



COURSE BOOKLET



BACHELOR OF SCIENCE (HONOURS), **BIOLOGY**

Introduction

Excellence in research and teaching is our aspiration, which is driven by research-active staff from diverse academic and research backgrounds. We offer exciting opportunities to students over a wide variety of topics related to Biological Sciences. Students are exposed to essential fundamental knowledge on ecosystem, biodiversity, plants, animals and microbial and cellular processes in the first 2 years of study. Towards the end of second year, students can choose to specialise in either Microbiology, Animal Biology or Plant Biology leading to a degree in Bachelor of Science (Honours) (Biology), in four years time. In addition, students are also encouraged to register in an optional internship programme (Elective Course) during the semester break at the end of the 3rd year (Semester 2). The 2 months internship programme will provide students with valuable industry and corporate exposures.

Students graduating from the School of Biological Sciences will be equipped with the following knowledge :

1. The diversity of life forms and the reasons for this.
2. The intricate relationships between life forms and their environments.
3. Role of all life forms in maintaining the delicate balance of our ecosystem.
4. Good Laboratory Practices and usage of common and advanced laboratory equipment.
5. Ability to design and implement scientific experiments.
6. Ability to write reports and make scientific presentations.

The knowledge acquired by the students will enable them to make wise decisions with respect to the current global environmental issues such as pollution, environmental deterioration, biodiversity loss, deforestation, global warming and climate change. In addition, the students also develop innovative skills and are able to generate and test new ideas. Students with this essential knowledge will excel in any career path that they choose. The School of Biological Sciences is proud to produce students who can think in a holistic manner to ensure a sustainable tomorrow.

Our programmes are recognised internationally by the Royal Society of Biology, United Kingdom (<https://www.rsb.org.uk/>) starting from the Academic Session of 2019/2020 to 2023/2024.

Vision

Centre of excellence for education and research in the field of biological sciences.

Mission

1. To provide quality and innovative teaching and learning for its entire degree programme.
2. To achieve research excellence.
3. To establish and enhance collaboration with industries for education input and research.
4. To serve the society and country by providing the latest knowledge and technology.

Bachelor of Science (Honours) (Biology)

There are three (3) areas of specialisation/major:-



Microbiology : Students will be equipped with knowledge on microbial growth, genetics, regulation and the importance of microbes to other life forms. Students will also learn basic methods to maintain microbes, cultivation, isolation, enumeration and sterilization procedures. Antigens and human immunological response systems and applied microbiology field will also be part of the course.



Animal Biology : Training in both basic and applied aspects of animal biology will be offered. Students will be also trained to use culture techniques of laboratory animals and to maintain and use related equipments.



Plant Biology : This programme is tailored to train students on the basics of plant biology and its uses and applications in other related disciplines, e.g. agriculture, genetics and biotechnology. Students will be taught various disciplines, which include taxonomy, plant function, biosystematics and environment.

Curriculum and Graduation Structure

In order to qualify for the Bachelor of Science (Honours) (Biology) students are required to fulfill the following requirements :

1. Accumulate a total of 122 – 124 units over a period of not less than 8 semesters (minimum residential requirement of 8 semesters).
2. Fulfill all credit requirements for each course component (Core, Elective/ Minor and University).
3. Obtain a minimum CGPA of 2.00 for the Core courses.
4. Obtain a minimum CGPA of 2.00 for the programme.
5. Obtain a minimum grade C for all of the University courses.

There are 2 types of study mode for students to choose, Minor structure or Elective structure :-

a. Minor Structure

Course Component		Course Code	Units
CORE	Basic • 38 units	T	73 - 76
	Required • 35 - 38 units		
ELECTIVE		E	14 - 15
MINOR		M	16
UNIVERSITY		U	18
TOTAL			122 - 124

b. Elective Structure

Course Component		Course Code	Units
CORE	Basic • 38 units	T	73 - 76
	Required • 35 - 38 units		
ELECTIVE		E	30 - 31
UNIVERSITY		U	18
TOTAL			122 - 124



University Requirements (15-22 units)

Students are required to complete a total of 15 - 22 units of the following courses for University requirements. These courses are compulsory for all students and must obtain a **minimum grade C**.

UNIVERSITY COURSE REQUIREMENT		CREDIT TOTAL	
		Local Students	International Students
General Studies (MPU)			
U1	<p><u>Local Students</u></p> <ul style="list-style-type: none"> HFF225 (Philosophy and Current Issues) (2 credits) HFE224 (Appreciation of Ethics and Civilisations) (2 credits) LKM400 (Bahasa Malaysia IV) (2 credits) <p><u>International Students of Science and Technology</u></p> <ul style="list-style-type: none"> HFF225 (Philosophy and Current Issues) (2 credits) LKM100 (Bahasa Malaysia I) (2 credits) 	6	4
U2 Or U3	<p><u>Local Students</u></p> <ul style="list-style-type: none"> WUS101 (Core Entrepreneurship) (2 credits) English Language Courses (4 credits) <p><u>International Students</u></p> <ul style="list-style-type: none"> SEA205E (Malaysian Studies) (4 credits) English Language Courses (4 credits) 	6	8
U4	Co-curricular courses*	2	2
Options	<p>Skill courses/Foreign Language Courses/ Other courses offered by other schools. Students have to choose any of the following:</p> <ul style="list-style-type: none"> Co-curricular courses Skill courses/Foreign Language Courses/ Other courses offered by other schools 	1-8	1-8
CREDIT TOTAL		15-22	15-22

Core Courses (74 - 76 units)

The Core Courses component is made up of courses of 100, 200, 300 and 400 levels. The courses include Basic Core courses ('Teras Asas') and required Core courses ('Teras Wajib'). Courses in the Basic Core and required Core groups are compulsory where students must attain passing grades.

Basic Core Courses (38 units)

All undergraduate students must enrol and attain passing grades for these courses and must obtain a total of **38 units**. The courses are as follows :-

Year	Semester	Course Code	Course Title	Total Units
1	1	KOT 122/4	Organic Chemistry I	24
	2	MAA 101/4	Calculus (for First Year Science Students)	
	2	KTT 112/4	Inorganic Chemistry I	
	1 or 2	BOI 102/3	Ecology	
		BOI 115/3	Plants and Animals Biodiversity	
		BOI 116/4	Genetics	
		BOI 117/2	Biodiversity and Ecology Practical	
2	1 or 2	BOI 205/4	Biostatistics	11
		BOI 206/4	Principles of Biochemistry	
		BOI 207/3	General Microbiology	
4	1	BOI 401/3	Scientific Writing, Seminar and Current Topics in Biology	3

Required Core Courses (35 - 38 units)

These courses are offered at 300 and 400 levels and have been identified according to each specialisation program namely Microbiology, Animal Biology and Plant Biology. Students must enrol in all required core courses that are listed in their respective field of specialisation. All final year students are also given the option to register for a final year project of 8 units which spans over 2 semesters. At the end of the second semester, a thesis based on the existing regulations and format must be submitted for examination.

Before a student is allowed to register for the final year project in their respective field of specialisation, the student must have achieved these minimum cumulative unit requirement.

- Total overall unit	=	93 - 94 units
- Total unit for Biology courses	=	63 - 64 units

Students who are not able to register for a final year project must substitute the 8 units with BOE 400/2 – Special Topics in Biology (which carries 4 units), while the remaining 4 units are fulfilled by taking elective courses that are suitable with his/her field of specialisation and approved by the programme chairman.

Majoring Into Field Of Specialisation

Students can specialize into three (3) majors; Animal Biology, Microbiology and Plant Biology, in their 3rd year OR when a threshold for his/her Basic Courses' unit have been achieved.

Criteria for selection to major are based on (but not limited exclusively to): 1) GPA-AT, 2) Self-directed Search (SDS) test, 3) Interview. The SBS's Academic Committee will review and approve the placement. Students will be notified of the result before the beginning of a new academic year.

Required core courses for each field of specialisation

FIELD OF SPECIALISATION : MICROBIOLOGY				
Course Code	Course Title	Semester	Prerequisite	
Required Core - Level 300 = 21 Units				
BMT 306/3	Virology	1	BOI 207/3	(S)
BMT 308/3	Mycology	1	BOI 115/3	(S)
BMT 310/3	Bacteriology	1	BOI 207/3	(S)
BMT 305/3	Microbial Physiology	2	BOI 115/3 BOI 206/4 BOI 207/3	(S) (S) (S)
BMT 307/3	Environmental Microbiology	2	BOI 207/4	(S)
BMT 309/3	Microbial Genetics	2	BOI 207/3	(S)
BMT 311/3	Immunology	2	BOI 207/3	(S)
Required Core - Level 400 = 14 Units				
BMT 401/8	Research Project in Microbiology	1 & 2		
BMT 402/3	Medical Microbiology	1	BOI 207/3	(S)
BMT 403/3	Industrial Microbiology	2	BOI 207 /3	(S)



Elective = 15 Units				
BOE 201/3	Biological Instrumentation	1 & 2	BOI 206/4	(C)
BTT 306/3	Techniques in Biotechnology	1 & 2	BOI 206/4	(S)
BOT 205/3	Microscopy and Histological Techniques	1 & 2		
BOA 301/4	Industrial Training	2		
BET 304/4	Introductory Parasitology	1	BOI 115/3	(S)
BTT 305/3	Protein Biochemistry	2	BOI 206/4	(S)
BGT 301/3	Plant Pathology	1	BGT 302/2	(C)
BGT 302/2#	Basic Practical in Plant Pathology	1	BGT 301/3	(C)
BTT 402/3	Fermentation Technology	1	BOI 207/3 BOI 206/4	(S) (S)
BET 403/3	Medical and Veterinary Protozoology	2	BET 304/3	(S)
BTT 404/3	Genetic Engineering	1	BMT 309/3	(S)
BET 405/3	Medical and Veterinary Helminthology	2	BET 304/4	(S)
BME 401/3	Soil Microbiology	2	BOI 207/3	(S)
BME 402/3	Microbial Genomics	2	BOI 207/3	(S)
BOE 400/4*	Critical Review in Biology	1 & 2		

Elective (15 units under Minor structure or 30 units under Elective structure)

Students **MUST** choose among the listed courses to complete a total of 15 or 31 units for Elective.

BGT302 course is given priority to students who register as their core. For students who want to apply as electives, they need to obtain permission from the instructors of this course.

* This course is open ONLY to student with special approval from the Dean, to replace the Research Project and requires 4 more units from other Elective courses.

(S) = Course must be taken in sequential order.

(C) = Course must be taken concurrently.

FIELD OF SPECIALISATION: ANIMAL BIOLOGY				
Course Code	Course Title	Semester	Prerequisite	
Required Core - Level 200 and 300 = 19 Units				
BOT 205/3	Microscopy and Histological Techniques	1 & 2		
BZT 304/3	Invertebrate Zoology	1	BOI 115/3	(S)
BZT 305/3	Vertebrate Zoology	1	BOI 115/3	(S)
BZT 308/2	Animal Taxonomy Practical	1	BOI 115/3 BZT 304/3 BZT 305/3	(S) (C) (C)
BZT 306/3	Animal Behaviour	2	BOI 115/3	(C)
BZT 307/3	Animal Physiology	2	BOI 115/3	(S)
BZT 309/2	Animal Physiology and Behaviour Practical	2	BZT 306/3 BZT 307/3	(C) (S)
Required Core - Level 400 = 17 Units				
BZT 401/8	Research Project in Animal Biology	1 & 2		
BZT 402/3	Biology of Vertebrate Pest Animals	1	BOI 115/3	(S)
BZT 403/3	Plant - Animal Interaction	1	BOI 115/3	(S)
BZT 404/3	Animal Conservation Genetic	2	BOI 115/3 BOI 116/4	(S) (S)

Resources

Elective = 14 Units

BOE 201/3	Biological Instrumentation	1 & 2	BOI 206/4	(C)
BOA 301/4	Industrial Training	2		
BET 304/4	Introductory Parasitology	1	BOI 115/3	(S)
BET 305/4	Insect Biology and Systematics	1	BOI 115/3	(S)
BST 307/3	Population and Community Ecology	2	BOI 102/3	(S)
BAT 307/3	Ichthyology	1	BOI 115/3	(S)
BAT 305/3	Benthic Biology and Ecology	2	BOI 102/3	(S)
BST 308/3	Tropical Ecosystems and Climate Change	2	BOI 102/3	(S)
BET 406/3	Integrated Pest Management	2	BET 305/4	(S)
BST 405/3	Conservation Ecology and Natural Resources	1	BST 308/3	(S)
BST 402/3	Ecology of Invasive Species	1	BOI 102/3 BOI 117/2	(S) (S)
BST 404/3	Wildlife Ecology & Management	2	BST 307/3	(S)
BOE400/4*	Critical Review in Biology	1 & 2		

Elective (14 units under Minor structure or 30 units under Elective structure)

Students **MUST** allowed to choose among the listed courses to complete a total of 14 or 30 units for Elective.

* This course is open ONLY to student with special approval from the Dean, to replace the Research Project and requires 4 more units from other Elective courses.

(S) = Course must be taken in sequential order.

(C) = Course must be taken concurrently.

FIELD OF SPECIALISATION: PLANT BIOLOGY				
Course Code	Course Title	Semester	Course Prerequisite	
Required Core - Level 300 = 18 Units				
BBT 308/3	Tropical Plant Ecology	1	BOI 115/3	(S)
BBT 309/4	Plant Structure and Evolution	1	BOI 115/3	(S)
BBT 305/4	Plant Physiology and Development	2	BOI 115/3	(S)
BBT 306/4	Plant Biosystematics and Taxonomy	2	BOI 115/3	(S)
BBT 307/3	Enthnobotany	2	BOI 115/3	(S)
Required Core - Level 400 = 20 Units				
BBT 401/8	Research Project in Plant Biology	1 & 2		
BBT 402/3	Plant Genetics	1	BOI 116/4 BOI 206/4	(S) (S)
BBT 404/3	Economy Botany	1	BOI 115/3	(S)
BBT 403/3	Plant Molecular Biology	2	BOI 116/4 BOI 206/4 BBT 402/3	(S) (S) (S)
BBT 405/3	Plant Tissue Culture	2	BOI 115/3 BOI 206/4	(S) (S)

Elective = 14 Units				
BOE 201/3	Biological Instrumentation	1 & 2	BOI 206/4	(C)
BOT 205/3	Microscopy and Histological Techniques	1 & 2		
BOA 301/4	Industrial Training	2		
BGT 301/3	Plant Pathology	1	BGT 302/2	(C)
BST 306/3	Soil Science and Environment	1	BOI 102/3	(S)
BST 308/3	Tropical Ecosystems and Climate Change	2	BOI 102/3	(S)
BMT 308/3	Mycology	1	BOI 115/3	(S)
BST 307/3	Population and Community Ecology	2	BOI 102/3	(S)
BST 405/3	Conservation Ecology and Natural Resources	1	BST 308/3	(S)
BST 402/3	Ecology of Invasive Species	1	BOI 102/3 BOI 117/2	(S) (S)
BGT 302/2#	Basic Practical in Plant Pathology	1	BGT 301/3	(S)
BGT 404/3	Horticultural Science	2	BOI 116/4	(S)
BZT 403/3	Plant-Animal Interaction	1	BOI 115/3	(S)
BOE400/4*	Critical Review in Biology	1 & 2		
<p>Elective (14 units under Minor structure or 30 units under Elective structure)</p> <p>Students MUST choose among the listed courses to complete a total of 14 or 30 units for Elective.</p> <p># BGT302 course is given priority to students who register as their core. For students who want to apply as electives, students need to obtain permission from the instructors of this course.</p> <p>* This course is open ONLY to student with special approval from the Dean, to replace the Research Project and requires 4 more units from other Elective courses.</p>				

(S) = Course must be taken in sequential order.

(C) = Course must be taken concurrently.

Proposed Curriculum Structure, Bachelor of Science (Honours) (Biology)

Year	Sem	Basic Core (36 units)	Required Core (35-38 units)		
			Microbiology (35 units)	Plant Biology (38 units)	Animal Biology (36 units)
1	1	BOI 102/3			
		BOI 115/3			
		BOI 117/2			
		KOT 122/4			
	2	BOI 116/4			
		KTT 112/4			
		MAA 101/4			
2	1	BOI 205/4			
		BOI 207/3			
	2	BOI 206/4			
3	1		BMT 306/3	BBT 308/3	BZT 304/3
			BMT 308/3	BBT 309/4	BZT 305/3
			BMT 310/3		BZT 308/2
	2		BMT 305/3	BBT 305/4	BZT 306/3
			BMT 307/3	BBT 306/4	BZT 307/3
			BMT 309/3	BBT 307/3	BZT 309/2
			BMT 311/3		
4	1	BOI 401/3	BMT 401/4	BBT 401/4	BZT 401/4
			BMT 402/3	BBT 402/3	BZT 402/3
				BBT 404/3	BZT 403/3
	2		BMT 401/4	BBT 401/4	BZT 401/4
			BMT 403/3	BBT 403/3	BZT 404/3
				BBT 405/3	
TOTAL		38	35	38	36

	Elective (14-15 units)	Minor (16 unit)	University (18 units)	TOTAL
			WUS 101/2	14
			LKM 100/2 OR	18
			LKM 400/2	
			University/4	
	BOE201/3	Minor/4	HFF 225/2	18
			University/2	
	BOT205/3	Minor/4	HFE 224/2	15
			University/2	
	Elective/3	Minor/4		14-16
		Minor/4	University/2	14-18
	Elective/3			13-16
	Elective/3			10-13
	14-15	16	18	



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