



# THE MODULE HANDBOOK

Magister Biology Study Program

FACULTY OF BIOLOGY

## CELL AND MOLECULAR GENETICS

Course code	BIMB202123
Course level	Magister
Semester/ term	Even
Course coordinator(s)	Dr. Niken Satuti Nur Handayani, M.Sc.
Lecture(s)	<ol style="list-style-type: none"><li>1. Dr. Niken Satuti Nur Handayani, M.Sc.</li><li>2. Prof. Dr. Budi Setiadi Daryono, M.Agr.Sc.</li><li>3. Prof.Dr. Endang Semiarti, M.S., M.Sc.</li><li>4. Dr. Endah Retnaningrum, M.Eng.</li></ol>
Language	Indonesian
Classification within the Curriculum	Compulsory Interest Course
Teaching format/ class hours per week during the semester	This course is organised in single class and planned to have 14-16 teachingweeks and 2 weeks of examination.
Workload	Estimated working hour: 2 credits of theory and 1 credit of laboratory work.
Credits	2-1 credits
Requirements	-
Program Learning Outcome	<p><i>CPL KN1: The graduates are <b>demonstrating excellent knowledge in biological theor</b> includes all aspects of biological studies at various levels in the organization of life (<b>knowledge</b>);</i></p> <p><i>CPL KN2: The graduates are <b>demonstrating excellent knowledge in biological theor</b> includes appropriate biological research methods (<b>knowledge</b>);</i></p> <p><i>CPL GS5: The graduates are <b>able to</b> use information technology in scientific developmentand implementing it in their area of expertise (<b>general skills</b>)</i></p> <p><i>CPL SS1: The graduates are <b>able to</b> conduct research in the field of biology independentlyor in groups, and able to solve various biological-related problems (<b>specific skills</b>)</i></p>
Course Learning Outcome	<ol style="list-style-type: none"><li>1. Students understand and are able to explain the core genome components and their functions, chromosome structure and function; describes the stages of genome library construction and its function, describes the regulation of gene expression in prokaryotic and eukaryotic organisms, explains the gene family.</li></ol>



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2. Students understand and are able to explain how the mechanism of genomic variation occurs, describe how chromosomal mutations and abnormalities occur, as well as the evolution of prokaryotic organisms and the aspects that accompany it.
3. Students understand and are able to explain in vivo and in vitro gene transfer mechanisms and related research methods, gene terminators and siRNA; DNA Microarray and Antisense RNA and make decisions in choosing methods to solve biological problems based on analytical or experimental studies
4. Students will be able to design research in the field of biology independently or in groups, be able to solve problems related to cell and molecular genetics by applying molecular markers and breeding methods in the field of genetics and the breeding of biological resources.

#### Course Description

This course explains the structure and function of chromosome organization and cell nucleus (structural and functional organization of the chromosome and nucleus), genome variation and genome library (genome variation & genome library), gene expression, gene family and evolution (gene family and evolution), gene regulation, terminator gene & small interfering RNA, DNA microarray & antisense RNA, gene transfer mechanism in vivo vs in vitro (gene transfer mechanism in vivo vs in vitro), application of molecular markers in genetics (application of molecular markers in genetics); chromosome variations and mutations including chromosome abnormalities (chromosome variation and mutation including chromosome abnormalities), chromosome engineering; chromosomes and genetic disorders (chromosome and diseases), breeding strategies and methods (breeding strategy and

#### Assesments

Assessment Component	Percentage	CPMK 1	CPMK 2	CPMK 3	CPMK 4
Quiz/Dissusion	10				
Assignment	20				
Mid Semester Exam	35				
Final Exam	35				

#### Study Media

Laptop, PC, Mobile phone, or Tablets

#### Literature

Albert, B., Bray, D., Lewis, J., Raff, M., Robert, K., Watson, J.D. (2014). Molecular Biology of the Cell. 6th ed. Garland Publ. Inc., New York.

Watson, J.D., Gilman, M., Witkowski, J., and Zoller, M. (2006). Recombinant DNA. 4th ed. Freeman and Co., New York.

Brown, T.A. (2017). Genomes 4th ed. New York and London: Garland Science



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- Griffiths, Anthony J.F.; Gilbert, William M.; Miller, Jeffrey H.; Lewontin, Richard C. (2017). *Modern Genetic Analysis* 5th ed. New York: W. H. Freeman & Co.
- Hartwell, L., Hood, L., Goldberg, M.L., Reynolds, A.E., Silver, L.M., and Veres, R.C. 2000.  
*Genetics: From Genes to Genomes*. 1st ed. The McGraw Hill Companies, Inc. USA
- Klug, W.S. and R. Cummings. (2000). *Concept of Genetics*. 6th ed. Prentice Hall Inc., New Jersey (USA)
- Reece, R.J. (2004). *Analysis of Genes and Genomes*. John Wiley & Sons, Inc., New York.
- Sekimura, T., Noji, S., Ueno, N., Maini, P.K. (2003). *Morphogenesis and Pattern Formation in Biological Systems. Experiments and Models*. Springer-Verlag, Tokyo.
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