

## A survey of planets

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**Start date** 14 Apr 2019                      **End date** 14 Apr 2019

**Venue**                      Madingley Hall  
                                    Madingley  
                                    Cambridge

**Tutor**                      Dr Sonali Shukla                      **Course code** 1819NDX033

**Director of Academic Centres**                      Sarah Ormrod

**For further information on this course, please contact**                      Head of Academic Centre Administration, Zara Kuckelhaus  
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**To book**                      See: [www.ice.cam.ac.uk](http://www.ice.cam.ac.uk) or telephone 01223 746262

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### Tutor biography

Dr. Shukla holds a PhD in astrophysics from Vanderbilt University, USA. Her research areas include understanding the formation of young low-mass stars and disks around young stars and brown dwarfs. She spent a year as a pre-doctoral fellow at the Spitzer Science Center, Caltech, and continued her research as a postdoctoral researcher at Penn State University. She has served in education and public outreach, both as the Astronomy Outreach Assistant at the Institute of Astronomy and Public Engagement Coordinator at the University of Cambridge. Previously, she served as Assistant Director for the physics department at the University of Maryland, where she developed novel outreach and educational programs, particularly to increase inclusion and diversity of students in the physical sciences. Dr. Shukla has developed inquiry-based practical exercises that incorporate real astronomical data whenever possible. When she is not lecturing astronomy, she works for the University of Cambridge's Careers Service advising students and postdoctoral researchers in the sciences.

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## Course programme

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09:30	Terrace bar open for pre-course tea/coffee
10:00 – 11:15	<b>What is a planet and why isn't Pluto one anymore?</b>
11:15	Coffee
11:45 – 13:00	<b>Exploring the solar system with satellites and robotic mission</b>
13:00	Lunch
14:00 – 15:15	<b>Exoplanets: Discovering planets beyond the Sun</b>
15:15	Tea
15:30 – 16:45	<b>Astrobiology: Are we alone in the universe?</b>
16:45	Day-school ends

## **Course syllabus**

### **Aims:**

This course aims to:

- 1) Provide the historical context for understanding the discovery of and classification of planets in our own solar system.
- 2) Give a comprehensive overview of the manned and unmanned space missions and the novel technologies that have developed from space exploration.
- 3) Understand how astronomers have found planets around other stars, with the opportunity to examine real data, and to understand the variety of such planets.
- 4) Explore the possibility of life on other planets and the emerging science of astrobiology.

### **Content:**

Since antiquity, people have looked to the skies and wondered about the planets. In this course, we will learn the origin of the word planet and how the working definition of a planet has changed over the last few centuries. We will discuss how astronomers have explored our own solar system using manned missions to the Moon, satellites and through robotic missions. We will then learn how astronomers detect and characterise planets around other stars, and how the new science of exoplanets has evolved since the first confirmed discovery of an exoplanet over 20 years ago. Finally, we will discuss how common planets are around other stars, and how astronomers ascertain the likelihood that life might exist on other planets.

### **Presentation of the course:**

This course will consist of a combination of Tutor-led lectures and group discussion. Time-permitting, there will be short Tutor-led group exercise to illustrate astronomical techniques.

**As a result of the course, within the constraints of the time available, students should be able to:**

- 1) understand the basic physics and astronomy of our solar system
- 2) gain a broad perspective of planetary exploration and its feasibility in our solar system
- 3) understand the advances in finding planets around other stars in the last decade
- 4) be able to understand popular space news items and differentiate what makes an astronomy story newsworthy.

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## Reading and resources list

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Listed below are texts that might be of interest should you wish to further or supplement your learning on the course.

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Author	Title	Publisher and date
Weintraub, David A.	<i>Is Pluto a Planet?</i>	Princeton University Press 2008
Sobel, Dava	<i>The Planets</i>	Harper Perennial 2006
Boss, Alan	<i>The Crowded Universe: The Search for Living Planets</i>	Basic Books 2009
Perryman, Michael	<i>The Exoplanet Handbook</i>	Cambridge University Press 2011

## Website addresses

List of Solar System Missions: <https://www.nasa.gov/content/solar-missions-list>

Comprehensive overview of exoplanets: <https://exoplanets.nasa.gov/>

NASA Exoplanet Archive: <https://exoplanetarchive.ipac.caltech.edu/>

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## Additional information

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### Venue

Details of how to find Madingley Hall can be found on our website:  
<http://www.ice.cam.ac.uk/who-we-are/how-to-find-the-institute>

### Refreshments

Tea and coffee and lunch will be provided. If you have any specific dietary requirements or allergies and have not already advised us, please inform our Admissions Team on [ice.admissions@ice.cam.ac.uk](mailto:ice.admissions@ice.cam.ac.uk) or +44 (0)1223 746262.

**Note** Students of the Institute of Continuing Education are entitled to 20% discount on books published by Cambridge University Press (CUP) which are purchased at the Press bookshop, 1 Trinity Street, Cambridge (Mon-Sat 9am – 5:30pm, Sun 11am – 5pm). A letter or email confirming acceptance on to a current Institute course should be taken as evidence of enrolment.

*Information correct as of:* 18 March 2019