

....Accretion processes in astrophysics....
- COURSE SYLLABUS



Doctoral School of
Exact and Natural
Sciences



1.	Course title: <i>Accretion processes in astrophysics</i>
2.	Lecturer: <i>Bożena Czerny, CFT PAN</i>
3.	Field, type and level of studies, year of study: <i>Astrophysics, includes some mathematics, all years of study</i>
4.	Course character: <i>monographic lecture</i>
5.	Teaching method: <i>traditional and online</i>
6.	Language: <i>English</i>
7.	Course type and number of hours: <i>Lecture, 30h, home exercises</i>
8.	Estimated load of student's independent work: <i>15h</i>
9.	Total workload and number of ECTS points: <i>45 h, 3 ECTS</i>
10.	Short description and main focus of the course: <i>Accretion (material falling onto stars or black holes) can be the most efficient source of the energy. Objects powered by accretion (X-ray binary stars, gamma-ray bursts, active galactic nuclei) are bright and variable, revealing the spectacular stages of the evolution of stars and galaxies. All most luminous sources in the Universe are powered by accretion. Also, without understanding of accretion we cannot understand the formation of stars and evolution of galaxies. In my lecture, I will concentrate on those aspects where the accretion phenomenon is at its extreme. The lecture will combine the simple theory with the observational material.</i>
11.	References: <i>Books:</i> <ol style="list-style-type: none"> 1. "Accretion power in astrophysics", Frank, King & Raine 2. "Radiative Processes in Astrophysics", Rybicki & Lightman 3. "Black hole astrophysics: the engine paradigm", David L. Meier <i>Original papers:</i> <ol style="list-style-type: none"> 1. Shakura & Sunyaev, 1973, classical disk Novikov & Thorne, 1973, GR version
12.	Prerequisites: <i>Basic physics, for example the idea of the angular momentum and the circular motion.</i>

13.	Educational outcomes: <i>Knowledge:</i> <i>Practical Skills:</i> <i>Social Skills:</i>	<u>PQF level 8 codes:</u> <i>eg., P8S_WG, ...</i> <i>eg., P8S_UW, ...</i> <i>eg., P8S_KK, ...</i>
14.	Evaluation of the educational outcomes: <i>homework assignments, short essay on selected topic</i>	
15.	Criteria to complete the course: <i>at least 80% attendance, 80 % of the homework completed, final grade depends also on the essay evaluation</i>	
16.	Contact with the lecturer: <i>Email: bcz@cft.edu.pl</i>	