

Language: English

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2021 Academic Year Course Description and Syllabus

Course Name	Instructor Name
Molecular Cell Biology 1(2credits) [BIO1454]	Kazunori Kondo
Molecular Cell Biology 1(2credits) [SESI365]	

Course numbers are displayed in blue color after course names.

Semester Spring Semester

Course Sub Title (for general course and seminars)

Basic molecular cell biology

General Description

On-line

Chapter 5 Basic Molecular Genetic Mechanisms

Chapter 6 Molecular Genetic Techniques

8.1 Genetic Analysis of Mutations to Identify and Study Genes

8.5 Inactivating the Function of Specific Genes in Eukaryotes

Chapter 9 Transcriptional Control of Gene Expression

9.1 Control of Gene Expression in Bacteria

9.2 Overview of Eukaryotic Gene Control

9.3 RNA Polymerase II and the General Transcription Factors Required for Initiation

9.4 Regulatory Sequences in Protein-Coding Genes and the Proteins Through Which They Function

9.5 Molecular Mechanisms of Transcription Repression and Activation

9.6 Regulation of Transcription-Factor Activity

9.7 Epigenetic Regulation of Transcription

9.8 Other Eukaryotic Transcription Systems

Chapter 10 Post-Transcriptional Gene Control

10.1 Processing of Eukaryotic Pre-mRNA

10.2 Regulation of Pre-mRNA Processing

10.3 Transport of mRNA Across the Nuclear Envelope

10.4 Cytoplasmic Mechanisms of Post-transcriptional Control

10.5 Processing of rRNA and tRNA

Chapter 19 The Eukaryotic Cell Cycle

19.1 Overview of the Cell Cycle and its Control

19.2 Model Organisms and Methods to Study the Cell Cycle

19.3 Regulation of CDK Activity

19.4 Commitment to the Cell Cycle and DNA Replication

19.5 Entry into Mitosis

19.6 Completion of Mitosis: Chromosome Segregation and Exit from Mitosis

19.7 Surveillance Mechanisms in Cell Cycle Regulation

19.8 Meiosis: A Special Type of Cell Division

Chapter 21 Stem Cells, Cell Asymmetry, and Cell Death

21.2 Stem Cells and Niches in Multicellular Organisms

21.4 Cell Death and Its Regulation

Chapter 24 Cancer

24.1 Tumor Cells and the Onset of Cancer

24.2 The Genetic Basis of Cancer

24.3 Cancer and the Misregulation of Growth Regulatory Pathways

24.4 Cancer and Mutation of Cell Division and Checkpoint Regulators

24.5 Carcinogens and Caretaker Genes in Cancer

Goals and Objectives

1. To be able to discuss what a "gene" is and how genes work.
2. To be able to discuss the background of the discovery of the gene and its functions in a cell: transcription and translation.
3. To be able to explain the DNA replication.
4. To be able to understand and discuss the mechanism of DNA repair and the occurrence of mutation.
5. To be able to understand and discuss the mechanism of DNA recombination.

Student Learning Outcomes

1. Students will learn basic knowledge in the area of molecular cell biology.
2. Students are able to think critically and reason logically.
3. Student will be able to discuss Molecular genetics, Chromosomes, Transcriptional Control of Gene Expression, Eukaryotic Cell Cycle, Stem Cells, Cell Asymmetry, and Cell Death and Cancer.

General Education / Faculty Courses: Most relevant Learning Outcomes for this course.

- ◎ Students are able to learn the knowledge necessary in the specialized field and utilize it.
- Students are able to have an inquiring mind/intellectual curiosity and collect the related knowledge from a wide range of information media.
- Students are able to analyze the issues/problems and solve them through critical/creative thinking.
- Students are able to communicate with each other in a group.
- Students are able to properly describe opinions and claims of their own.
- Students are able to actively take an action under their self-management and display their leadership.
- Students are able to have a sense of ethics and be aware of the social contribution and responsibility.
- Students are able to be conscious of their contribution to the international communities.

Course Syllabus

		Content
Class 1	Lecture contents	Introduction of the text book, Molecular Cell Biology 8th edition. Lodish et al 2016/3/26, chapters covered in this course, Mini-test. Chapter 5. Basic Molecular Genetic Mechanisms
	Self-study Assignments	Molecular Biology I & II
Class 2	Lecture contents	Chapter 6 Molecular Genetic Techniques Chapter 8 Genes, Genomics, and Chromosomes
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
Class 3	Lecture contents	Chapter 8 Genes, Genomics, and Chromosomes Chapter 9 Transcriptional Control of Gene Expression
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
Class 4	Lecture contents	Chapter 9 Transcriptional Control of Gene Expression
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
	Lecture contents	Chapter 9 Transcriptional Control of Gene Expression

Class 5	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
Class 6	Lecture contents	Chapter 9 Transcriptional Control of Gene Expression Chapter 10 Post-Transcriptional Gene Control
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
Class 7	Lecture contents	Chapter 10 Post-Transcriptional Gene Control
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
Class 8	Lecture contents	Chapter 10 Post-Transcriptional Gene Control
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
Class 9	Lecture contents	Chapter 10 Post-Transcriptional Gene Control Chapter 19 The Eukaryotic Cell Cycle
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
Class 10	Lecture contents	Chapter 19 The Eukaryotic Cell Cycle Chapter 21 Stem Cells, Cell Asymmetry, and Cell Death
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
Class 11	Lecture contents	Chapter 21 Stem Cells, Cell Asymmetry, and Cell Death
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
Class 12	Lecture contents	Chapter 24 Cancer
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
Class 13	Lecture contents	Chapter 24 Cancer
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
Class 14	Lecture contents	Chapter 24 Cancer
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.
Class 15	Lecture contents	Chapter 24 Cancer
	Self-study Assignments	Answer the quizzes at the "TEST" on the portal site.

Evaluation/Assessment

Assessment	Percentage	Evaluation Criteria (Explanation)
Final Exam	90%	test
Midterm		
Papers		

Performance/Works		
Continuous Assessment (quizzes, assignments, etc.)	10%	Mini-tests in the "TEST" & "Report" on the portal site
Other		

Grading Method:ABC

Course Materials

1. Molecular Cell Biology 8th edition Lodish et al 2016/3/26

The latest version of the text book is "Molecular Cell Biology 8th edition Lodish et al. published on 2016/3/26". (7th edition for Japanese translated) Please purchase the latest version.

Reference Materials

1. MOLECULAR BIOLOGY OF THE CELL, 6TH EDITION Alberts, Bruce; Johnson, Alexander; Lewis, Julian; Raff, Martin; Roberts, Keith; Walter, Peter Garland Science; 6th edition (2014/12/2) ISBN-10: 0815344643 ISBN-13: 978-0815344643
2. MOLECULAR BIOLOGY OF THE GENE, 7th Edition, Watson,James D.;Baker,Tania A.; Bell,StephenP.; Gann,Alexander; Levine,Michael; Losick, Richard
3. Life 8th edition Chapter 2,3 and 4 by David Sadava 2008
4. Essential Cell Biology Alberts et al Garland Science 2013
5. The Gene: An Intimate History. Siddhartha Mukherjee; Scribner; 2016/5/17 ISBN-10: 1476733503 ISBN-13: 978-1476733500
6. The Gene: An Intimate History. Siddhartha Mukherjee; Scribner; 2016/5/17 ISBN-10: 1476733503 ISBN-13: 978-1476733500

Please be careful to get the latest version of each book.

Advice for Prospective Students

For full understanding this course, you should finished Biology, Molecular Biology and Biochemistry I. Also you may attend Molecular Cell Biology II for further improvement. Powerpoint materials used in this class will be uploaded on the portal site or homepage of Kondo. Answer the quizzes in the "TEST" on the portal site.

Estimated time to prepare and to review for each class session. (incl. assignments, tests, papers, etc) : 4hrs

Implementation of Active Learning

No

Will you use ICT for class or to support self-learning?

Yes

- Portal site (forum, questionnaire functions)
- PC room / CALL room for class, or to use Laptop, tablet devices.

How to give feedback for assignments (mid-term exams, reports, etc.)

Correct and return tests or reports.

Language used in class

Japanese

Instructor Profile

Molecular Genetics of *C. elegans*

Print

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Link URL: <https://plas.soka.ac.jp/csp/plas/slb.csp?nd=2021&sm=1&mk=11&lc=108673>