

## MOLECULAR BIOLOGY

Module designation	<i>Molecular Biology</i>
Semester(s) in which the module is taught	1
Person responsible for the module	<ol style="list-style-type: none"> <li>1. Prof. apt. Junaidi Khotib, S.Si., M.Kes.,Ph.D (<b>Course Coordinator</b>)</li> <li>2. Prof. Dr. apt. Djoko Agus Purwanto, M.Si.</li> <li>3. Prof. Dr. apt. Sukardiman, MS.</li> <li>4. apt. Chrismawan Ardianto, S.Farm., M.Sc., Ph.D.</li> </ol>
Language	<i>Bahasa Indonesia</i>
Relation to curriculum	<i>Compulsory / elective / specialisation</i>
Teaching methods	<i>lecture, discussion, assignment</i>
Workload (incl. contact hours, self-study hours)	<p><i>(Estimated) Total workload:</i>  <i>Contact hours (structured activities.): 90,67 hours</i>  <i>Private study including independent learning activities: 90,67 hours</i></p>
Credit points	<i>2 SCU / 6 ECTS</i>
Required and recommended prerequisites for joining the module	NA
Module objectives/intended learning outcomes	<p>Students are:</p> <p>LO1: Able to realize excellence based on religious morals (excellence with morality), able to work together, and show a responsible attitude to work in their field of expertise independently</p> <p>LO2: Able to internalize the spirit of independence, struggle, and entrepreneurship</p> <p>LO3: Able to develop and build logical-critical-systematic-creative thinking and scientific conceptions through scientific research, design creation, or artworks of science and technology that pays attention to and applies humanities values through an interdisciplinary or multidisciplinary approach in the form of a thesis or other equivalent forms.</p> <p>LO4: Able to develop a pharmaceutical professional performance with analytical acumen in solving pharmaceutical problems and managing research in the pharmaceutical field related to national and global systems and policies, both inter and inter-disciplinary approaches.</p> <p>LO5: Able to access and review information through an Information and Communication Technology (ICT) system, decide on a specific subject of study, maintain the feasibility of implementing research designs, conduct research, analyze data, conclude research results comprehensively, and create strategic issues based on the study that reflect the latest updates in the field of pharmaceutical sciences, and communicate them in the media and scientific forums at the national and international level through an interdisciplinary or multidisciplinary approach in the form of a thesis or other equivalent forms.</p> <p>LO6: Able to make decisions in the context of solving problems related to science and technology development based on analytical or experimental studies through</p>

	<p>collaboration with colleagues, colleagues in institutions and research communities at both national and international levels and utilizing research results for the benefit of the user and other communities</p> <p>LO7: Able to analyze natural materials to obtain active ingredients and/or pharmaceutical excipients with due observance of nature conservation.</p> <p>LO8: Able to carry out drug designs through the synthesis of bioactive compounds based on the structure-activity relationship.</p> <p>LO9: Able to carry out molecular manipulation of substances and develop formulations and manufacturing of pharmaceutical preparations with active pharmaceutical ingredients derived from natural products and synthetic compounds through the manufacture of polymorphs, nanoparticles, solid dispersions.</p> <p>LO10: Able to develop pharmaceutical management systems and policies related to the referral health care system and the role and function of pharmacists as an integral part of the health care team in order to improve community welfare.</p> <p>LO11: Able to develop systems for evaluating the bioavailability of drugs in the body, pharmaceutical products circulation permits, and their in-vitro and in-vivo evaluations with specific delivery systems with appropriate analytical methods.</p> <p>LO12: Able to develop analytical methods to ensure the quality of drugs, cosmetics, foods, and beverages.</p> <p>LO13: Able to design drug development both from natural products and/or synthetic compounds by considering the biological mimicry system.</p> <p>LO14: Able to build drug management systems from active pharmaceutical ingredients to finished products that are ready for therapeutic uses.</p>
Content	<p>The Molecular Biology course presents the scope and benefits of molecular biology; Demonstrate the relationship of molecular biology with physiological and pathological conditions, drug effects and drug development; molecular biochemistry of cell constituents, structure and function of organelles and biomembranes; inter and intracellular signal delivery pathways (MAP Kinase, JAK/STAT signalling, TLR Signaling); changes in signalling pathways in physiological and pathophysiological conditions (diabetes mellitus, cardiovascular disease and cancer); changes in signalling pathways due to agonist exposure; genetic code, gene expression and protein synthesis in prokaryotes and eukaryotes; cell cycle and control of cell growth/development; apply molecular techniques in drug development research.</p>
Exams and assessment formats	<i>Mid term exam and final exam</i>
Study and examination requirements	<i>The final grade in the module is composed of 45% mid term exam, 45% final exam, 10% in-class participation and soft-skills assessment. Students must have a final grade of 70% or higher to pass</i>

Reading list	<ol style="list-style-type: none"><li>1. <i>Albert B, Johnson A, Lewis J, Raff M, Molecular Biology of The Cell, 6th edition, Garland Science, 2014</i></li><li>2. <i>Lodish H, Berk A, Kaiser CA, Krieger M, Molecular Cell Biology, 9th edition, Massachusetts Institute of Technology, 2021</i></li><li>3. <i>Franklin TJ and Snow GA, 2005, Biochemistry and Molecular Biology of Antimicrobial Drug Action, 6th edition, USA: Springer</i></li><li>4. <i>Anonim, Inside The Cell, NIH, 2005</i></li><li>5. <i>Bolsover SR, Shephard EA, White HA, Hyams JS, Cell Biology, 3rd edition, USA, Willey Lis, 2011</i></li><li>6. <i>Watson JD, Baker TA, Bell SP, Gann A, Levine M, Losick R, Molecular Biology of the Gene, (7th Edition), 2013</i></li></ol>
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