

MAS423 / AST001 Solar System (Semester B, 2007/2008)

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| Lecturer: | Dr. Craig Agnor | Office Hours: | 4-6 Thursday |
| Office: | Maths 512 | | 11-12 Friday |
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The Course

As the planetary system most familiar to us, the Solar System presents the best opportunity to study questions about the origin of life and how enormous complexity arises from simple physical systems in general. This course surveys the physical and dynamical properties of the Solar System. It focuses on the formation, evolution, structure, and interaction of the Sun, planets, satellites, rings, asteroids, and comets. The course applies basic physical and mathematical principles needed for the study, such as fluid dynamics, electrodynamics, orbital dynamics, solid mechanics, and elementary differential equations. However, prior knowledge in these topics is not needed, as they will be introduced as required. The course will also include discussions of very recent, exciting developments in the formation of planetary and satellite systems and extrasolar planets (planetary migration, giant impacts, and exoplanetary atmospheres).

Schedule & Lectures

- Thursdays 2-4pm, Maths Room 103
(Note: the week of February 11-15, we will meet on Tuesday, Feb 12, 2-4pm instead of Thursday).

Textbook

Two recommended texts for the course are:

Planetary Sciences by Imke de Pater and Jack J. Lissauer (Cambridge University Press)
Solar System Dynamics by C. D. Murray and S. F. Dermott (Cambridge University Press)¹

Students are *not required* to purchase or know all the material in the books. However, it will be useful to have handy access to them. There are two copies of each text available in the Library. If you wish to purchase them, both are available via www.amazon.co.uk. Supplementary reading material may be distributed in class or via the class website. Students who wish further details on some introductory aspects of the course may wish to consult the following books (copies are in the Library)

Physics of the Solar System by B. Bertotti et al. (Kluwer Academic Publishers)
The New Solar System (4th Ed.) by J. K. Beatty et al. (Cambridge Univ. Press/Sky Pub.)
Physics and Chemistry of the Solar System (2nd Ed.) by J. S. Lewis (Elsevier Acad. Press)

Coursework

- Coursework exercises will be handed out at various times throughout the course (at roughly 2-3 week intervals). Students are expected to attempt solutions to these questions independently and return them on the announced due dates (usually after two weeks).

¹There is a web site associated with the *Solar System Dynamics* book, which students might find useful, at <http://ssdbook.maths.qmul.ac.uk>; they should consult it for information about free software and animations associated with the book and a list of known errors.

- Full, correct answers to each coursework will contribute 10% to a student's final mark for the course.
- Corrected scripts will be handed back in class and any difficulties will be discussed. Students should be aware that the type of questions they will be required to answer in the written examination may be similar to those presented in the coursework questions. As the coursework counts towards the final mark, late scripts will only be accepted in exceptional circumstances.

Written Examinations

Up to 90% of the final marks for the course can be obtained in the written examination. The exam will take place in the normal examination period (i.e. May or June). The exam will last 3 hours.

Questions & Concerns

If you have any questions or concerns with any aspects of the course, please feel free to contact me either after the lectures, during office hours, or at some mutually convenient time in my office.

Other Information

Students are encouraged to attend the Astronomy Unit seminars, which take place in the Mathematics Seminar Room at 2:15pm on most Fridays during the term. Some of these seminars are on topics related to those covered in the course. On the second Friday of each month from October to April, the Royal Astronomical Society (RAS) organises meetings, which take place at Burlington House in Piccadilly and in the Scientific Societies Lecture Theatre in Savile Row. Some of these meetings could be of interest to students.