

Optional course – main information	
Academic subject	Introduction to Astrochemistry and Astrobiology
ECTS credits (CFU)	4
Compulsory attendance	Yes
Teaching language	Italian
Accademic Year	2019/2020

Professor/Lecturer	
Name & SURNAME	Savino Longo
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Tutorial time/day	Working days 12-13, plus Tue and Thu 16-17

Course details	Pass-fail exam/Exam with mark out of 30	SSD code	Type of class
	Exam with mark out of 30	CHIM03	Lecture/workshop

Teaching schedule	Semester	day and time (afternoon)	room
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Lesson type	CFU/ECTS	Lessons (hours)	CFU/ECTS lab	Lab hours	CFU/ECTS tutorial/workshop	Tutorial/workshop hours	CFU/ECTS field trip	Field trip Hours
	4	32						

Time management	Total hours	Teaching hours	Self-study hours

Academic Calendar	First lesson	Final lesson

Syllabus	
Course entry requirements	
Expected learning outcomes (according to Dublin Descriptors) (it is recommended that they are congruent with the learning outcomes contained in A4a, A4b, A4c tables of the SUA-CdS)	
<i>Knowledge and understanding</i>	The student knows the fundamental questions and methodologies of modern Astrochemistry and Astrobiology
<i>Applying knowledge and understanding</i>	The student can use the above knowledge to discuss proposals for the use of the space environment in the chemical / biological field and space exploration
<i>Making informed judgements and choices</i>	The student develops judgment autonomy in the evaluation of requests and proposals related to the areas of the previous point
<i>Communicating knowledge and understanding</i>	The student is able to express a personal motivated opinion about the requests and proposals of the previous point
<i>Capacities to continue learning</i>	Having both notional and methodological bases, the student can deepen the aspects related to Space and space technologies that have an impact on his future field of investigation

Syllabus	
Course content	<p>Outline of chemical and physical environments in space: stars, planets, asteroids, molecular clouds and dust</p> <p>The interface between biosphere and Space: the upper terrestrial atmosphere</p> <p>The atmospheres of the planets and satellites in the solar system</p> <p>Temperature and habitable zone, greenhouse effect</p> <p>Surface and internal composition of planets and satellites</p>

	<p>Some major case studies: Mars, Europe, Titan</p> <p>Space observation and exploration tools.</p> <p>Exoplanets: chemical environments and prospects for life</p> <p>Differences between terrestrial chemistry and space chemistry</p> <p>Spectroscopic study of molecules in Space</p> <p>The Universe as a chemical system: the formation of molecules</p> <p>Classification of meteorites, with the example of real samples</p> <p>The composition of the phases in meteorites</p> <p>Meteorite analysis techniques</p> <p>Meteors as a chemical and physical phenomenon: observations and models</p> <p>Computer simulations of the behavior of extraterrestrial materials</p> <p>Terrestrial materials exposed to the space environment.</p> <p>Extreme forms of life on Earth</p> <p>Hypothesis on extraterrestrial biochemistry</p> <p>Survival of living matter in space</p> <p>The problem of the origin of life</p> <p>The Cairn-Smith theory and the inorganic genome.</p> <p>The theory of Panspermia: original version and modern forms.</p> <p>Computer simulation in Astrobiology: games of life</p> <p>The debate on the nature of life in the light of progress in Astrobiology</p> <p>Applications to spatial colonization</p> <p>Applications to the energy problem on Earth</p> <p>Applications to environmental protection on Earth</p>
Course books/Bibliography	<p>1. Shaw, Andrew M. <i>Astrochemistry: From astronomy to astrobiology</i>. John Wiley & Sons, 2007.</p> <p>2. Galletta, G., & Sergi, V. (2005). <i>Astrobiologia, le frontiere della vita: la ricerca scientifica di organismi extraterrestri</i>. Hoepli.</p>
Notes	The texts are used for basic notions, but the teacher will provide electronic versions of scientific articles to deepen the topics covered in the individual lessons
Teaching methods	Traditional teaching with blackboard - presentation of slides
Assessment methods (indicate at least the type written, oral, other)	Oral Examination
Evaluation criteria (Explain for each expected learning outcome what a student has to know, or is able to do, and how many levels of achievement there are)	In the case of a short dissertation, the student must be able to display the entire contents using only, and if necessary, the figures contained therein. Then, she/he will have to be able to answer specific questions raised by the teacher, which will link the specific content exposed with the topics covered in the course.
Further information	