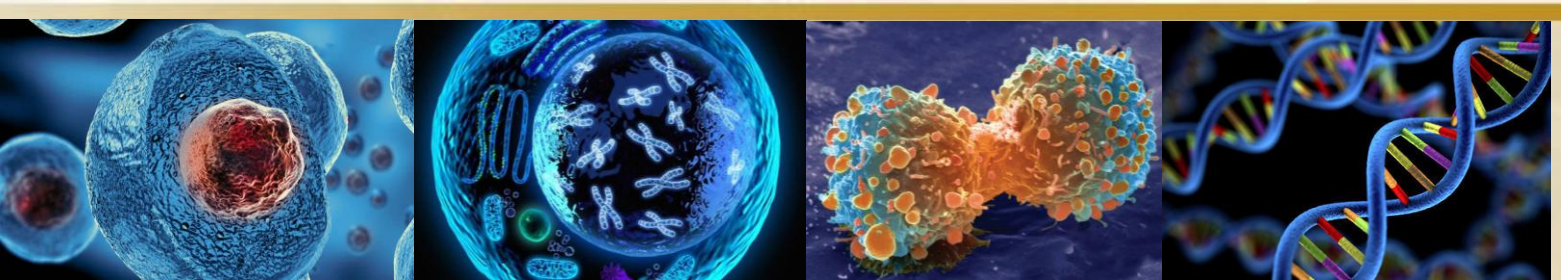
MD 567 712
CELLS AND MOLECULAR BIOLOGY 3(3-0-6)

First semester, Academic Year 2025



MDKKU 50 years Moving Forward
แห่งการดูแลสุขภาพประชาชนชาวไทย

COURSE ORIENTATION

Asst.Prof.Dr. Malinee Thanee
malitha@kku.ac.th

Asst.Prof.Dr. Prapaporn Jattujan
prapjat@kku.ac.th

KKU-MAIL

LINE

Khon Kaen University
e-Learning
e-learning.kku.ac.th

More detail in E-learning ☺

Course coordinators

Ms. Rapee Wonganan
Graduate education section of academic affair
E-mail : rapeewong@kku.ac.th (043-363384)

MD 567 712 Cells and Molecular Biology

- First semester, Academic Year 2025
- 3 CREDITS
- A 10-WEEK course (23rd June – 25th August 2025)

Class: Graduate students
Language: English

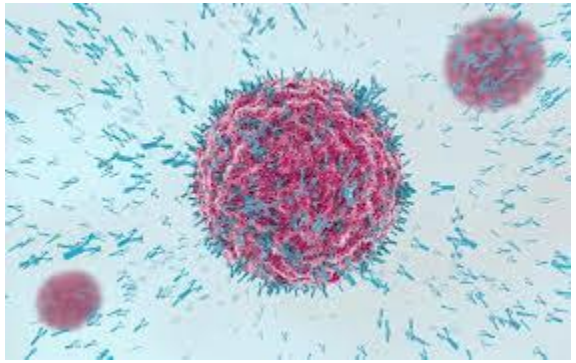
MD 567 712 Cells and Molecular Biology

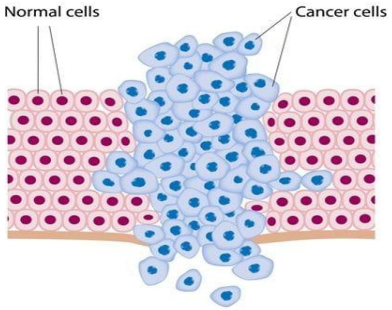
Course Description

- Biomolecules and molecular organization within cells
- Cellular energy and metabolisms
- Genome structure and gene regulation
- Molecular structures of the cell and their functions
- Cell cycle growth and differentiation
- Cellular interactions and communication
- The immune system
- Molecular and cellular basis of diseases
- Cancer biology
- Maintenance of life and control mechanisms

Course Objective:

To provide a basic knowledge outlining various aspects of the cells at molecular level both in normal and pathological settings.



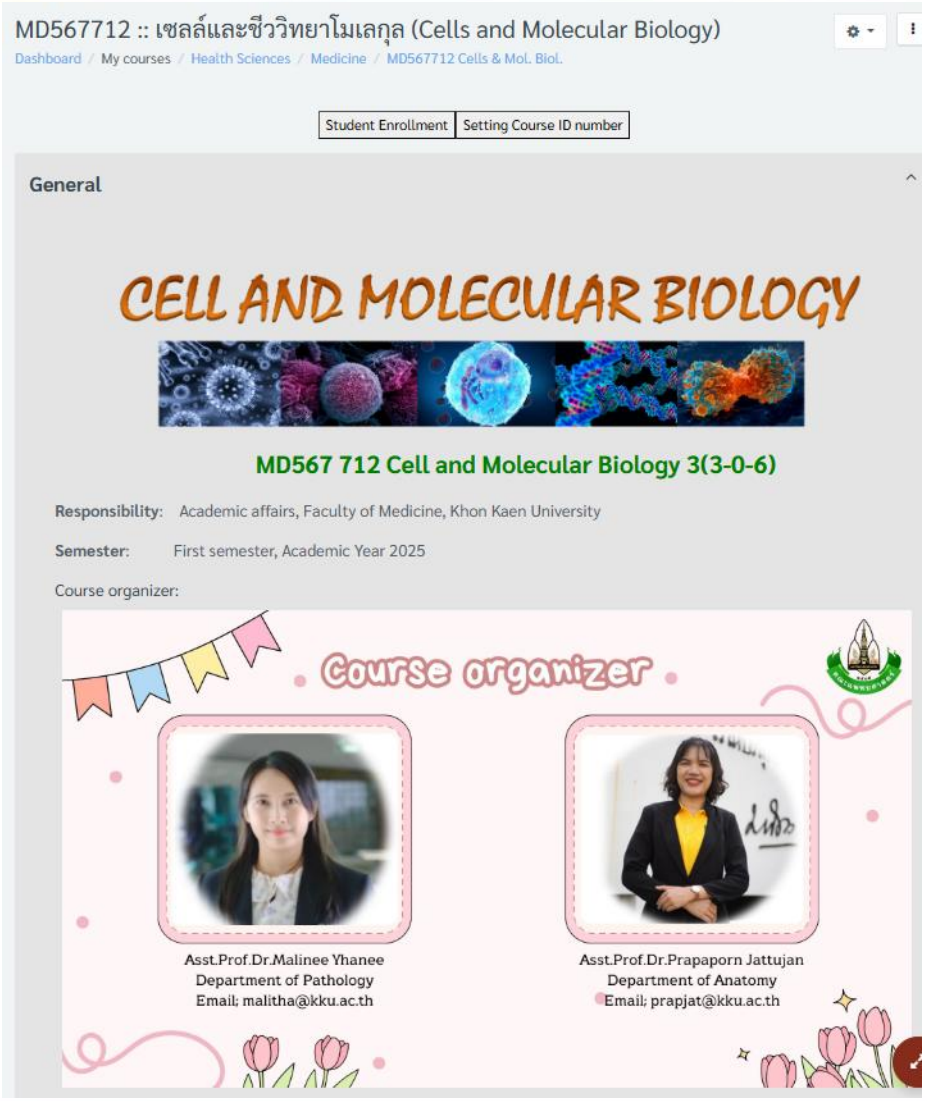


https://www.cancerfoundation.org.au/what-is-cancer-.html
https://theconversation.com/your-immune-system-is-as-unique-as-your-fingerprint-new-study-168228

MD 567 712 Cells and Molecular Biology

Information

KKU E-learning: MD567712: Cells and Molecular Biology → Using KKU Single Sign On to login



MD 567 712 Cells and Molecular Biology

Line group: MD567712_1st 2025

Program Schedule

Mondays (1:00 PM-4:00 PM)

Wednesdays (09:00 AM-12:00 PM)

Thursdays (09:00 AM-12:00 PM)

Venues

Onsite

Post-grad room (2nd Floor)

Faculty of Medicine,
Khon Kaen University

Course organization

Language	• English
Lectures	• 12 lecture topics • Questions & Answers (Q&A)
Current topic discussions	• 2 sessions of current topic discussion • A group of 10-12 students
Examinations	• 3 examination sessions
Grading	• Passing level for B is 50% of raw score

Criterion-referenced grading

Download

KKU E-learning

Course Outline and Schedule for MD567712, AY 2025

Date	Time (GMT+7)	Hours	Topics	Instructors
M 23rd June 2025	13:00-14:00	1	Course orientation Introduction to Cell and Molecular Biology	Malinee /Prapaporn
	14:00-16.00	2	1. Bioenergetics (2) 1.1 Thermodynamics in biological system 1.2 High energy phosphate compound 1.3 Oxidation-reduction in biological system 1.4 Energy in oxidative phosphorylation	Patcharee
W 25th June 2025	09:00-11:00	2	2. Biomolecules: Structures, Functions and Interactions (2) 2.1 Biomolecules & stereochemistry 2.2 Molecular interactions 2.3 Structure and function of amino acids & proteins 2.4 Structures and functions of nucleosides, nucleotides & nucleic acids 2.5 Structures and functions of sugars & polysaccharides 2.6 Structures and functions of lipids and membranes	Chadarnas
TH 26th June 2025	09:00-11:00	2	3. Metabolisms (2) 3.1 Metabolic concepts in plants and animals 3.2 Mammalian fuel metabolism: integration and regulation 3.3 Nucleotide metabolism	Kulthida
M 30th June 2025	13:00-16:00	5	4. Genome and gene regulation (5) 4.1 Genome structure and evolution 4.2 DNA and RNA synthesis and processing 4.3 Synthesis, processing and targeting of proteins 4.4 Control of gene expression	Charupong
W 2nd July 2025	09:00-11:00			
TH 3rd July 2025	09:00-11:00	2	Questions and Answers (for topics 1-4) In-class and additional Q&A on e-learning	Patcharee, Chadarnas, Kulthida, Charupong
M 7th July 2025	13:00-16:00	3	Exam 1: Topics 1-4 (11 hr lectures x5 = 55 points) Venue: Small examination room, Research Laboratory Building, 7th floor	Malinee /Prapaporn
W 9th July 2025	09:00-10:00	1	5. Cell structure (4) 5.1 Prokaryotic and eukaryotic cells	Kiatichai
	10:00-12:00	2	5.2 Cell organization and movement: cell membrane, cytoskeleton, cell adhesion, and cell junction	Wanchana
TH 10th July 2025	"Asalha Bucha Day"			

Date	Time (GMT+7)	Hours	Topics	Instructors
M 14th July 2025	13:00-14:00	1	5.3 Cell-cell interaction and cell to cell communication	Wises
	14:00-16:00	2	6. Cell function (2) 6.1 Membrane transport and ionic conductance 6.2 Molecular trafficking (protein traffic, vesicular traffic, secretion and endocytosis)	Weerapon
W 16th July 2025	09:00-12:00	3	7. Cell growth and development (3) 7.1 Regulation of eukaryotic cell cycle 7.2 Signal transduction 7.3 Cell birth and lineage (stem cell)	Kanlayanee Kulthida Atit
TH 17th July 2025	09:00-12:00	3	Current Topic discussion I (Related to lecture topics 1-4) *10-12 students and 2 tutors per group* - Room 4401-4405, 4th floor, Wechwichakarn Building	Charupong, Chadarnas, Kulthida, Patcharee, Prapaporn, Kitti, Arporn, Arnone, Weerapon, Umaporn, Piman, Opal, Malinee
M 21st July 2025	13:00-15:00	2	8. Host immune system (5) 8.1 Cell-microbes interaction 8.2 Cell recognition	Arnone
W 23rd July 2025	9:00-10.30	1.5	8.3 Innate immunity	Chukkris
	10.30-12.00	1.5	8.4 Adaptive immunity	
TH 24th July 2025	"Wai Kru" (Day of Paying Respect to Teachers)			
M 28th July 2025	"HM King Maha Vajiralongkorn Phra Vajiraklaochaoyuhua's Birthday"			
W 30th July 2025	09:00-10.30	1.5	Questions and Answers (for topics 5-6) In-class and additional Q&A on e-learning	Kiatichai, Wanchana, Wises, Weerapon
W 30th July 2025	10.30-12.00	1.5	Questions and Answers (for topics 7-8) In-class and additional Q&A on e-learning	Kanlayanee, Kulthida, Atit, Arnone, Chukkris
M 4th August 2025	13:00-16:00	3	Exam 2: Topics 5-8 (14 hr lecture x5 = 70 points) Venue: Small examination room, Research Laboratory Building, 7th floor	Malinee /Prapaporn
W 6th August 2025	09:00-11:00	2	9. Molecular and cellular basis of diseases I (2) 9.1 Diseases and causes of diseases 9.2 Inflammation: acute and chronic 9.3 Tissue repair and Angiogenesis	Kitti
TH 7th August 2025	09:00-12:00	3	10. Molecular and cellular basis of diseases II (3) 10.1 Cell injury and cell death: mechanisms and consequences 10.2 Programmed cell death and cellular senescence	Raksawan
M 11th August 2025	"Bridge Public Holiday"			

Date	Time (GMT+7)	Hours	Topics	Instructors
W 13th August 2025	09:00-12:00	3	11. Cancer (3) 11.1 Definitions and characteristics of cancer 11.2 Etiology and carcinogenic processes 11.3 Molecular basis of cancer	Chawalit
TH 14th August 2025	09:00-12:00	3	12. Maintenance of life and control mechanisms (3) 12.1 Regulation of body metabolism 12.2 Theories and biophysical factors and homeostatic mechanism governing the life of an organism 12.3 Homeostasis: Positive and negative feedback control	Putcharawipa
M 18th August 2025	13:00-15:00	2	Questions and Answers (for topics 9-12) In-class and additional Q&A on e-learning	Raksawan, Kitti, Chawalit, Putcharawipa
W 20th August 2025	09:00-12:00	3	Current Topic Discussion II *(Related to lecture topics 5-12)* *10-12 students and 1-2 tutors per group* - Room 4401-4405, 4th floor, Wechwichakarn Building	Wises, Arporn, Kitti, Atit Weerapon, Malinee, , Umaporn, Kanlayanee, Arnone, Putcharawipa, Areeya
M 25th August 2025	13:00-16:00	3	Final Exam: Topics 9-12 (11 hr lecture x5 = 55 points) Venue: Small examination room, Research Laboratory Building, 7th floor	Malinee /Prapaporn

Course credits: 36 lecture hrs, 2 discussion topics (6 hrs), and Q&A (7 hrs) (8-week course)

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Criterion-referenced grading

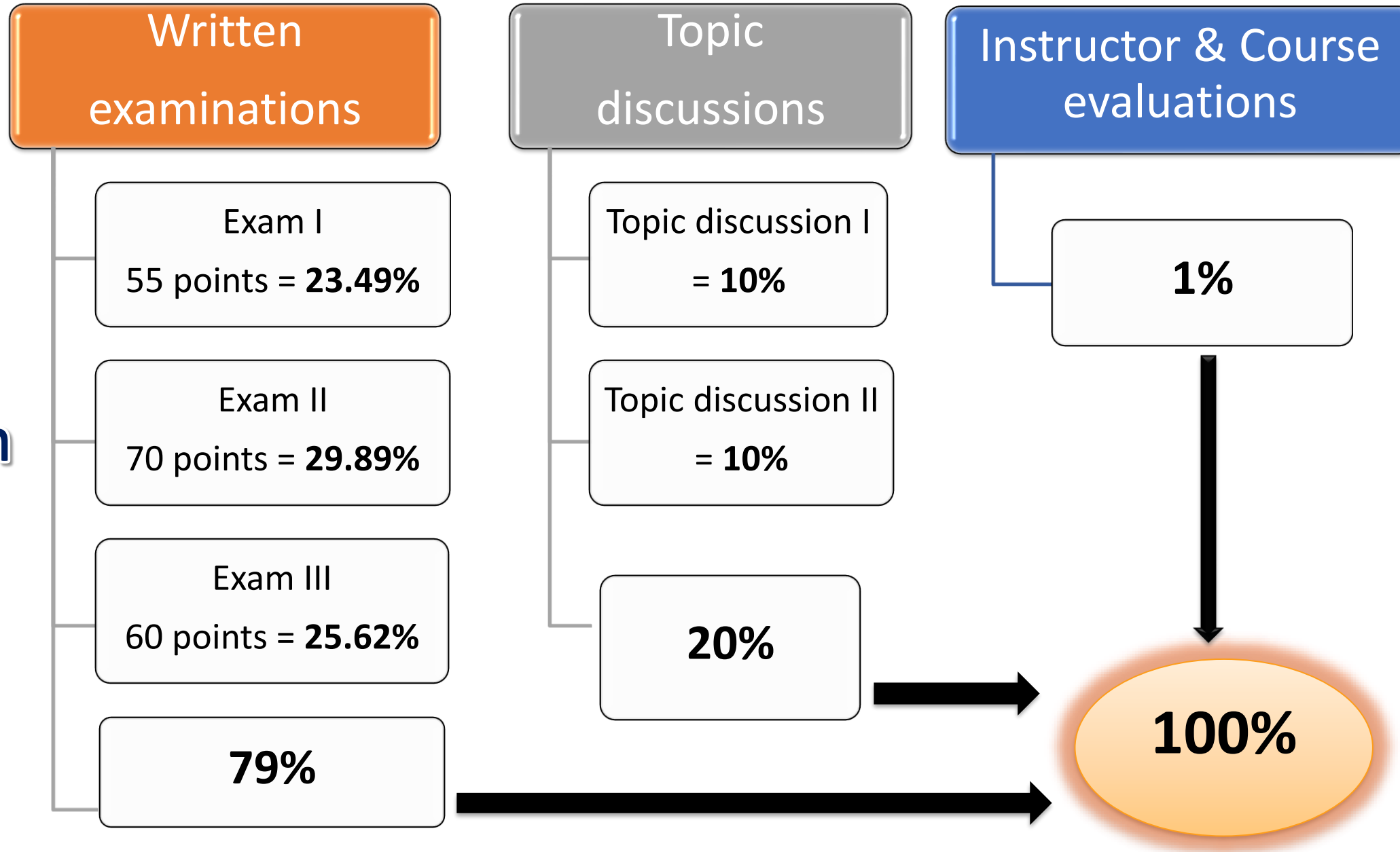
Grades in the course will be determined by student performance on examinations (79%), course and teaching evaluation (1%), and two topics discussion (20%) Passing level is ≥ 50%.

SU & AU, ≥ 50%

Grading will be based on the following criteria:
A, ≥ 80%
B+, ≥ 65%
B, ≥ 50%
C+, ≥ 46.25%
C, ≥ 42.5%
D+, ≥ 38.75%
D, ≥ 35%
F, < 35 %

Grading will be considered and determined by course & lecturer committee.

Evaluation



***Written Examination scores worth 5 points per one-hour lecture**

****Please write your answers in English**

Current topic discussion I & II

Objectives:

- To encourage students to utilize and apply their current knowledge on understanding the assigned scientific article.
- To provide students an opportunity to practice oral presentation and discussion in the class.
- To promote students' teamwork and problem-solving skills.

Current topic discussion I & II

Method:

- Students will be divided into 6 groups of 10-12 persons.
- A selected scientific article related to the lecture topics will be provided to students a week prior to the scheduled date.
- All students are expected to read the given article and encouraged to actively participate in a current topic discussion session.
- The instructor in charge prepares a set of questions and quiz after the discussion ends.

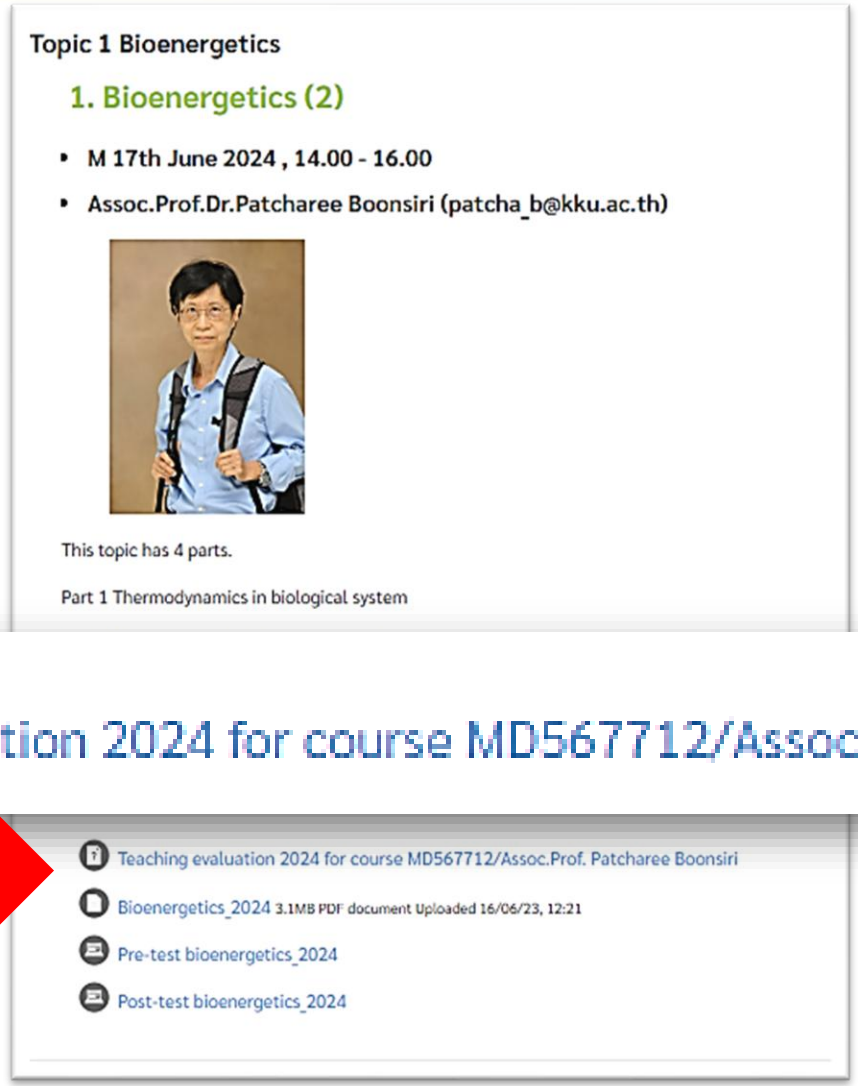
Each current topic discussion session

10%

5%	Knowledge/Ability to response questions
	Critical thinking/Providing further information
	Participation
	Punctuality
5%	Quiz

Instructor and course evaluations

Please perform both instructors and course evaluation online at the end of this course. 100% evaluation should be completed, 1% will be given to you.



Course instructors

อ.จักรกฤษ

อ.ประภาภาพร









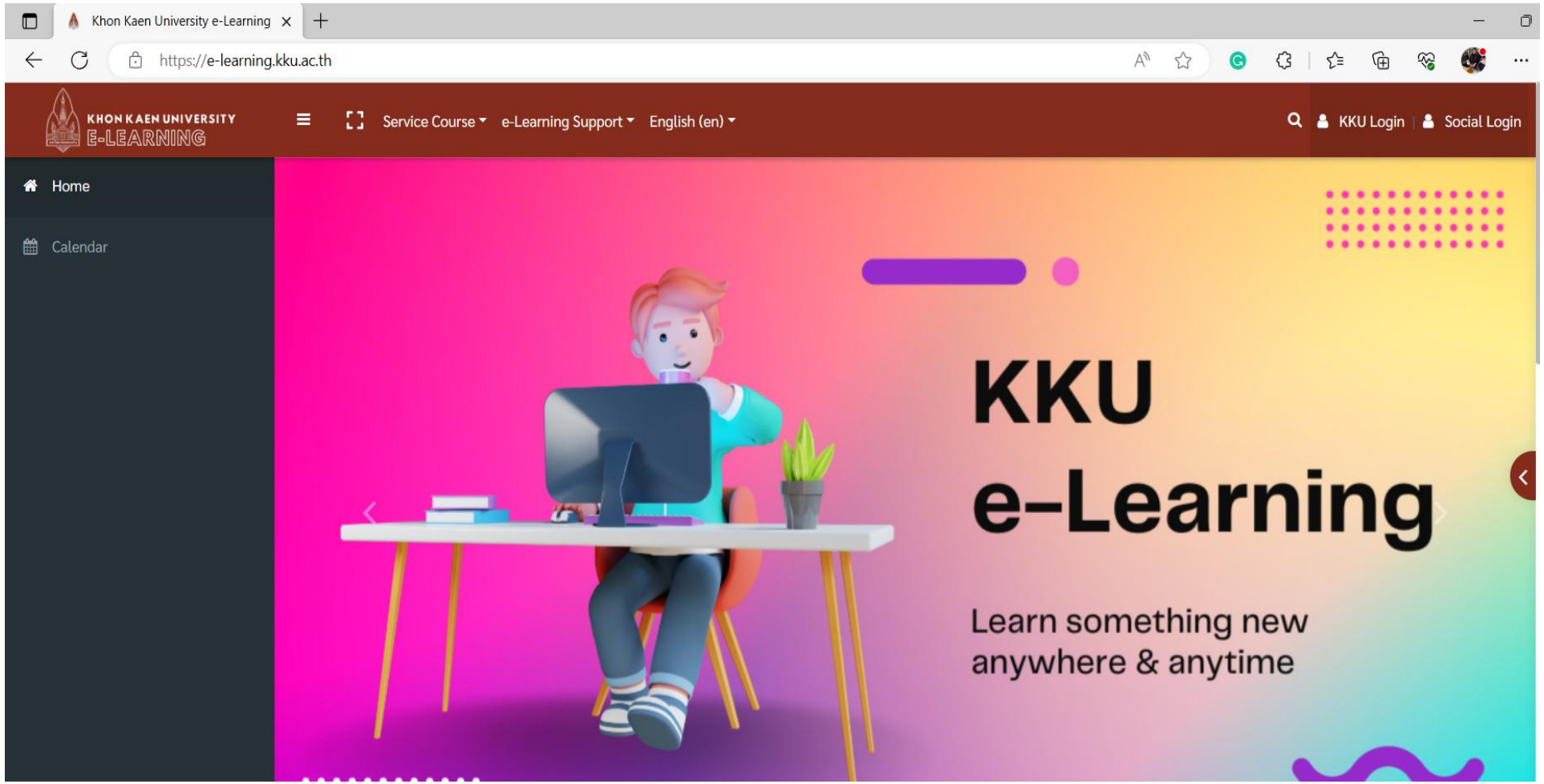







E-Learning Guide

https://e-learning.kku.ac.th/ KKULogin



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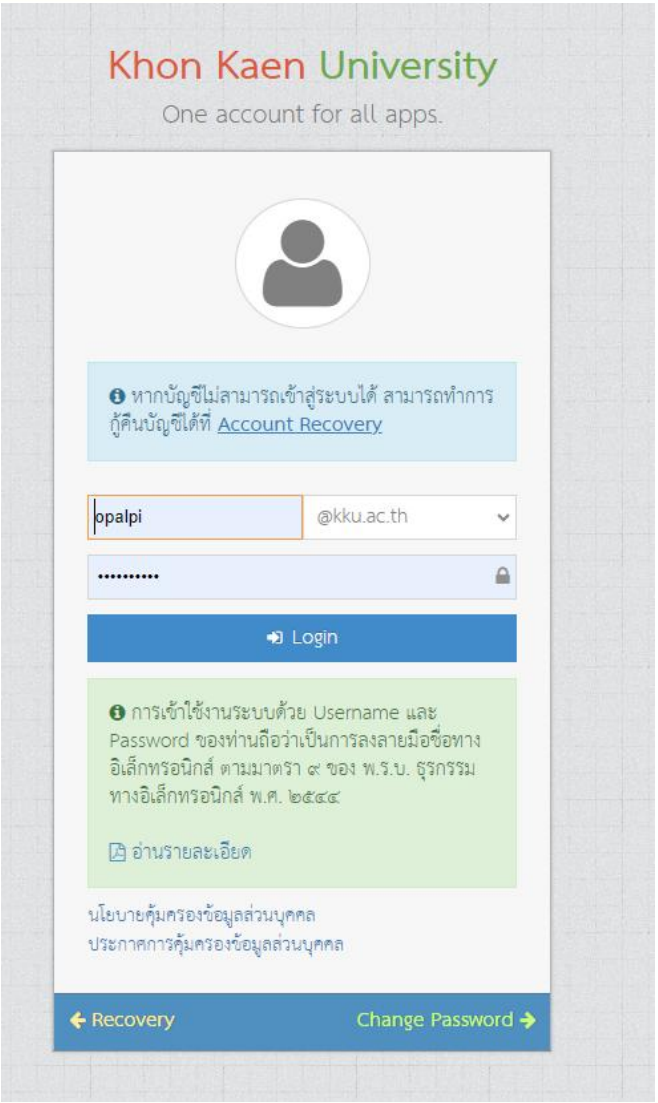
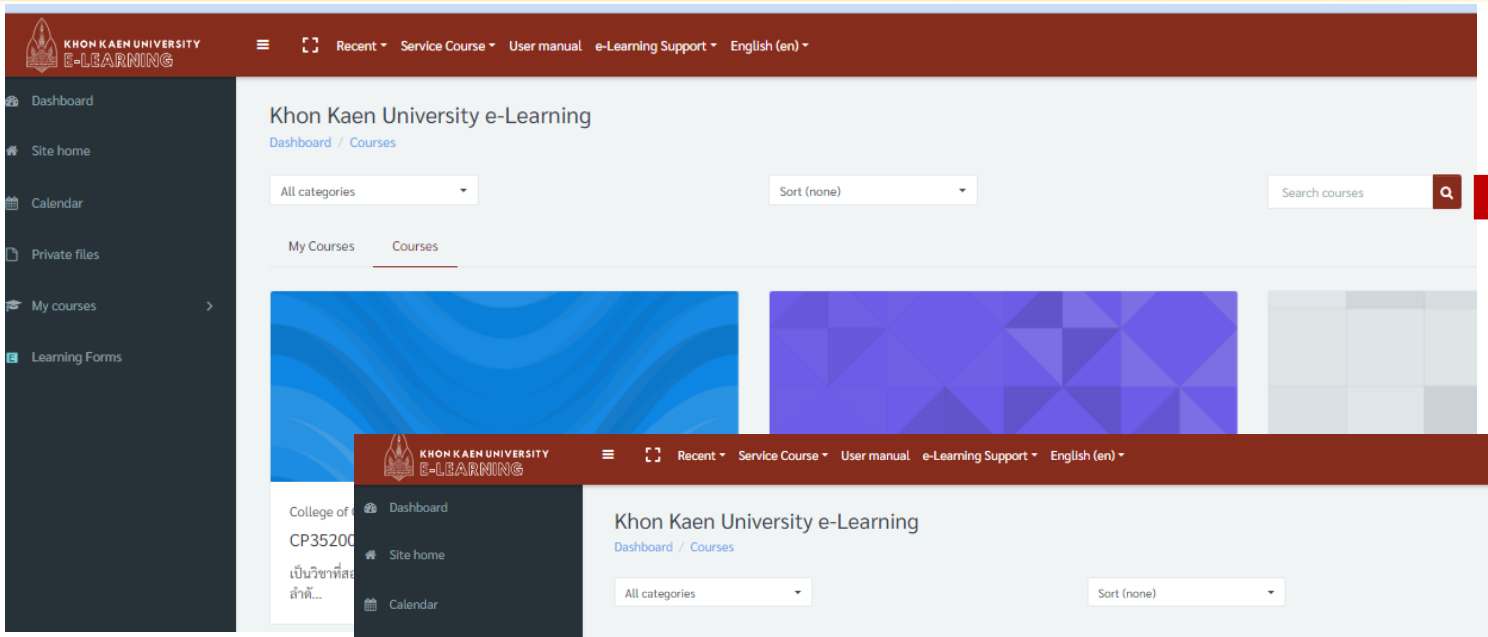
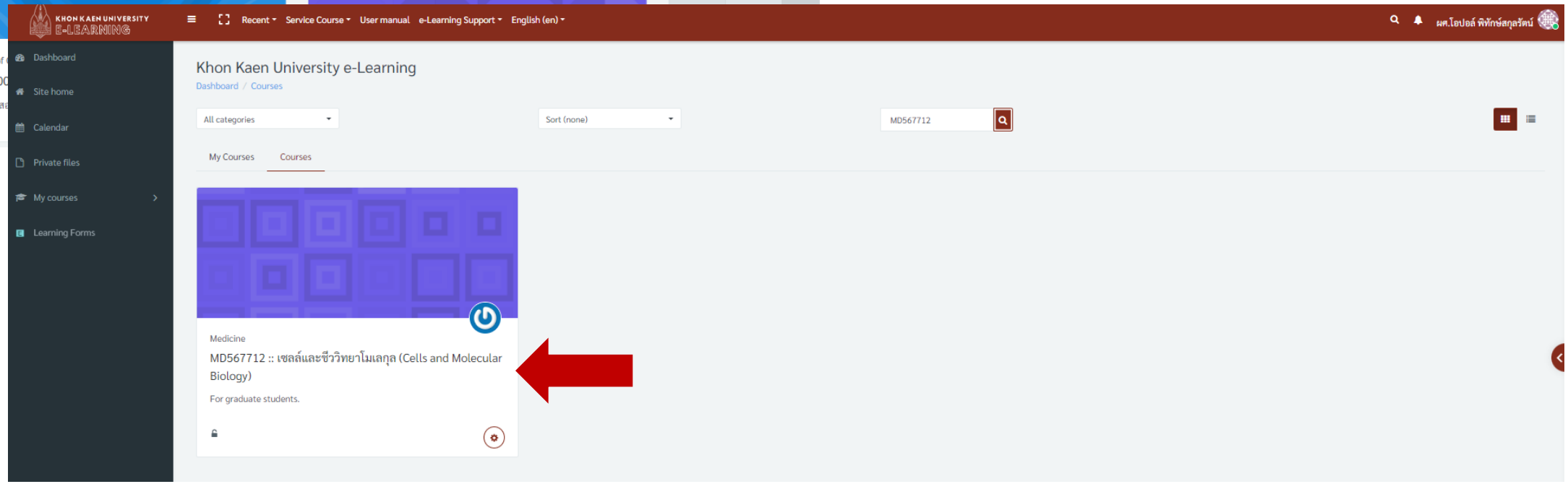
Login→ KKUmail



Course organization



Search→ MD567712



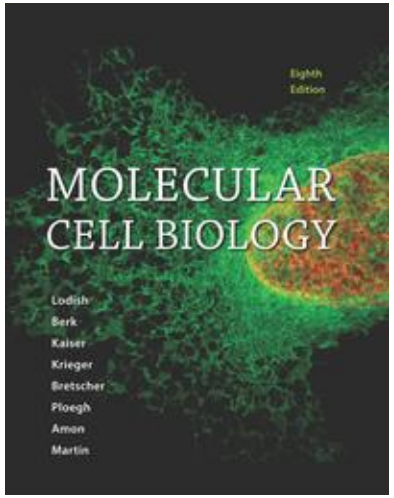
Five important days

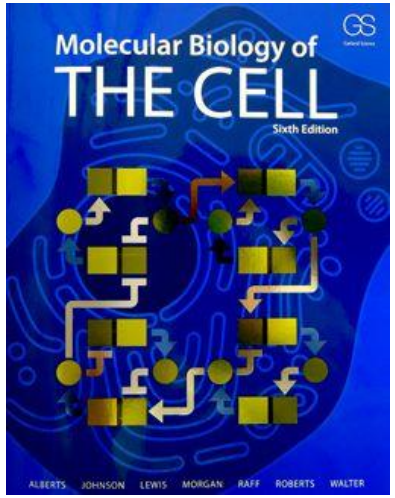
EXAM I	• **M 7th July 2024 (1-4 pm)**
Topic discussion I	• **Th 17th July 2024 (9-12 pm)**
EXAM II	• **W 30th July 2025 (9-12 am)**
Topic discussion II	• **Th 14th August 2025 (9-12 am)**
EXAM III	• **Th 21st August 2025 (9-12 am)**

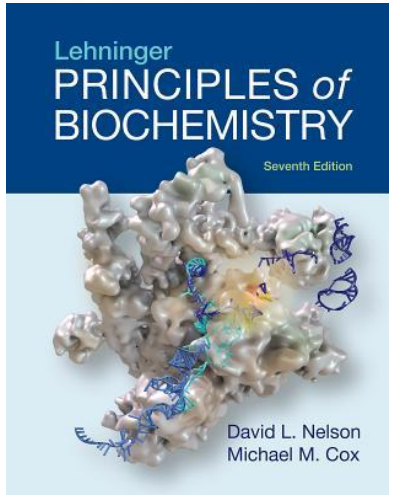
Classroom rules

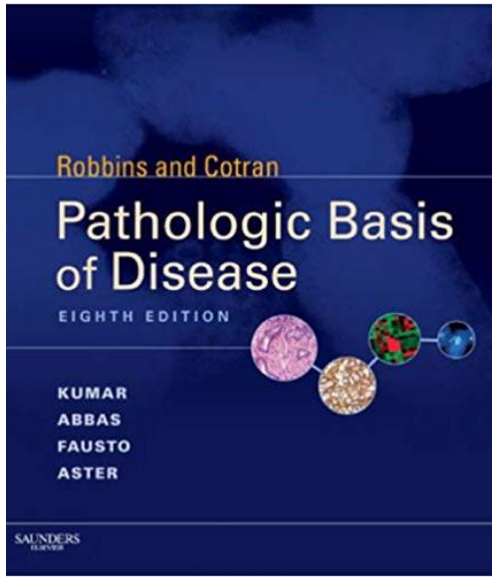
- **Get to class on time**
- **Be prepared for class each day**
- **Prepare to be an active participant**
- **Turn off your mobile phone**
- **PowerPoint presentation is used in all lectures, and the slides will be posted on the course e-learning system at least three days before each class.**
- **News and updates will be posted on KKU e-learning/Line**

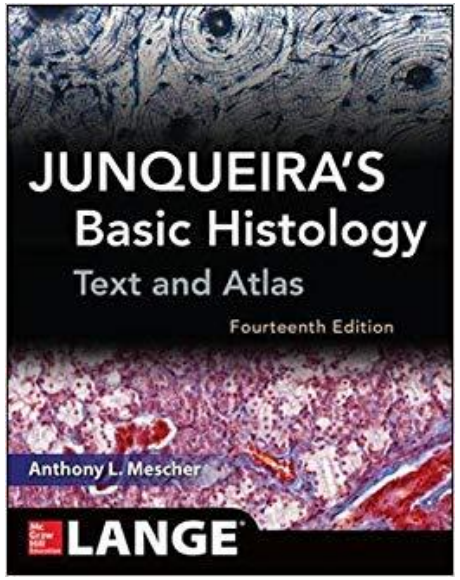
Reference Books

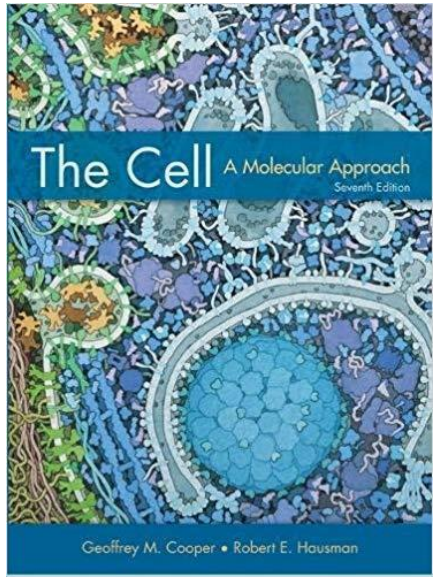


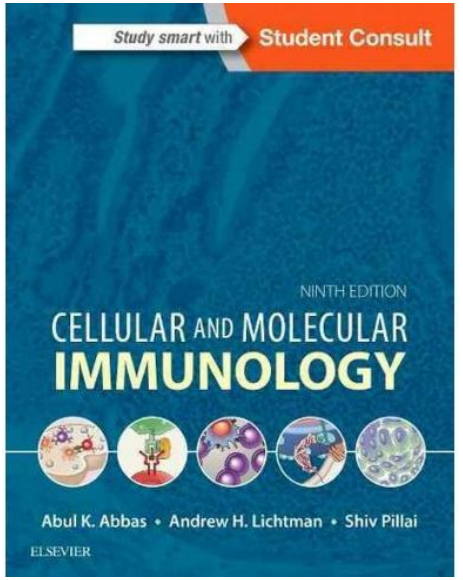












60 years of creativity and development for society