| Course number | U-LAS14 20029 LE68 | | |
|---|---|---|---|
| Course title (and course title in English) | Principles of Genetics-E2<br>Principles of Genetics-E2 | Instructor's name, job title, and department of affiliation | Graduate School of Medicine<br>Professor,THUMKEO， Dean |
| Group | Natural Sciences | Field(Classification) | Biology(Issues) |
| Language of instruction | English | Old group | Group B |
| Number of credits | 2 | | |
| Number of weekly time blocks | 1 | Class style | Lecture<br>(Face-to-face course) |
| Year/semesters | 2025・First semester | | |
| Days and periods | Tue.4 | Target year | Mainly 1st & 2nd year students |
| Eligible students | For science students | | |

## [Overview and purpose of the course]

Genetics is the science of heredity and seeks to explain variation between related organisms at the genes level. All aspects of life are affected by genetic inheritance. Moreover, normal developmental events are regulated by genes, and mutations and aberrations of genes can lead to various genetic diseases.

In this course, we will learn about the basic concepts of genetic inheritance, i.e. how Mendelian traits are passed to the next generation. In addition, we will also review our current understanding of chromosomes, DNA, genes and their regulation. Finally, we will consider how such genes can control normal developmental events in organisms, whereas aberrant control of genes can lead to developmental failure and cancer.

To take this lecture, it is recommended to have some prior knowledge of biology. Otherwise, the student will have to prepare well before each class using the textbook or lecture handouts

## [Course objectives]

To acquire a basic understanding of the principles of classical and molecular genetics and their relevance and application to biomedical sciences, especially development and cancer.

## [Course schedule and contents)]

Main Topics:
1.Introduction to genetics
2. Central Dogma (Cell and proteins)
3. Cell cycle, mitosis, chromatin architecture
4. Sickle cell anemia, splicing
5. Gene expression & meiosis
6. Gene structure, function
7. Epigenetics 1
8. Epigenetics 2, Genome variation 1
9. Genome variation 2
10. Genome variation 3 & Chromosome aberrations and disorders
11. Chromosome aberrations and disorders 2; Mendelian inheritance I
12. Mendelian inheritance II
13. Mendelian inheritance III
14. Pedigree, Extension of Mendel’s genetics & Review
15. Final exam

**Continue to Principles of Genetics-E2(2)↓↓↓**

**Principles of Genetics-E2(2)**

16. Feedback

**[Course requirements]**

None

**[Evaluation methods and policy]**

Evaluation will be based on class attendance and participation (~30 %), a report (~10%) and a final examination (~60 %).

**[Textbooks]**

Not used
Full handouts will be provided

**[References, etc.]**

**（References, etc.）**
Ronald Cohn, et al. 『Thompson & Thompson Genetics and Genomics in Medicine, 9th edition』 （Elsevier, 2024）ISBN:978-0-323-54762-8（A copy is available in Yoshida-South library）

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

I recommend students to confirm the handouts for each lecture and/or the relevant reference textbook to learn about the lecture content in advance of the class. Handouts for each lecture will be uploaded on PandA approximately one week before each class.

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

Students are welcome to ask any questions in the class. Consultation via email or online meetings such as Zoom is possible. For those students who prefer to discuss directly with me, please arrange appointments by email in advance.