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| | **Adam Mickiewicz University in Poznań** |
| | Doctoral School of Exact Sciences AMU |
| | **Cosmology** |
| | Andrzej Grudka |
| | Scientific lectures, workshops |

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| **Field of science** | Physics |
| **Teaching method** | Lecture with problems |
| **Language** | English |
| **Numbers of hours** | 20 |
| **Aims of the course** | To understand basics of cosmology, to perform simple cosmological calculations.<br>Learning outcomes<br>E_W01 - the achievements of world science in the discipline in which the education takes place, as well as the paradigms and directions of development of this discipline, in a way that enables their creative and innovative development and their verification within the framework of research projects undertaken;.<br>E_W02 - at an advanced level research methodology appropriate for the discipline of science in which education takes place, which allows for proper selection of research theories and tools and their effective application and modification within the framework of own research;<br>E_02 - effectively retrieve information related to scientific activity from various sources, including from sources in foreign languages, and to properly select, critically analyse and interpret this information; furthermore, |

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| | he/she is able to assess its relevance for scientific<br><br>development;<br>EK01 - critical evaluation of the work in the field of the<br><br>scientific discipline within which the education is<br><br>provided and its own contribution to the development<br><br>of this discipline; |
| **Course contents** | 1. Robertson-Walker metric<br>2. Redshift<br>3. Distances<br>4. Friedmann equations<br>5. Thermal history of the universe (neutrino decoupling, electron-positron annihilation, nucleosynthesis, recombination)<br>6. Inflation<br>7. Cosmological perturbation theory<br>8. Jeans instability<br>9. Acoustic oscillations<br>10. Cosmic microwave background anisotropies |
| **Prerequisites and co-requisites** | |

| **Learning outcomes** | |
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| **On completion of the course PhD candidates will be able to:** | **Assessment mode** |
| understand basics of cosmology, perform simple cosmological calculations, to read scientific literature | |

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| **Literature** | **D. Baumann – Cosmology – Cambridge University Press, 2022** |
| **Additional information** | |