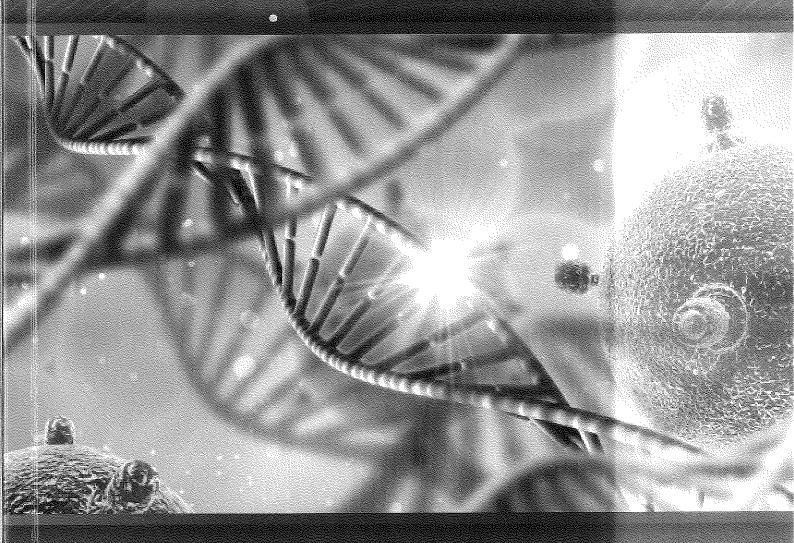
# LABORATORY MANUAL PRACTICAL BIOLOGY BIO0401



DEPARTMENT OF BIOLOGY CENTRE FOR FOUNDATION STUDIES INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

007



HUM Press

## LABORATORY MANUAL PRACTICAL BIOLOGY BIO0401

### DEPARTMENT OF BIOLOGY CENTRE FOR FOUNDATION STUDIES INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA



Gombak • 2018

#### First Print, 2018 ©IIUM Press, 2018

IIUM Press is a member of the Majlis Penerbitan Ilmiah Malaysia - MAPIM (Malaysian Scholarly Publishing Council)

All rights reserved. No Part of this publication may be reproduced, stored in retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

LABORATORY MANUAL: PRACTICAL BIOLOGY (BIO0401)

ISBN 978-967-491-012-9

1. Biology--Laboratory manuals. 2. Government publications--Malaysia.

I. International Islamic University Malaysia. Department of Biology.

Published by **IIUM Press** International Islamic University Malaysia P.O.Box 10, 50728 Kuala Lumpur, Malaysia Tel: +603-6196 5014; Fax: +603-6196 4862/6298

Printed in Malaysia by Alamedia Sdn. Bhd. No. 14, Jalan LP 1A/5, Taman Lestari Perdana, 43300 Seri Kembangan, Selangor, Malaysia

#### CONTENTS

			Page	
	Pref	ace	vii	
	Acki	Acknowledgements		
	About the Book			
	General Introduction to the Laboratory			
	Labo	oratory Safety Guidelines	xv *	
1.	MICROSCOPY I		1	
	1.1	Determining the Magnification	3	
	1.2	Comparing Microscope Images at Different Magnification	4	
	1.3	Determining the Field of View	5	
	1.4	Determining the Depth of Field	6	
	1.5	Using Dissecting Microscope	7	
2.	MICROSCOPY II		9	
	2.1	Using the Ocular Micrometer	10	
	2.2	Handling Immersion Oil Techniques	11	
	2.3	Preparing Wet Mount and Staining	12	
3.	EXAMINATION OF SOME BASIC ANIMAL AND PLANT TISSUES		14	
	3.1	Examination of Some Basic Animal Tissues	14	
	3.2	Examination of Some Basic Plant Tissues	16	
4.	DIS	SECTION OF SMALL MAMMAL: RAT	18	
:	4.1	Dissection of the Rat Digestive System	20	
	4.2	Dissection of the Rat Urogenital System	22	
	4.3	Dissection of the Rat Respiratory System	24	
·	4.4	Dissection of the Rat Circulatory System	25	
5.	REPRODUCTION DEVELOPMENT			
	5.1	Sexual Reproductive System of Plants	28	
	5.2	Sexual Reproductive System of Animals	29	
	5.3	Observation of Frog's Embryo	29	
6.	RESPIRATION		31	
	PART A			
	6.1	Measurement of Resting Heart Rate, After Exercise	31	
		and 1 Minute After Exercise		

	6.2	Measurement of Respiration Rate Before	35
		and After Exercise	
	PART	39	
	6.1	Measurement of Respiration Rate	3)
		At different temperature	
7.	MAN	42	
	7.1	The Vertebrate Skeleton	44
8.		55	
	HUMAN TRAITS AND CHI-SQUARE TEST  8.1 Human Trait Survey		56
0	<b>* * * * * * * * * *</b>	59	
9.	9.1	TER POTENTIAL OF LIVING CELLS  Water Potential of Potato Tuber Cell	59
	• 9.2	Effect of Salt Concentration on An Erythrocyte	. 61
	9.3	Plasmolysis of Onion Cell	63
10.	ECOLOGY		64
	PART A: WATER QUALITY MONITORING		64
	10.1 Turbidity		64
	10.2		65
	10.3	•	65
	10.4	4 Nitrate	66
	10.	5 Phosphate	66
	10.	6 pH	67 -
	PART B: QUADRAT SAMPLING METHOD		68
	10.	an are at all	68
			71
	Re	73	
	In	dex	

#### ABOUT THE AUTHORS



Haliza Hamzah is a teacher at the Biology Department, CFS IIUM since 2009. She graduated in B.Sc. (Hons) (Zoology, University Malaya). Previously, she worked as a teacher at Kolej Matrikulasi Perak. She has more than ten years of teaching experience. She was one of the authors of the Biology Matriculation book. She was appointed as Academic Advisor (Medical & Dentistry) from 2010 to 2012 and Deputy Head from 2013 to 2016.



Kamaril Azlah Teruk (compiler for Experiment 1 and Experiment 6) is a teacher at the Biology Department, CFS IIUM since 2000. She obtained her degree in Bachelor of Science (Biology) from Universiti Putra Malaysia in 1999. She started her teaching career as a Matriculation Biology lecturer (for KPM) at private college in 2000. Currently she is one of the member of Department Biology Publication team and she also involve in Problem Based Learning committee. She is now teaching at CFS IIUM, Gambang Campus.



Nor Sa'adah Mohd Nasohah has been a lecturer at CFS IIUM for eight years and has more than 15 years of teaching experience. She has also experience teaching University of Malaya Foundation programme and Ministry of Education Matriculation Programme. She has been with Ministry of Education Matriculation Division before joining CFS IIUM in 2004. She received her B.Sc. (Hons) and M.Sc. (Plant Tissue Culture and Phytochemistry) qualifications from Universiti Malaya.



Rosmarina Jamaludin started her teaching profession at Kolej Mara Kulim for two years and has been teaching at Biology Department, CFS IIUM since 1999. She received her first degree in Genetics and Molecular Biology from University of Malaya in 1996 and obtained her second degree in Curriculum and Instruction from IIUM in 2014.



Rositi Mashani Mohd Sani has been teaching at the Biology Department, CFS IIUM since 2005 and has total 14 years of teaching experience. She received her degree in B.Sc. (Biochemistry) and earned her postgraduate in M.Sc. (Food Science) from Universiti Kebangsaan Malaysia. She also has experienced in teaching Degree students in Food Science at Management and Science University (MSU) for 2 years. Previously she was one of the Academic Advisor (Pharmacy) and Advisor for MEDCY society Department of Biology which allows her to share her excitement and experiences with students. She also currently appointed as Problem Based Learning Committee and Lab Project Committee for Department of Biology, CFS IIUM.



Shafiyyah Solehah Zahari has joined the Department of Biology CFS IIUM in May 2008. She received her degree in Biomedical Science in year 2007 from International Islamic University Malaysia. She used to teach Diploma students at PTPL Terengganu group of colleges before joining CFS IIUM. Currently she is the Lab Coordinator for Biology Department. Previously she was the Academic Advisor for Pre-Dentistry and Pre-Medical students for 4 years which she enjoyed so much to be engaged with the student's activity. She is appointed as PBL committee, E-learning committee, Sub-assessment committee (Test bank) and Lab project committee for Department of Biology. She is one of the author for Discovering Your Body System, a book published by Pearson.

ISBN 978-967-491-012-9

#### **IIUM Press**

Tel: +603 6196 5014 / 6196 5004 Fax: +603 6196 4862 / 6196 6298 Email: iiumbookshop@iium.edu.my

Website: http://iiumpress.iium.edu.my/bookshop

