

## REVISED Class Schedule – Ast 281 – Astrobiology – Spring 2008

No.	Dy	Date	Read	Due	Topic
1	Tu	1/15	A		Introduction
2	Th	1/17	B		Solar System Physics
3	Tu	1/22	C		Solar System Physics and Chemistry
4	Th	1/24	D	Hmk 1	Molecules and Solar System Formation
5	Tu	1/29	E		Terrestrial Processes – Exogenic
6	Th	1/31	F	Hmk 2	Comets and The Real Deep Impact – Cratering Hazards
7	Tu	2/05	G		Terrestrial Processes – Endogenic (Tectonics, Volcanos)
8	Th	2/07	H	Hmk 3	Terrestrial Processes – Endogenic (Ices, Dating, Isotopes)
9	Tu	2/12	I		Terrestrial Processes – Atmospheres
10	Th	2/14	J	Hmk 4	Evolution of Early Earth (Land/atmosphere)
11	Tu	2/19			<b>QUIZ 1</b>
12	Th	2/21	K		Life and its Requirements
13	Tu	2/26	L		Origin and Evolution of Life
<b>14</b>	<b>Th</b>	<b>2/28</b>	M	Hmk 5	Life in Extreme Environments
15	Tu	3/04	N		Mars Habitability, Mars Environment
16	Th	3/06	O	Hmk 6	Life on Mars? Viking, ALH84001, Where to look
17	Tu	3/11	P		Future Mars Missions and Biohazards
18	Th	3/13	Q	Hmk 7	Other Extreme Environments: Europa, Titan
19	Tu	3/18	R		Extra Solar Planetary Systems and Habitable Zones
20	Th	3/20	S	Hmk 8	SETI – Techniques
21	Tu	3/25			<b>SPRING BREAK</b>
22	Th	3/27			<b>SPRING BREAK</b>
23	Tu	4/01	T		SETI – Programs
24	Th	4/03			<b>QUIZ 2</b>
25	Tu	4/08	U		Atmospheric Optics
26	Th	4/10	V		UFOs
<b>27</b>	<b>Tu</b>	<b>4/15</b>	W	Hmk 9	Space Environment and Hazards
<b>28</b>	<b>Th</b>	<b>4/17</b>	X		Space Transportation & Orbits
29	Tu	4/22	Y	Hmk 10	Space Resources
30	Th	4/24	Z		US Space Program: History & Modern Era
31	Tu	4/29	AA		Biosphere II
32	Th	5/06	BB		Space Colonies & Lunar Bases
33		5/xx			<b>FINAL EXAM</b>

**Instructor** – Karen Meech – office hrs 13:15-14:00 Tu-Th, WAT 404 (x6-6847). Institute for Astronomy (2680 Woodlawn Drive, B110, 956-6828). **Email:** meech@ifa.hawaii.edu. **Web:** www.ifa.hawaii.edu/~meech/ast281; **Bold** dates indicate KJM travel: Feb. 28 – Origins of Earth Water workshop; Apr. 15-17 NASA Astrobiology Inst. AbSciCon (San Francisco).

**Pre-Requisites** – Astronomy 110, Intro to Astronomy (C or better) or equivalent. For exceptions, see instructor. From 110 you should know the basics of scientific principles / inquiry, and have a general knowledge of the scale and content of the universe, and know the basic architecture of our Solar System, and be familiar with electromagnetic radiation.

**Grades** – Grading is based on class participation (15%), homeworks (35%), quizzes (30%), and the final exam (20%). The quizzes and final are closed book and consist of T/F, multiple choice and short answer questions. No late homeworks are accepted for any reason; I will drop the 2 lowest scores.

## Required Readings

The reading assignments from the text and *Elements* magazine as well as other articles are listed below. These additional readings will be passed out in class. These are intended to supplement the lecture materials, and the content will be covered in the homeworks and quizzes.

- **A — Text:** pp. 1-15
- **B — Text:** pp. 80-88, 132-138; *Knowledge and Wonder – The Natural World as Man Knows it*, [V. Weisskopf], pp. 48-66, 81-97, 113-118.
- **C — Text:** pp. 343-354; *Earth, Evolution of a Habitable World*, [J. Lunine], 75-84.
- **D — Text:** pp. 70-80; **Elements:** pp. 205-210; *Holt Chapter – Formation of the Solar System*, [K. Meech]
- **E — Text:** pp. 139-143, 215-220; **Elements:** 211-215.
- **F — Text:** 215-220; A’Hearn, M. F. *et al.* (2005). “Deep Impact: Excavating Comet Tempel 1”, *Science* **310**, 258-264. Meech, K. J. *et al.* (2005). “Deep Impact: Observations from a Worldwide Earth-Based Campaign”, *Science* **310**, 265-269. “Report of the Task Force on Potentially Hazardous NEOs”, pp. 7-19 ([http://www.near-earth-objects.co.uk/report/resources\\_task\\_intro.cfm](http://www.near-earth-objects.co.uk/report/resources_task_intro.cfm))
- **G — Text:** pp. 99-105, 116-132, *Volcanoes of the Solar System*, [C. Frankel], 1-18, 202-220.
- **H — Text:** pp. 106-115, **Elements:** pp. 201-4.
- **I —** [http://meted.ucar.edu/hao/aurora/txt/x.t.1\\_0.php](http://meted.ucar.edu/hao/aurora/txt/x.t.1_0.php)
- **J — Elements:** pp. 217-227. *Earth, Evolution of a Habitable World*, [J. Lunine], 196-222.
- **K — Text:** pp. 140-177, *Earth, Evolution of a Habitable World*, [J. Lunine], 134-144.
- **L — Text:** pp. 191-214; **Elements:** 229-33.
- **M — Text:** pp. 236-246, 178-181. *Bioastronomy Proceedings, Extreme Life Article*, [J. Seckbach], 379-386.
- **N — Text:** pp. 260-280.
- **O — Text:** pp. 280-290. *The Hunt for Life on Mars*, [W. Schopf], 304-325.
- **P —** NRC Document: *Prevention of Forward Contamination of Mars*, Chapter 4.
- **Q — Text:** pp. 295-323.
- **R — Text:** pp. 328-342, 359-393.
- **S — Text:** pp. 437-466.
- **T — Text:** pp. 398-424. *Bioastronomy Proceedings, SETI Implications Article*, [J. Billingham], 667-675.
- **U —** *Rainbows, Haloes and Glories*, [R. Greenler], 1-28.
- **V — Text:** pp. 425-432, 477-485. *UFOs, The Public Deceived*, [P. Klass], 1-23.
- **W —** NRC Document: *Space Radiation Hazards and the Vision for Space Exploration*, Chapter 1, pp. 7-23; *The Ionosphere, Radio Wave Propagation*.
- **X —** [www.permanent.com](http://www.permanent.com) - Chapter 3 (Transportation).

- **Y** — www.permanent.com - Chapter 2 (Lunar Materials), Chapter 4 (Industrial Processes). *Developing the Resources of the Solar System*, 2001, ISRU White paper ww.isruinfo.com.
- **Z** — *Holt Chapter – History of Space Exploration*, [K. Meech], 1-19.
- **AA** — *Space Biospheres* – chapters 2-3, p. 45-72.
- **BB** — *Space, the Next 25 Years*, [T. McDonough], 207-222.
- **CC** — *Space Biospheres* – chapter 4, p. 73-85. *Lunar Bases and Space Activities of the 21st Century*, Chapter 6 – “Lunar Construction”, p. 361-422.

## Useful References

- *Evolution of a Habitable World* — J. Lunine
- *Cradle of Life* — W. Schopf
- *Terraforming, Engineer Planetary Environments* — Fogg
- *Lunar Bases and Space Activities of the 21st Century* — W. K. Mende II, ed.
- *Bioastronomy '99: A new Era in Bioastronomy* — G. Lemarchand and K. Meech, ed.
- *When SETI Succeeds: The Impact of High-Information Contact* — A. Tough, ed.
- *The Ages of Gaia* — J. Lovelock
- *The SETI Pioneers* — Swift
- *UFOs - the Public Deceived* — P. Klass
- *Inside NASA* — H. McCurdy
- *Prospects for Interstellar Travel* — J. Mauldin
- *Rainbows, Halos and Glories* — R. Greenler