

IL907-20 Habitability in the Universe

20/21

Department

Institute for Advanced Teaching and Learning

Level

Taught Postgraduate Level

Module leader

David Armstrong

Credit value

20

Module duration

10 weeks

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module will draw together concepts of habitability from across the university, starting in our own Solar System and exploring how we find and understand habitable planets in the wider galaxy using modern telescopes. We will look at life at the extremes, considering extremophiles on Earth, and what they might tell us about habitable conditions elsewhere, before approaching the sustainability and long term habitability of our own planet. From this initial exploration of the realities of habitability, we will turn to our own reactions to it. Popular culture is replete with the idea of the other, within our normal environment and outside of it. Finally, even the ideas of politics are affected: how should we organise a growing settlement on another planet, where small mistakes can rapidly lead to failure and death?

[Module web page](#)

Module aims

The principal aim of the module will be to draw together concepts of habitability from across the university, starting in our own Solar System and exploring how we find and understand habitable planets in the wider galaxy using modern telescopes.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

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- Introduction and Planetary Habitability
- Redefining Habitability - Life at the Extremes
- Habitability in Film: The Martian
- The Early Modern Space Age
- Habitability in the Solar System/Examination pathways
- Humans, Chickens and Tardigrades - Multicellular life at the extremes
- Forms of Cognition Sustainability and Habitability on Earth Colonisation of the Americas as context for space colonisation
- Neocatastrophism

Learning outcomes

By the end of the module, students should be able to:

- Interpret the history of planetary habitability, both in and out of the solar system
- Evaluate what is necessary to make an environment habitable, and how we can investigate the required properties.
- Demonstrate an original understanding of the diversity and capabilities of life on Earth, and interpret the implications of this diversity for external life.
- Connect knowledge from diverse research areas to form a unique conception of the habitation and habitability.
- Develop critical responses to existing theoretical discourses and develop hypotheses of the influence of habitability on political institutions.
- Make connections from across multiple disciplines to synthesise their ideas on the concept of habitability

Indicative reading list

Astrophysics:

- Habitability of other planets and satellites / Jean-Pierre de Vera and Joseph Seckbach (editors). Dordrecht : Springer, 2013.
- Exoplanets: detection, formation, properties, habitability / John W. Mason (editor). Berlin ; New York : Springer, in association with Praxis Pub., Chichester, UK, 2008.
- The Habitability of Planets Orbiting M-dwarf Stars, A. Shields et. al., Physics Reports 2016
- Sustainability:
- Slow Violence and the Environmentalism of the Poor, R. Nixon. Harvard University Press 2011.
- Building a Sustainable and Desirable Economy in Society in Nature, R. Costanza et al, Report to the United Nations on Sustainable Development in the 21st Century, Rio 2012
- Welcome to the Anthropocene, The Economist May 28th 2011

Literature:

- The Road, Cormac McCarthy, Knopf. 2006
- The Three-Body-Problem, Liu Cixin, Chogqing Press. 2008
- True History, Lucian
- The Tempest, Shakespeare
- Gulliver's Travels, Swift

Film:

- Suggested screenings: Forbidden Planet (Fred Wilcox, 1956), 2001: A Space Odyssey (Stanley Kubrick, 1968), Alien (Ridley Scott, 1979), Avatar (James Cameron, 2009), Interstellar (Christopher Nolan, 2014).
- Bould, Mark. Routledge Film Guidebooks: Science Fiction. London: Routledge, 2012.
- King, Geoff and Krzywinska. Science Fiction Cinema: From Outerspace to Cyberspace. London: Wallflower, 2000.
- Sanders, Steven (Ed) The Philosophy of Science Fiction Films. Kentucky: Kentucky University Press, 2009.
- Schneider, Susan (Ed) Science Fiction and Philosophy: From Time Travel to Superintelligence. Oxford: Wiley-Blackwell, 2009.
- Sobchack, Vivian. Screening Space: The American Science Fiction Film, revised edition. New Jersey: Rutgers University Press, 1987.

Interdisciplinary

Seminars will consist of guided discussions and group activities, as relevant to each topic covered. Each week will be led by academics from the appropriate departments. We will cover a scientific conception of habitability, in the solar system and galaxy, as well as expanding the concept progressively to include habitability in the arts. Through this module, students will be able to form a new conception of their subject specialism from the perspective of other disciplines and standpoints.

Subject specific skills

- Appreciate multi-disciplinary approaches to conceptual and aesthetic questions
- Form a new conception of their subject specialism from the perspective of other disciplines and standpoints
- Use technical language from a range of disciplines
- Develop argumentation and analysis skills relevant to a range of disciplines
- Utilise the connections the concept of habitability forms across multiple disciplines

Transferable skills

- Work collaboratively to combine multiple perspectives into original interpretations.
- Articulate advanced arguments orally and in written form
- Manage time to meet deadlines, both in relation to presentations and written assignments
- Learn to give constructive critiques outside of usual disciplinary boundaries
- Independent and collaborative problem solving
- Understand the use of specialization and technical language across disciplines

Study

Study time

Type	Required
Lectures	10 sessions of 1 hour (7%)
Seminars	10 sessions of 1 hour (7%)
Private study	30 hours (20%)
Assessment	100 hours (67%)
Total	150 hours

Private study description

- Directed reading
- Private study
- Independent research and reflection
- Feedback on activities
- Preparation for seminars and follow up reading

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

Assessment group A1

	Weighting	Study time
Presentation	40%	40 hours
15 minute presentation+5 minutes questions		

After the teaching is complete a final session will be organised at which students will present to their peers and markers on a topic arising from the course. The quality of the presentation (form), accuracy of the content and ability to respond to questions and discussion will be taken into account in the marking.

2500 word Essay/Report/Literature Review	60%	60 hours
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Weighting

Study time

A written piece in a format chosen by the student. This will focus on a topic or question raised during the course of the students choice, and will be encouraged to utilise the interdisciplinary nature of the teaching. The written work can comprise either an essay, scientific report or literature review. In each case students will be encouraged to apply lessons learnt from disciplines outside their usual experience to the topic chosen.

Feedback on assessment

Detailed written and oral feedback will be provided on both elements of the assessment. In the case of the presentations, students will receive feedback immediately following their submission, as discussion with their peers and assessors. Seminars throughout the module will give the opportunity for formative feedback contributing to the students' eventual written submissions.

Availability

Courses

This module is Core optional for:

- Year 1 of THRA-D4A1 Postgraduate Taught Environmental Bioscience in a Changing Climate
- Year 1 of THRA-D4A3 Postgraduate Taught Food Security