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|--|--|--|---|-------------------------------------|---------|
| <b>Course number</b>   | U-LAS70 10002 SE50   |  |   |                                     |         |
| <b>Course title (and course title in English)</b>  | ILAS Seminar-E2 :Topics in Frontier Physics ( 現代物理学の最先端 )<br>ILAS Seminar-E2 :Topics in Frontier Physics | <b>Instructor's name, job title, and department of affiliation</b> | Graduate School of Science<br>Professor, WENDELL, Roger |                                     |         |
| <b>Group</b>   | Seminars in Liberal Arts and Sciences  | <b>Number of credits</b>   | 2   | <b>Number of weekly time blocks</b> | 1       |
| <b>Class style</b>   | seminar<br>(Face-to-face course)   | <b>Year/semesters</b>  | 2026 · First semester                                   | <b>Quota (Freshman)</b>             | 20 (15) |
| <b>Target year</b>   | Mainly 1st year students   | <b>Eligible students</b>   | For all majors  | <b>Days and periods</b>             | Mon.5   |
| <b>Classroom</b>   | 36, Yoshida-South Campus Academic Center Bldg. North Wing  |  |   | <b>Language of instruction</b>      | English |
| <b>Keyword</b>   | Modern Physics / Nobel Prize / Physics Discoveries   |  |   |                                     |         |
| <b>[Overview and purpose of the course]</b>  |  |  |   |                                     |         |
| <p>This class will introduce students to new and exciting topics in modern physics. Recent discoveries and Nobel prize-winning research will be discussed in straight-forward terms such that anyone can understand and enjoy modern science. Lectures and discussions will be held in English and will cover a wide variety of topics in recent research. Even students with no previous physics experience are encouraged to join this class and learn about how we understand the world today. There will be in-class demonstrations to match some of the topics and we will frequently work in groups to approach interesting problems in current research.</p>  |  |  |   |                                     |         |
| <b>[Course objectives]</b>   |  |  |   |                                     |         |
| <p>Students in this course will learn about the fundamental physics behind recent topics in modern research as well as how they are applied in the real world. We will discuss these as both large and small groups. Students will work together and with the lecturer to understand new and challenging ideas at the forefront of physics.</p>  |  |  |   |                                     |         |
| <b>[Course schedule and contents]</b>  |  |  |   |                                     |         |
| <p>Each week a different topic in modern physics and cosmology will be presented. The following week will include small and large group discussion on that material and related topics. Topics will include some of the following:</p> <ul style="list-style-type: none"> <li>-) From the birth of stars to supernovae</li> <li>-) The history of the universe and its expansion</li> <li>-) Dark matter and dark energy</li> <li>-) Observation of gravitational waves</li> <li>-) Radiation in the modern world</li> <li>-) Quarks and CP symmetry</li> <li>-) Discovery of the Higgs boson</li> <li>-) Neutrinos and their oscillations</li> <li>-) Lasers for trapping atoms</li> <li>-) Superconductivity at low and high temperatures</li> </ul> <p>In addition to the above, students may request lectures on a few topics of their choice.</p> |  |  |   |                                     |         |
| <p>-----<br/>Continue to ILAS Seminar-E2 :Topics in Frontier Physics ( 現代物理学の最先端 ) (2)</p>   |  |  |   |                                     |         |

ILAS Seminar-E2 :Topics in Frontier Physics (現代物理学の最先端) (2)

Total : 14 classes, 1 Feedback class.

**[Course requirements]**

None

**[Evaluation methods and policy]**

This is a seminar course and the grade will be based on in-class participation (50%) and short reports (50%). Coming to each class with questions and an open mind is essential. Be ready to discuss in English with other students and the lecturer.

**[Textbooks]**

Not used

**[References, etc.]**

( References, etc. )

Introduced during class

**[Study outside of class (preparation and review)]**

Instructions on material to review ahead of lectures and supplementary reading will be presented in class.

**[Other information (office hours, etc.)]**

Students curious about recent discoveries in modern physics are encouraged to attend this course. No prior knowledge of physics is required.

**[Essential courses]**