



KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI
UNIVERSITAS BRAWIJAYA
FAKULTAS KEDOKTERAN
PROGRAM MAGISTER ILMU BIOMEDIK

Jalan Veteran, Malang 65145, Jawa Timur – Indonesia
 Telp. (62)(341) 569117; 567192 Pes. 134, 135 – Fax. (62)(341) 564755
 E-mail: sekr.fk@ub.ac.id Website: <http://biomedical.fk.ub.ac.id>

Teaching Plan

Course Title : Instrumentation and Biomolecular Technique
Course Code : DKF6103
Credits : 3
Course Coordinator : Dr. dr. Loeki Enggar Fitri, M.Kes., Sp.ParK
 (Phone: 085649561303, email: lukief@ub.ac.id)

Course Description

This course was designed with overall goal is to introduce students to the biosafety, as well as principles, techniques, and application of the basic cellular and molecular techniques used in biomedical research, and also the use of animal models. The key objective is to apply the principles rather than merely memorize information. Subject areas covered include biosafety, spectrophotometry, flow cytometry, immunohistochemistry, Enzyme-linked Immunosorbent assay (ELISA), DNA isolation, vertical electrophoresis, Western blot, Dot blot, free radicals measurement, care and use of laboratory animals, and also animal models.

Course Learning Outcomes

On successful completion of this course students will (be):		Bloom's Taxonomy
CLO1	Demonstrate a comprehensive understanding of the biosafety, as well as principles, techniques, and application of the basic cellular and molecular techniques used in biomedical research, and also the procedure of inducing various animal models.	Level 2. Understanding
CLO2	Awareness amongst students to implement biorisk management in every activities related to their works using biological agents, including procedures, equipment, personnel, storage and transport of materials, as well as appropriate disposal of biological materials.	Level 3. Applying
CLO3	Able to analyze the results of the basic cellular and molecular techniques used in biomedical research.	Level 3. Applying
CLO4	Able to apply the principles of care and use of laboratory animals.	Level 3. Applying
CLO5	Demonstrate ethical standards for the intellectual activities.	Level 3. Applying

Links between CLOs and PLOs

	PLO1.1	PLO1.2	PLO2.1	PLO2.2	PLO2.3	PLO3.1	PLO3.2	PLO3.3	PLO3.4	PLO4
CLO1		√	√							
CLO2				√	√		√			√
CLO3			√	√	√		√			√
CLO4				√	√		√			√
CLO5										√

Topic and Schedule

Week	Topics	Competencies	Lecturer
1	Biosafety in Laboratories Topics: personal hygiene, donning and doffing of Personal Protective Equipment (PPE), work safety in laboratories (including hazardous chemicals in laboratories), handling and transportation of biological specimen, decontamination, emergency response and security in laboratories.	Awareness amongst students to implement biorisk management in every activities related to their works using biological agents, including procedures, equipment, personnel, storage and transport of materials, as well as appropriate disposal of biological materials.	
2	Spectrophotometry	Able to explain the basic principle, technique, and application of spectrophotometry. Able to analyze the results of spectrophotometry, including how to measure the sample concentration from the absorbance result.	SP



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3	Flow cytometry	Able to explain the basic principle and technique of flow cytometry, and also the use of flow cytometry in research and pathologic or disease diagnostic. Able to analyze the results of flow cytometry.	ATE
4	Immunohistochemistry	Able to explain the basic principle and technique of immunohistochemistry, and also the use of immunohistochemistry on research and pathologic or disease diagnostic. Able to analyze the results of immunohistochemistry.	LEF
5	Enzyme-linked Immunosorbent Assay (ELISA)	Able to explain the basic principle and technique of ELISA, and also the use of ELISA on research and pathologic or disease diagnostic. Able to analyze the results of ELISA.	LEF
6	DNA Isolation	Able to explain the basic principle, technique, and application of DNA purification. Able to analyze the results of DNA purification.	SIR
7	Mid-Exam		TEAM
8	Vertical electrophoresis	Able to explain the basic principle, technique, and application of vertical electrophoresis. Able to analyze the results of vertical electrophoresis, including how to count the molecular weight of the protein from the result.	TYM
9	Western Blot	Able to explain the basic principle, technique, and application of Western Blot. Able to analyze the results of Western Blot.	HS
10	Dot Blot	Able to explain the basic principle, technique, and application of Dot Blot. Able to analyze the results of Dot Blot.	SMN
11	Free radicals measurement	Able to explain the basic principle, technique, and application of free radicals measurement. Able to analyze the results of free radicals measurement.	NP
12	Care and use of laboratory animals, and animal models	Able to apply the principles of care and use of laboratory animals (including anesthetics, analgesics, surgery, euthanasia). Able to explain the procedure of inducing various animal models.	HK
13	Final-Exam		TEAM

Lecturers:

LEF : Dr. dr. Loeki Enggar Fitri, M.Kes., Sp.ParK*
SP : Dr. Drs. Sasangka Prasetyawan, MS.
ATE : Agustin Tri Endharti, S.Si., Ph.D.
SIR : dr. Siwipeni Irmawanti Rahayu, M.Biomed.
TYM : Dr.rer.nat. Tri Yudani Mardining Raras, M.App.Sc.
HS : dr. Hidayat Sujuti, Ph.D., Sp.M.
SMN : Prof. Dr. dr. Sumarno, DMM, Sp.MK(K)
NP : Dr. drg. Nur Permatasari, MS.
HK : Dr. Husnul Khotimah, S.Si., M.Kes.

Teaching and Learning Strategy

Core material will be delivered through lectures and practical works.



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Assessment Methods

Type	Weighting	CLO Assessed	Description
Laboratory reports	50%	1, 2, 3, 4	Complete laboratory work report contains an introduction, the basic principle, the procedure, and the results, following with discussion.
Written exam (mid)	25%	1, 2, 3, 5	The examination will be close book or open book exam with questions on theoretical and application aspects of the instrumentation and biomolecular technique.
Written exam (final)	25%	1, 2, 4, 5	

Learning Sources

Essential reading/resources	<ol style="list-style-type: none">1. Clinical Biochemistry: Techniques and Instrumentation A Practical Course By (author): John S Varcoe (<i>Royal Melbourne Institute of Technology, Australia</i>) 604 pp Mar 2001 ISBN: 978-981-02-4550 4 (hardcover).2. Immunohistochemistry: Basics and Methods Oleh Igor B. Buchwalow, Werner Böcker, Springer 2010.3. The ELISA Guidebook Second Edition Authors: Crowther, John R. 2009.
Further reading/resources	Textbook of Medical Physiology by Khurana

Course Coordinator,

Dr. dr. Loeki Enggar Fitri, M.Kes., Sp.Park