# Introduction to Astrobiology

## (EASC064H5, Level 5, 15 credits)

### Introduction

This course is designed to provide a broad introduction to the exciting new field of astrobiology: the study of the astronomical and planetary context within which life on Earth has evolved, and the implications for the prevalence of life elsewhere in the Universe. The main aims of the course are to:

(1) Introduce the astronomical background of the origin of life, including the origin of the necessary chemical elements, and the origin and evolution of the Solar System;

(2) Introduce the concept of pre-biological chemical evolution and the key theories and experimental results in this area;

(3) Provide an overview of the history of life on Earth, and its relevance for life elsewhere;

(4) Outline the prospects for life elsewhere in the Universe, both in our own Solar System and on planets around other stars; and

(5) Introduce the scientific and philosophical issues concerning the possibility of extraterrestrial intelligence.

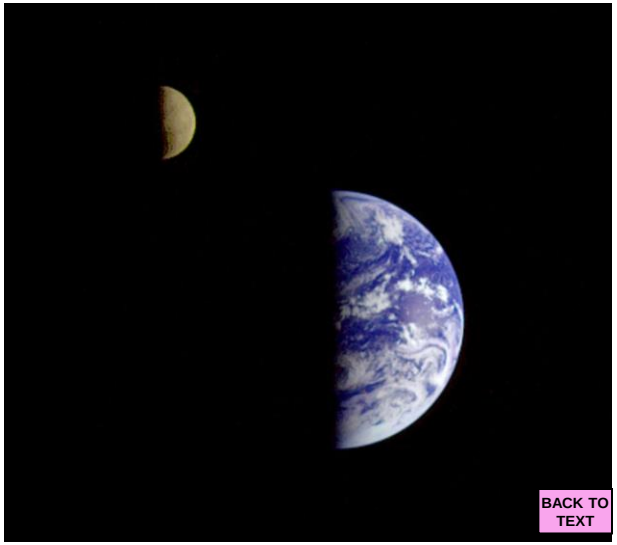


**Fig. 1.** The Earth and Moon photographed together by the Jupiter-bound Galileo spacecraft in 1992. As far as we know at present the Earth is the only life-bearing planet in the Universe, and its blue, watery, surface contrasts vividly with the barren, and lifeless, surface of the Moon. (NASA).

**Contacting the Lecturer**

Dr Andrew Rushby

Office: Room 610c

Email: a.rushby@bbk.ac.uk

For full functionality of the pdf files, it is recommended that you download the files from Moodle and open them using the freely available Adobe Reader software rather than using a web browser.

## Further Reading

The lecture notes are largely self-contained, but students wishing to do some background reading are directed to the following books (library links are included, to e-books where available):

- Life in the Universe, by Lewis Dartnell (Oneworld Publishing, 2007);
- An Introduction to Astrobiology (3rd edition), eds. D.A. Rothery, I. Gilmour and M.A. Sephton (Cambridge University Press, 2018);
- Handbook of Astrobiology, edited by Vera Kolb (CRC Press, 2019).

The course also has its own website which contains the full syllabus and additional reference material.

## Timetable and syllabus

The module will be taught during 11 evenings over the first term, starting on **Wednesday 5 October 2022** between 18:00 and ~21:00 with a break in the middle. Lectures will be streamed live at these times, and videos will be archived and made available on Moodle for those unable to attend the live sessions. Students are advised to read through the printed notes on Moodle prior to the lecture so as to be ready to discuss the material in class. These will be available on the Monday prior to the Wednesday lecture. Please also feel free to email the lecturer with any questions you may have arising from the lecture content. The timetable, and summary of the syllabus, for this module is given in the table on the next page (lecture numbers are given in brackets). For further information, including the student handbook and information on study aids, please refer to the Department's Resources for Current Students webpage.

# Introduction to Astrobiology: Timetable

| Week | First Period (1 hour) | | Second Period (1 hour 40 minutes) |
|---|---|---|---|
| 1 | Introduction | B | Introduction |
| 2 | Lecture 1: Stellar Evolution for Astrobiology | R | Lecture 1: Stellar Evolution for Astrobiology (continued) |
| 3 | Lecture 2: Conditions in the Early Solar System | E | Lecture 2: Conditions in the Early Solar System (continued) |
| 4 | Lecture 3: Earliest evidence for Life on Earth | A | Lecture 4: Biological Basics (for students without A-level Biology) |
| 5 | Lecture 5: Pre-biological Chemical Evolution | K | Lecture 5: Pre-biological Chemical Evolution (continued) |
| 6 | Lecture 6: History of Life on Earth | | Lecture 6: History of Life on Earth (continued) |
| 7 | Lecture 7: Requirements for Life | B | Lecture 7: Requirements for Life (continued) |
| 8 | Lecture 8: Prospects for Life on Mars | R | Lecture 8: Prospects for Life on Mars (continued) |
| 9 | Lecture 9: Life Elsewhere in the Solar System? | E | Lecture 9: Life Elsewhere in the Solar System? (continued) |
| 10 | Lecture 10: Planets around other Stars | A | Lecture 10: Planets around other Stars (continued) |
| 11 | Lecture 11: Extraterrestrial Intelligence | K | Lecture 11: Extraterrestrial Intelligence (continued) |

## Assessment and Further Information

Final assessment for the course is derived from a written examination (85%) and course work (15%). The coursework will consist of one c.2000-word essay or report. Details regarding the topic of the essay/report will be released in a few weeks.

For further information, including the student handbook and information on study aids, please refer to the Department's Resources for Current Students webpage.