Office Address
E-mail ams@psu.edu

Instructor Bella Eve Friesel
Title Assistant Teaching Prof, Communications
Office Phone
Office Address
E-mail bef10@psu.edu

Location
Times
Start Date
Course Credits 3

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Giannetti,
Understanding Movies, 13th edition, Pearson, 2014

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Powers of Ten

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Examples of presenting this in film media, techniques of presenting these concepts in informative documentary media. What do these presentation videos have in common to show scale?

Assessment: Quiz on structure of the universe and its scale

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Geologic evolution, evidence for first life on Earth

Documentary coverage, compare storyline and narrations, Which were more effective? Why?

Excerpts suggested from the following:

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Origins: segments *Earth is Born, How Life Began*

Assessment: Class discussion on comparison of the narratives and story lines on the formation and evolution of the Earth in the two documentary treatments. Small group discussions and sharing for the class as a whole.

Week 3 Necessary conditions for extraterrestrial life and possibilities for life elsewhere in the solar system, examples of documentary treatment of these ideas

Extremophiles, analysis of interview techniques, mis en scene, editing and transitions, cinema verite, Comparison of interviews in the following suggested documentaries:

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Life Beyond earth

Finding Life Beyond Earth

Assessment: Classification of extremophile types, critical analysis of the interview.

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Assessment: Compare two documentaries of different quality, evaluation

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Suggested films:

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Week 8 Space Missions to Mars compared to possible future realities

Suggested films:

The Martian

National Geographic Mars

Critical analysis of film techniques (mis en scene, transitions, special digital effects to convey convincing realism), use of documentary and fiction together

Assessment: class discussion and/or assignment, critical analysis of the effectiveness of the technique

Week 9 Icy Moons—habitable zones beyond the terrestrial planets

Suggested fiction film, ***Europa Report***

Assessment: Quiz on icy moons and why they are a possible habitat for life; assignment to compare/contrast *Europa Report* to *National Geographic Mars*

Week 10

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Interstellar Travel

Group project to create travel proposals, show calculations of resource needs, energy required, number of passengers,

Comparison to fictional films for interstellar travel

Assessment: Presentation of a travel proposals to the class by each group

Week 11

Assessment: Midterm Exam 2

Group proposal for film to be used in final project is due. Instructor approval is required.

Week 12 Drake Equation

Examination of documentaries, how do they explain the Drake Equation?

Excerpts suggested from

Origins

Finding Life Beyond Earth

The Drake Equation: Finding Life Beyond Earth

Assessment: Assignment to calculate your own results from the Drake Equation; analysis of the implications, class discussion

Week 13 The Search for Extraterrestrial Intelligent life, SETI

The science behind the search

Fiction film on SETI, suggestion is ***Contact or Arrival***, critical analysis of film

Week 14 Group project presentations on critical analysis of a film

Week 15 Group project presentations on critical analysis of a film

Grading

Exam 1 25%

Exam 2 25 %

Quizzes and classwork including travel plan to an exoplanet, drake equation estimate 25%

Final project 25%

Academic Integrity

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ASTRO 141N, COMM 151N, Section 001: The Film and Extraterrestrial Life: Science Fact or Fiction?

Instructor [Dr. Ann Schmiedekamp](#)
Title Prof. Physics
Office Phone
Office Address
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Instructor Bella Eve Friesel
Title Assistant Teaching Prof, Communications
Office Phone
Office Address
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Location
Times
Start Date
Course Credits 3

Prerequisite none
Corequisites none
Concurrent requirements none
Recommended preparation none

Course Attributes/Designations: GN, GA, interdomain

General Education Learning Objectives:

EFFECTIVE COMMUNICATION—Students will investigate how the ideas of science are conveyed in both nonfiction and fiction films. They will be required to investigate film works and to write and present an analysis to the rest of the class as an assessment. These assessments will include an oral group presentation to the class as a culminating project

KEY LITERACIES—Students will learn the background principles in astronomy and planetary science that describe distances and size of the universe, locations in the solar system where conditions may allow the initiation and survival of life form, the variety of extremophiles known in biology, the conditions for life to form, the estimations put forth by the Drake equation. Students will also become familiar with the vocabulary of film techniques, animation, mis en scene, storylines and other aspects of film analysis.

INTEGRATIVE THINKING—Students will learn and recognize the aesthetic aspects and formal values and characteristics of the medium of film as it is applied to representing aspects of planetary science, the solar system, representation of conditions on other bodies in our solar system, the ideas of scale in the solar system and the probabilities outlined in the Drake equation. Students will be required to

compare the way the same scientific concepts are presented from two different perspectives of the filmmaker and the scientist.

CRITICAL AND ANALYTICAL THINKING Students will explore the ideas presented in both nonfiction (documentaries) and fictional films. They will analyze the scientific ideas presented and evaluate the presentations in terms of accurate scientific ideas. Students will also evaluate how effectively the films present certain scientific concepts, i.e., do they introduce misconceptions by presenting scientific ideas poorly? How does the artistic approach of the filmmaker enhance the scientific communication by the use of editing, interviews or cinema verite? Does the film communicate a bias or a true scientific evaluation according to the scientific method?

Course Description:

The search for life beyond planet Earth has been the subject of much interdisciplinary scientific search and has stimulated human imagination. Scientific discoveries of exoplanets (outside of our solar system), of extremophiles (life which can survive in extreme conditions) and the discoveries of conditions on other bodies in our solar system which might be able to support life, has provided progress in answering the question of the existence of extraterrestrial life. Not only have a plethora of fictional work appeared in the film media to depict scenarios of life beyond Earth, but there has also been an abundance of video media created to present the scientific ideas to the wider audience beyond the scientific community. This course intends a critical evaluation of both nonfiction and fictional media works in the educational dissemination of scientific ideas and the effective presentation of concepts. We will analyze techniques in photography, mise en scene, editing, sound, dramatization and writing as they are applied to topics in astrobiology.

Course Learning Objectives:

Learning Outcomes after completing the course, the student should be able to

1. Describe the scale of the universe and realistic space travel and critically analyze how time travel is presented in film
2. Describe exoplanets and how we know they exist.
3. Compare documentary treatment of the beginning of the Earth and the formation of life, use of animations
4. Compare fictional works on mass extinction events, dramatization, storylines, integrity of science presented and analyze the different modes of presentation and their effectiveness for different topics.
5. Compare fictional works representing human travel and habitation on Mars and icy moons, and critique on their mise en scene, storylines, dramatization. Compare their realism with respect to scientific accuracy.
6. Compare the style and form of documentaries to fiction
7. Compare documentary treatments of the Drake Equation and how they present different factors in the computation. Use the Drake equation to understand the range of probabilities.
8. Critique fiction film media as to their presentation of extraterrestrial intelligent life. Compare with the SETI effort.

Suggested Texts

Bennett, Shostak
Life in the Universe, fourth edition, Pearson 2017

Giannetti,
Understanding Movies, 13th edition, Pearson, 2014

Tentative Schedule

Week 1 Content and scale of the universe, hierarchy and structure of the universe: planetary systems, star clusters, galaxies, galactic clusters, critique of how the scale of the universe was shown in documentary treatments

Powers of Ten

Finding Life beyond Earth,

Origins (Standing Up in the Milky Way, episode 1)

Examples of presenting this in film media, techniques of presenting these concepts in informative documentary media. What do these presentation videos have in common to show scale?

Assessment: Quiz on structure of the universe and its scale

Week 2 Informative Documentary, History of Earth

Formation of solar system and planet Earth, formation of the Moon, heavy bombardment

Geologic evolution, evidence for first life on Earth

Documentary coverage, compare storyline and narrations, Which were more effective? Why?

Excerpts suggested from the following:

Finding Life Beyond Earth, note representations of bodies in the solar system

Origins: segments *Earth is Born*, *How Life Began*

Assessment: Class discussion on comparison of the narratives and story lines on the formation and evolution of the Earth in the two documentary treatments. Small group discussions and sharing for the class as a whole.

Week 3 Necessary conditions for extraterrestrial life and possibilities for life elsewhere in the solar system, examples of documentary treatment of these ideas

Extremophiles, analysis of interview techniques, mis en scene, editing and transitions, cinema verite, Comparison of interviews in the following suggested documentaries:

Origins—

Life Beyond earth

Finding Life Beyond Earth

Assessment: Classification of extremophile types, critical analysis of the interview.

Week 4 Duration of life on Earth and mass extinctions

Documentary excerpts suggested from:

Cosmos, episode 9, Lost Worlds of Planet Earth

The Mystery of Meteor Crater, Meteor Crater Enterprises

Fireballs from Space—example of a documentary with multiple storylines

Week 5 Assessment Midterm Exam 1

Modern scientific portrait of Mars

Week 6 Mars climate and geology in documentary

Assessment: Compare two documentaries of different quality, evaluation

Suggestions:

***Mars and Beyond: Where No Man Has Gone --
Life on Mars-*** (UFOTV)

Week 7 Mars in fiction

Suggested films:

The Red Planet-fiction or ***The Last Days on Mars***-fiction

Reading the film, class discussion on the storylines in these films, elements of the plots, acting, special effects, opinion of the existence of Martian life?

Week 8 Space Missions to Mars compared to possible future realities

Suggested films:

The Martian

National Geographic Mars

Critical analysis of film techniques (mis en scene, transitions, special digital effects to convey convincing realism), use of documentary and fiction together

Assessment: class discussion and/or assignment, critical analysis of the effectiveness of the technique

Week 9 Icy Moons—habitable zones beyond the terrestrial planets

Suggested fiction film, ***Europa Report***

Assessment: Quiz on icy moons and why they are a possible habitat for life; assignment to compare/contrast *Europa Report* to *National Geographic Mars*

Week 10

Exoplanets and techniques for discovering them; excerpts from documentaries, including scientist interviews; the search for planets like Earth

Interstellar Travel

Group project to create travel proposals, show calculations of resource needs, energy required, number of passengers,

Comparison to fictional films for interstellar travel

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