

BUKU PANDUAN PROGRAM PENGAJIAN PRASISWAZAH

*UNDERGRADUATE STUDY
PROGRAMME HANDBOOK*



**SESI AKADEMIK
ACADEMIC SESSION
2018/2019**

**FAKULTI
SAINS PERTANIAN DAN
MAKANAN**
*FACULTY OF AGRICULTURE AND
FOOD SCIENCE*

FAKULTI SAINS PERTANIAN DAN MAKANAN

Maklumat Am

Sejarah UPMKB bermula dengan penubuhan sebuah kampus sementara di Semenggok, Kuching pada 10 Ogos 1974. Kampus ini telah berkembang dan berpindah ke kampus tetap yang lebih selesa di Bintulu, Sarawak pada bulan Jun 1987. Dengan kawasan kampus seluas 714 hektar, kampus ini telah mengorak langkah demi mencapai matlamat ketiga pelan strategik UPM 2001-2010 iaitu untuk meningkatkan keupayaan UPM sebagai pusat pengajian dan perkhidmatan pertanian serta biosumber terkemuka di peringkat antarabangsa. Menerusi proses penstrukturkan semula UPMKB bermula tahun 2018, lima tujuan utama telah dikenalpasti iaitu pertanian, perhutanan, kimia industri, tenaga boleh diperbaharui dan ekonomi sosial.

Fakulti Sains Pertanian dan Makanan terdiri dari lima jabatan akademik iaitu Jabatan Sains Tanaman, Jabatan Sains Perhutanan, Jabatan Sains Sosial, Jabatan Sains Asasi dan Kejuruteraan serta Jabatan Sains Haiwan dan Perikanan. Program yang ditawarkan oleh FSPM mempunyai kebolehpasaran graduan yang tinggi kerana program pengajian yang relevan dan bertepatan dengan keperluan industri tempatan. Pelajar akan memperolehi pengalaman pembelajaran di dalam dan luar kelas yang komprehensif sambil dibantu oleh pensyarah yang kebanyakannya berkelulusan ijazah PhD. Kini, fakulti ini menawarkan 7 program Diploma, 3 program Bacelor, 1 program pra-Diploma, Master dengan tesis dan PhD. Umumnya, fakulti ini mampu menampung seramai 3000 orang pelajar menjelang tahun 2021.

FACULTY OF AGRICULTURE AND FOOD SCIENCES

General Information

The history of UPMKB began with the establishment of a temporary campus at Semenggok, Kuching on August 10, 1974. The campus has expanded and moved to a more comfortable fixed campus in Bintulu, Sarawak in June 1987. With a 714-hectare campus area, this campus has begun its steps in achieving the third goal of UPM's 2001-2010 strategic plan to enhance UPM's capabilities as an internationally recognized center of study and agricultural services and bioresource. Through the restructuring of UPMKB beginning 2018, five main thrusts have been identified namely agriculture, forestry, industrial chemistry, renewable energy and social economy.

The Faculty of Agricultural Science and Food consists of five academic departments namely the Department of Crop Science, the Department of Forestry Science, the Department of Social Sciences, the Department of Science and Engineering and the Department of Animal and Fishery Sciences. The program offered by FSPM has high graduate employability due to its program relevance in accordance to the needs of the local industries. Students will gain comprehensive in-class and outdoor learning assisted by lecturers who are mostly with a PhD degree. Currently, the faculty offers 7 Diploma programs, 3 Bachelor programs, 1 pre-Diploma program, Master with thesis and PhD. Generally, this faculty is able to accommodate 3000 students by 2021.

Pengurusan Fakulti

Dekan/ Dean

Prof. Madya Dr. Shahrul Razid Sarbini

Timbalan Dekan Akademik

Deputy Dean (Academic)

Dr. John Keen Chubo

Ketua Jabatan Sains Tanaman

Head, Department of Crop Science

Dr. Wan Asrina Wan Yahaya

Ketua Jabatan Sains Perhutanan

Head, Department of Forestry Science

Dr. Roland Kueh Jui Heng

Ketua Jabatan Sains Asasi Dan Kejuruteraan

Head, Department of Basic Science And Engineering

P.M. Dr Yiu Pang Hung

Ketua Jabatan Sains Sosial

Head, Department of Social Science

Dr. Neilson Anak Teruki

Ketua Jabatan Sains Haiwan dan Perikanan

Head, Department of Animal Science and Fishery

Dr. Kamil bin Latif

Program Prasiswazah yang Ditawarkan

Bachelors

1. Bachelor Sains Bioindustri [*Bachelor of Bioindustrial Science*]
2. Bachelor Sains Akuakultur [*Bachelor of Agriculture (Aquaculture)*]
3. Bachelor Sains Perhutanan [*Bachelor of Forestry Science*]

ELEX PACKAGE STUDY SCHEME FOR FOUR-YEAR PROGRAMMES
(Effective for September 2018 intake and above)

MUET Band	TOEFL/IELTS Score	CIEP Level	Graduation Requirements for 4-year programmes
1 & 2	-	107	3 BBI + 3 CEL + 24 LAX points
3 & 4	TOEFL 500 - 599 IELTS 5.5 - 6.5	108 – 109	2 BBI + 2 CEL + 24 LAX points
5 & 6	TOEFL 600 - 677 IELTS 7.0 - 9.0	-	2 LPE + 1 CEL + 24 mata LAX atau 1 LPE + 1 CEL + 24 mata LAX (+1 bahasa global)

Sem	4 - Years Programme		
	MUET/UTEIS 1 & 2 CIEP 107	MUET 3 & 4 CIEP 108 - 109 TOEFL 500 - 599 IELTS 5.5 - 6.5	MUET/UTEIS 5 & 6 TOEFL 600 - 677 IELTS 7.0 - 9.0
Sem 1	BBI2422	6 LAX points	6 LAX points
Sem 2	6 LAX points	CEL2102	CEL2103
Sem 3	BBI2423	BBI2424	BBI2424 / LPE2502 / LPE2402 / Global Language
Sem 4	BBI2424	6 LAX points	6 LAX points
Sem 5	12 LAX points	Cel2103	BBI2424 / LPE2502 / LPE2402 / Global Language
Sem 6	CEL2103	Choose ONE : CEL2102/2105/2106/2107	6 LAX points
Sem 7	Choose ONE : CEL2105/2106/2107	6 LAX points	6 LAX points
Sem 8	6 LAX points	6 LAX points	-

Students must follow the prescribed scheme of study based on their MUET results (or equivalent) every semester.

- MUET Band 5 and 6 students can choose to enrol in either two LPE courses or one BBI course and one global language.
- Students who are away on Industrial Training in any semester do have not to enrol in any course or LAX activity for that particular semester. However, they must enrol in a course or LAX activity in the prior or subsequent semester (subject to course pre-requisites).

ELEX Package Information

I. BBI Courses [(2+1) credits]

- BBI 2422 (Reading for Academic Purposes)
- BBI 2423 (Academic Interaction and Presentation)
- BBI 2424 (Academic Writing)
- LPE2402 – for MUET Band 5 & 6 students only

- LPE2502 – for MUET Band 5 & 6 students only

Note: If students fail in a BBI course, they must repeat and pass the course before they can enrol in a subsequent BBI course.

II. CEL Courses

- CEL 2102 (Effective Listening and Speaking)
- CEL 2103 (Writing Academic Texts)
- CEL 2105 (Spoken Communication for the Workplace)
- CEL 2106 (Communication for Professional Development)
- CEL 2107 (Written Business Communication)

Note: If students obtain LEVEL 1, they must repeat and pass the course (LEVEL 2 and above).

III. LAX

- LAX (6 points or 12 points); 1 point = 2 hours per week
- 6-point LAX = 6 weeks x 2 hours per week
- 12-point LAX = 12 weeks x 2 hours per week

Note: If students obtain TM (*Tidak Memuaskan*/Unsatisfactory), they must enrol in the same or different LAX activity to replace the failed points. Students must ensure that they fulfil the required number of LAX points for graduation.

IV. Pre-requisites for courses

- BBI 2422: MUET Band 1 – 2/equivalent
- BBI 2423: CEL 2102 Level 2 or MUET Band 3 – 4/equivalent
- BBI 2424: Passed BBI 2423
- CEL 2103: Passed BBI 2424 or MUET Band 5 – 6/equivalent
- CEL 2102, 2105, 2106, 2107: No prerequisite required

STRUKTUR KURIKULUM / CURRICULUM STRUCTURE

Nama Program : **Bachelor Sains Bioindustri / Bachelor of Bioindustrial Science**

Jumlah Kredit Bergraduat : **132 Jam Kredit / Credit Hours**

Tempoh Pengajian : **8 Semester / Semesters (4 Tahun / Years)**

- Matlamat Program** :
1. Melahirkan graduan profesional yang berketrampilan dan beretika dalam mengurus serta menggunakan sumber biologi secara mesra alam dan lestari bagi pembangunan sektor industri biologi negara.
 2. Melahirkan graduan profesional yang mahir dan berdaya saing dalam memenuhi pasaran gunatenaga industri berdasarkan sumber biologi negara.
 3. Melahirkan graduan profesional yang mampu meneroka dan mewujudkan peluang pekerjaan baharu dalam bidang keusahawanan secara komersial dan berteknologi tinggi menggunakan sumber biologi sedia ada.

RINGKASAN HASIL PEMBELAJARAN PROGRAM

Program	Pengetahuan								
	Kemahiran Teknikal/ Praktikal/ Psikomotor	Pendekatan Kemahiran Berfikir dan Saintifik	Kemahiran Berkommunikasi	Kemahiran Sosial dan Bertanggungjawab	Professionalisme, Nilai, Sikap dan Etika	Pendidikan Sepanjang Hayat dan Pengurusan Informasi	Kemahiran Pengurusan dan Keusahawanan	Kemahiran Kepimpinan	
	P1	P2	P3	P4	P5	P6	P7	P8	P9
Bachelor Sains Bioindustri	30	18	28	7	12	17	21	8	6

1. Kursus Universiti / University Courses (21 Kredit / 21 Credits)

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A	PRASYARAT / PREREQUISITE
BBI2423	Reading for Academic Purposes	3	2	1	Tiada / None
BBI2424	Academic Interaction and Presentation	3	2	1	Tiada / None
KOM3403	Pengucapan Awam / Public Oration	3	3	0	Tiada / None
PRT2008	Pertanian dan Manusia / Agriculture and Man	2	2	0	Tiada / None
SSK3000	Teknologi Maklumat dan Penggunaannya / Information Technology and its Applications	3	2	1	Tiada / None
SKP2101	Kenegaraan Malaysia / Malaysian Nationhood	3	3	0	Tiada / None

SKP2203	Tamadun Islam dan Tamadun Asia / <i>Islamic Civilization and Asian Civilization</i>	2	2	0	Tiada / None
SKP2204	Hubungan Etnik / <i>Ethnic Relation</i>	2	2	0	Tiada / None

2. Kursus Teras / Core Courses (78 Kredit / Credits)

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A	PRASYARAT / PREREQUISITE
AFS2001	Program Buku Hijau / <i>Green Book Programme</i>	2	0	2	Tiada / None
AHP3507	Pengeluaran dan Pengurusan Hasilan Ternakan / <i>Production and Management of Livestock Products</i>	3	2	1	Tiada / None
PRT3402	Biokimia Pertanian / <i>Agricultural Biochemistry</i>	3	2	1	Tiada / None
CAG3000	Diversiti Mikroorganisma dan Tumbuhan / <i>Microorganism and Plant Diversity</i>	3	2	1	Tiada / None
BGY3201	Struktur dan Fungsi Tumbuhan / <i>Plant Structure and Function</i>	3	2	1	Tiada / None
CAG3003	Pengeluaran dan Pengurusan Tanaman/ <i>Crop Production and Management</i>	3	2	1	Tiada / None
CAG3004	Pembibitan Tumbuhan dan Pengurusan Semaian / <i>Plant Propagation and Nursery Management</i>	3	2	1	Tiada / None
BIP3301	Prinsip Pemprosesan Bioproduk / <i>Principles in Bioproduct Processing</i>	3	2	1	Tiada / None
BIP3402	Rekabentuk Eksperimen dan Analisis / <i>Experimental Design and Analysis</i>	3	2	1	Tiada / None
BIP3302	Bioteknologi Bioindustri / <i>Bioindustrial Biotechnology</i>	3	2	1	Tiada / None
CHM3010	Kimia Fizik dan Tak Organik / <i>Physical and Inorganic Chemistry</i>	4	3	1	Tiada / None
SEC3101	Ekonomi Bioindustri / <i>Bioindustrial Economics</i>	3	3	0	Tiada / None
MTH3003	Statistik bagi Sains Gunaan / <i>Statistics for Applied Sciences</i>	4	3	1	Tiada / None
CSS3700	Sains Tanah / <i>Soil Science</i>	3	2	1	Tiada / None
CSS3702	Sumber Air dan Iklim / <i>Water Resources and Climate</i>	3	2	1	Tiada / None
CSS3701	Pengurusan Kesuburan Tanah dan Tanaman / <i>Crop and Soil Fertility Management</i>	3	2	1	Tiada / None
CIT4901	Latihan Industri / <i>Industrial Training</i>	12	0	12	Tiada / None

CFP4999	Projek Ilmiah Tahun Akhir / <i>Final Year Academic Project</i>	6	0	6	Tiada / None
CAG3001	Amalan Perladangan Tanaman Tahunan / <i>Annual Crop Farming Practices</i>	1	0	1	Tiada / None
CAG3002	Amalan Perladangan Tanaman Industri / <i>Plantation Practices in Industrial Crops</i>	1	0	1	Tiada / None
CES2241	Pengembangan Pertanian / <i>Agricultural Extension</i>	3	2	1	Tiada / None
CPP3600	Perlindungan Tumbuhan / <i>Plant Protection</i>	3	2	1	Tiada / None
MGM3180	Asas Keusahawanan / <i>Basic Entrepreneurship</i>	3	2	1	Tiada / None

3. Kursus Elektif / *Elective Course (33 Jam Kredit / Credit Hours)*

i. Kursus Elektif Opsyen Pengeluaran Primer / *Elective Courses for Primary Production Option*

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A	PRASYARAT / PREREQUISITE
AHP4504	Sistem Penternakan Bersepadu / <i>Integrated Livestock Systems</i>	3	2	1	Tiada / None
CAT4100	Pertanian Persis / <i>Precision Agriculture</i>	3	2	1	Tiada / None
CAT4102	Kultur Tisu Tumbuhan / <i>Plant Tissue Culture</i>	3	2	1	Tiada / None
CAT4106	Pengurusan Sisa Pertanian / <i>Agricultural Waste Management</i>	3	2	1	Tiada / None
CAG4101	Teknologi Biji Benih / <i>Seed Technology</i>	3	2	1	Tiada / None
CPP4600	Sains Racun Perosak / <i>Pesticide Science</i>	3	2	1	Tiada / None
AHP4401	Pemakanan Ternakan / <i>Animal Nutrition</i>	3	2	1	Tiada / None
CAG4000	Pemakanan Tanaman / <i>Crop Nutrition</i>	3	2	1	Tiada / None
CAG4001	Pembibkaan Tumbuhan / <i>Plant Breeding</i>	3	2	1	Tiada / None
CAG4002	Botani Tumbuhan / <i>Plant Botany</i>	3	2	1	Tiada / None
CAG4003	Ekonomi Botani / <i>Economic Botany</i>	3	2	1	Tiada / None
CPP4601	Pengurusan Perosak / <i>Pest Management</i>	3	2	1	Tiada / None
CPT4802	Teknologi Lepastuai / <i>Postharvest Technology</i>	3	2	1	Tiada / None
CSS4701	Pengurusan Tanah Lestari / <i>Sustainable Land Management</i>	3	2	1	Tiada / None
SAB4401	Pemasaran Produk Agro-Bio / <i>Marketing of Agro-bio Product</i>	3	2	1	Tiada / None

SFC3200	Kaedah Instrumentasi / <i>Instrumental Methods</i>	3	1	2	Tiada / None
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ii. Kursus Elektif Opsyen Pengurusan dan Utilisasi Sisa / *Elective Courses for Management and Wastes Utilisation Option*

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A	PRASYARAT / PREREQUISITE
AHP4401	Pemakanan Ternakan / <i>Animal Nutrition</i>	3	2	1	Tiada / None
AHP4504	Sistem Penternakan Bersepadu / <i>Integrated Livestock Systems</i>	3	2	1	Tiada / None
CAG4000	Pemakanan Tanaman / <i>Crop Nutrition</i>	3	2	1	Tiada / None
CAT4100	Pertanian Persis / <i>Precision Agriculture</i>	3	2	1	Tiada / None
CAT4103	Mikrobiologi Gunaan / <i>Applied Microbiology</i>	3	2	1	Tiada / None
CAT4104	Mikrobiologi Makanan / <i>Food Microbiology</i>	3	2	1	Tiada / None
CAT4105	Teknologi Fermentasi / <i>Fermentation Technology</i>	3	2	1	Tiada / None
CAT4106	Pengurusan Sisa Pertanian / <i>Agricultural Waste Management</i>	3	2	1	Tiada / None
CAT4107	Rawatan Air dan Air Kumbahan / <i>Water and Waste Water Treatment</i>	3	2	1	Tiada / None
CAT4108	Pengurusan Sisa Perbandaran, Berbahaya dan Bioperubatan / <i>Municipal, Hazardous and Biomedical Waste Management</i>	3	2	1	Tiada / None
CPP4600	Sains Racun Perosak / <i>Pesticide Science</i>	3	2	1	Tiada / None
CPT4803	Pemprosesan Produk Semulajadi / <i>Natural Product Processing</i>	3	2	1	Tiada / None
CSS4700	Ekologi Pencemaran / <i>Pollution Ecology</i>	3	2	1	Tiada / None
CSS4701	Pengurusan Tanah Lestari / <i>Sustainable Land Management</i>	3	2	1	Tiada / None
SAB4401	Pemasaran Produk Agro-Bio / <i>Marketing of Agro-bio Product</i>	3	2	1	Tiada / None
SFC3200	Kaedah Instrumentasi / <i>Instrumental Methods</i>	3	1	2	Tiada / None

iii. Kursus Elektif Opsyen Pemprosesan Hiliran / *Elective Courses for Downstream Processing Option*

KOD KURSUS/ COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A	PRASYARAT/ PREREQUISITE
AHP4504	Sistem Penternakan Bersepadu / <i>Integrated Livestock Systems</i>	3	2	1	Tiada / None
CAT4105	Teknologi Fermentasi / <i>Fermentation Technology</i>	3	2	1	Tiada / None
CAT4100	Pertanian Persis / <i>Precision Agriculture</i>	3	2	1	Tiada / None
CAT4103	Mikrobiologi Gunaan / <i>Applied Microbiology</i>	3	2	1	Tiada / None
CAT4104	Mikrobiologi Makanan / <i>Food Microbiology</i>	3	2	1	Tiada / None
CAT4106	Pengurusan Sisa Pertanian / <i>Agricultural Waste Management</i>	3	2	1	Tiada / None
CPT4800	Kimia dan Pemprosesan Hasilan Komoditi Tumbuhan / <i>Chemistry and Processing of Plant Based Commodities</i>	3	2	1	Tiada / None
CPT4801	Kimia dan Pemprosesan Hasilan Komoditi Haiwan / <i>Chemistry and Processing of Animal Based Commodities</i>	3	2	1	Tiada / None
CPT4802	Teknologi Lepastuai / <i>Postharvest Technology</i>	3	2	1	Tiada / None
CPT4803	Pemprosesan Produk Semulajadi / <i>Natural Product Processing</i>	3	2	1	Tiada / None
CPT4804	Pengendalian dan Pengangkutan Produk Bioindustri / <i>Handling and Transportation of Bioindustry Product</i>	3	2	1	Tiada / None
CPT4805	Teknologi Pemprosesan Hiliran / <i>Downstream Processing Technology</i>	3	2	1	Tiada / None
CPT4806	Teknologi Pemprosesan Hasilan Tanaman / <i>Crop Produce Processing Technology</i>	3	2	1	Tiada / None
CSS4701	Pengurusan Tanah Lestari / <i>Sustainable Land Management</i>	3	2	1	Tiada / None
SAB4401	Pemasaran Produk Agro-Bio / <i>Marketing of Agro-bio Product</i>	3	2	1	Tiada / None
SFC3200	Kaedah Instrumentasi / <i>Instrumental Methods</i>	3	1	2	Tiada / None

Nota/ Notes : Kr = Jam Kredit / Credit Hour, K = Kuliah / Lecture, A = Amali / Laboratory

SKEMA PENGAJIAN/ STUDY SCHEME

TAHUN 1 / 1ST YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
PRT2008	Pertanian dan Manusia / <i>Agriculture and Man</i>	2	2	0
SKP2101	Kenegaraan Malaysia	3	3	0
SSK3000	Teknologi Maklumat dan Penggunaannya / <i>Information Technology and its Applications</i>	3	2	1
CAG3000	Diversiti Mikroorganisma dan Tumbuhan / <i>Microorganism and Plant Diversity</i>	3	2	1
MTH3003	Statistik bagi Sains Gunaan / <i>Statistics for Applied Sciences</i>	4	3	1
JUMLAH/ TOTAL		15	12	3

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
BBI2423	Academic Interaction and Presentation	3	2	1
KOM3403	Pengucapan Awam / <i>Public Oration</i>	3	3	0
SKP2203	Tamadun Islam dan Tamadun Asia / <i>Islamic Civilization and Asian Civilization</i>	2	2	0
SKP2204	Hubungan Etnik / <i>Ethnic Relation</i>	2	2	0
BGY3201	Struktur dan fungsi tumbuhan / <i>Plant Structure and Function</i>	3	2	1
CAG3001	Amalan Perladangan Tanaman Tahunan / <i>Annual Crop Farming Practices</i>	1	0	1
CHM3010	Kimia Fizik dan Tak Organik / <i>Physical and Inorganic Chemistry</i>	4	3	1
JUMLAH/ TOTAL		18	14	4

TAHUN 2 / 2ND YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
BBI2424	Academic Writing	3	2	1
AHP3507	Pengeluaran dan Pengurusan Hasilan Ternakan / <i>Production and Management of Livestock Products</i>	3	2	1
CAG3003	Pengeluaran dan Pengurusan Tanaman / <i>Crop Production and Management</i>	3	2	1

CAG3002	Amalan Perladangan Tanaman Industri / <i>Plantation Practices in Industrial Crops</i>	1	0	1
CPP3600	Perlindungan Tumbuhan / <i>Plant Protection</i>	3	2	1
CSS3700	Sains Tanah / <i>Soil Science</i>	3	2	1
PRT3402	Biokimia Pertanian / <i>Agricultural Biochemistry</i>	3	2	1
QKXxxx	Kokurikulum / <i>Cocurriculum</i>	1	0	1
JUMLAH /TOTAL		20	12	8

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
AFS2001	Program Buku Hijau / <i>Green Book Programme</i>	2	0	2
BIP3301	Prinsip Pemprosesan Bioproduk / <i>Principles in Bioproduct Processing</i>	3	2	1
CAG3004	Pembibakan Tumbuhan dan Pengurusan Semaian / <i>Plant Propagation and Nursery Management</i>	3	2	1
CSS3701	Pengurusan Kesuburan Tanah dan Tanaman / <i>Crop and Soil Fertility Management</i>	3	2	1
MGM3180	Asas Keusahawanan / <i>Basic Entrepreneurship</i>	3	2	1
SEC3101	Ekonomi Bioindustri / <i>Bioindustrial Economics</i>	3	3	0
QKXxxx	Kokurikulum / <i>Cocurriculum</i>	1	0	1
JUMLAH / TOTAL		18	11	7

TAHUN 3 / 3RD YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
BIP3302	Bioteknologi Bioindustri / <i>Bioindustrial Biotechnology</i>	3	2	1
BIP3402	Rekabentuk Eksperimen dan Analisis / <i>Experimental Design and Analysis</i>	3	2	1
CES2241	Pengembangan Pertanian / <i>Agricultural Extension</i>	3	2	1
CSS3702	Sumber Air dan Iklim / <i>Water Resources and Climate</i>	3	2	1
Elektif / <i>Elective</i>		6	4	2
JUMLAH /TOTAL		18	12	6

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
CIT4901	Latihan Industri / <i>Industrial Training</i>	12	0	12
JUMLAH /TOTAL		12	0	12

TAHUN 4 / 4TH YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
CFP4999A	Projek Ilmiah Tahun Akhir / <i>Final Year Academic Project</i>	3	0	3
	Elektif / <i>Elective</i>	15	10	5
JUMLAH /TOTAL		18	10	8

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
CFP4999B	Projek Ilmiah Tahun Akhir / <i>Final Year Academic Project</i>	3	0	3
	Elektif / <i>Elective</i>	12	8	4
JUMLAH /TOTAL		15	8	7

Nota/Notes :

1. Pelajar diwajibkan memilih 2 kredit daripada kursus kokurikulum yang ditawarkan oleh universiti. / *Students are required to select 2 credits from the cocurriculum courses offered by the university.*
2. Pelajar perlu melengkapkan pakej keperluan bahasa inggeris seperti jadual di bawah: Butiran lanjut mengenai CEL dan LAX sila rujuk di muka surat 3 buku panduan ini./ *Students need to complete the english package as the table below : For more details on CEL and LAX please refer to page 3 of this book.*

MUET Band	TOEFL/IELTS Score	CIEP Level	Graduation Requirements
1 & 2	-	107	3 BBI + 3 CEL + 24 LAX points
3 & 4	TOEFL 500 - 599 IELTS 5.5 - 6.5	108 – 109	2 BBI + 2 CEL + 24 LAX points
5 & 6	TOEFL 600 - 677 IELTS 7.0 – 9.0	-	2 LPE + 1 CEL + 24 LAX points atau 1 LPE + 1 CEL + 24 LAX points (+1 Global Language)

STRUKTUR KURIKULUM / CURRICULUM STRUCTURE

Nama Program : **Bachelor Pertanian (Akuakultur) / Bachelor of Agriculture (Aquaculture)**
Jumlah Kredit Bergraduat : **127 Jam Kredit / Credit Hours**
Tempoh Pengajian : **8 Semester / Semesters (4 Tahun / Years)**

Matlamat Program :
1. Melahirkan pegawai perikanan dalam bidang akukultur yang berpengetahuan dalam aspek teori dan praktikal serta berdaya saing.
2. Melahirkan pegawai perikanan yang boleh mengaplikasi ilmu pengetahuan dalam mengurus dan melaksanakan penyelidikan secara teknikal dan beretika.
3. Melahirkan pegawai perikanan yang berkebolehan mengurus industri akuakultur secara berdikari atau berkhidmat dengan agensi berkaitan.

RINGKASAN HASIL PEMBELAJARAN PROGRAM

Program	Pengetahuan	Kemahiran Teknikal/ Praktikal/ Psikomotor	Pendekatan Kemahiran Berfikir dan Saintifik	Kemahiran Berkomunikasi	Kemahiran Sosial dan Bertanggungjawab	Professionalisme, Nilai, Sikap dan Etika	Pendidikan Sepanjang Hayat dan Pengurusan Informasi	Kemahiran Pengurusan dan Keusahawanan	Kemahiran Kepimpinan
		P1	P2	P3	P4	P5	P6	P7	P8
Bachelor Pertanian (Akuakultur)	38	12	15	11	8	14	15	10	2

1. Kursus Universiti / University Courses (22 Kredit / Credits)

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A	PRASYARAT / PREREQUISITE
SKP2203	Tamadun Islam dan Tamadun Asia / <i>Islamic Civilization and Asian Civilization</i>	2	2	0	Tiada / None
SKP2204	Hubungan Etnik / <i>Ethnic Relations</i>	2	2	0	Tiada / None
PPT3701	Keusahawanan Pertanian / <i>Agricultural Entrepreneurship</i>	3	1	2	Tiada / None
SKP2101	Kenegaraan Malaysia / <i>Malaysian Nationhood</i>	3	3	0	Tiada / None
TKP3206	Pengembangan Akuakultur / <i>Aquaculture Extension</i>	2	1	1	Tiada / None
BBI2423	Interaksi Akademik dan Pembentangan / <i>Academic Interaction and Presentation</i>	3	2	1	BBI2422 atau CEL2102 Tahap 2

BBI2424	Penulisan Akademik / Academic Writing	3	2	1	BBI2423
PRT2008	Pertanian dan Manusia / Agriculture and Man	2	2	0	Tiada / None
QKS2112	Renang Asas / Basic Swimming	1	0	1	Tiada / None
QKXxxxx	Kokurikulum / Cocurriculum	1	0	1	

Pelajar diwajibkan mengambil satu kredit kursus Renang Asas (QKS2112) bagi memastikan pelajar mempunyai kemahiran renang dan keselamatan air sebagai nilai tambah / Students are required to take one credit course Basic Swimming (QKS2112) to ensure that students have basic swimming skills and water safety as a value-added

2. Kursus Teras / Core Courses (73 Kredit / Credits)

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A	PRASYARAT / PREREQUISITE
AKU3103	Iktiologi / Ichthyology	3	2	1	Tiada / None
AKU3105	Biologi Invertebrat Akuatik / Aquatic Invertebrate Biology	3	2	1	Tiada / None
AKU3106	Botani Akuatik / Aquatic Botany	3	2	1	Tiada / None
AKU3201	Prinsip Akuakultur / Principles of Aquaculture	3	2	1	Tiada / None
AKU3301	Genetik dan Pembiakbakaan Ikan / Fish Genetics and Breeding	3	2	1	Tiada / None
AKU3302	Teknologi Pemberian Ikan dan Pengurusan Fri / Fish Seed Technology and Fry Management	3	2	1	Tiada / None
AKU3401	Pemakanan Akuakultur / Aquaculture Nutrition	3	2	1	Tiada / None
AKU3501	Pengurusan Kesihatan Ikan / Fish Health Management	3	2	1	Tiada / None
AKU3601	Kualiti Air dan Tanah dalam Akuakultur / Water and Soil Quality in Aquaculture	3	2	1	Tiada / None
AKU4901	Latihan Industri / Industrial Training	12	0	12	Tiada / None
PPT3301	Prinsip Pengurusan dan Pemasaran Pertanian / Principles of Agricultural Management and Marketing	3	3	0	Tiada / None
AKU3602	Ekologi Akuatik / Aquatic Ecology	3	2	1	Tiada / None
AKU4959	Disertasi Bacelor / Bachelor Dissertation	6	0	6	Tiada / None
AKU4402	Pengeluaran Makanan Hidup dalam Akuakultur / Live Food Production in Aquaculture	3	2	1	Tiada / None
AKU3108	Statistik Dan Penyelidikan Dalam Akuakultur / Statistics and Research in Aquaculture	4	3	1	Tiada / None
AKU3210	Kultur Ikan / Finfish Culture	3	1	2	Tiada / None
AKU3109	Fisiologi Ikan dan Biokimia / Fish Physiology and Biochemistry	4	3	1	Tiada / None

EPT3102	Ekonomi Pertanian / <i>Agricultural Economics</i>	3	2	1	Tiada / None
AKU3801	Pasca Tuai Dalam Akuakultur / <i>Postharvest In Aquaculture</i>	2	1	1	Tiada / None
AKU3802	Inovasi dalam Akuakultur / <i>Innovation in Aquaculture</i>	3	1	2	Tiada / None

3. Kursus Elektif / *Elective Courses* (32 Kredit/credits)

Kursus elektif (32 kredit) terdiri daripada 26 kredit kursus yang disenaraikan dalam kursus elektif program dan enam (6) kredit kursus bebas UPM atau mana-mana universiti dalam dan luar negara untuk melengkapkan keperluan dengan persetujuan Jabatan.

The elective courses (32 credits) consisted of 26 credits listed as program elective courses and six (6) open elective courses from UPM or other local or foreign universities to complement the requirement with the permission of the department.

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A	PRASYARAT / PREREQUISITE
AKU4701	Teknologi Maklumat dan Komunikasi dalam Akuakultur / <i>Information and Communications Technology in Aquaculture</i>	3	1	2	Tiada / None
AKU4203	Sistem Pengeluaran Akuakultur / <i>Aquaculture Production Systems</i>	3	2	1	Tiada / None
AKU4102	Limnologi / <i>Limnology</i>	3	2	1	Tiada / None
AKU4202	Kultur Ikan dan Tumbuhan Akuatik Hiasan / <i>Culture of Ornamental Fish and Aquatic Plants</i>	3	2	1	Tiada / None
AKU4221	Kultur Krustacea / <i>Crustacean Culture</i>	3	2	1	Tiada / None
AKU4231	Kultur Molusk / <i>Mollusc Culture</i>	3	2	1	Tiada / None
AKU4301	Endokrinologi Ikan / <i>Fish Endocrinology</i>	3	2	1	Tiada / None
AKU4801	Perikanan Rekreasi dalam Ekopelancongan Perairan Darat / <i>Recreational Fisheries in Inland Waters Ecotourism</i>	3	2	1	Tiada / None
AKU4501	Mikrobiologi Akuatik / <i>Aquatic Microbiology</i>	3	2	1	Tiada / None
AKU4502	Imunologi Ikan / <i>Fish Immunology</i>	3	2	1	Tiada / None
AKU4601	Ekologi dan Pengurusan Tanah Basah/ <i>Ecology and Management of Wetlands</i>	3	2	1	Tiada / None
AKU4101	Penilaian Dan Pengurusan Sumber Perikanan / <i>Fisheries Resource Assessment and Management</i>	3	2	1	Tiada / None
AKU4802	Biologi Molekul Dalam Akuakultur / <i>Molecular Biology in Aquaculture</i>	3	2	1	Tiada / None
AKU4401	Teknologi Makanan Akuakultur / <i>Aquafeed Technology</i>	3	1	2	Tiada / None
AKU4243	Kultur Alga / <i>Algae Culture</i>	3	2	1	Tiada / None

AKU4804	Polisi dan Akta Untuk Perikanan dan Akuakultur/ <i>Policy and Acts for Fisheries and Aquaculture</i>	2	2	0	Tiada / None
AKU4204	Kultur Spesies Unik/ <i>Unique Species Culture</i>	2	2	0	Tiada / None
AKU4103	Oseanografi/ <i>Oceanography</i>	3	2	1	Tiada / None

Nota/ Notes : Kr = Jam Kredit / Credit Hour, K = Kuliah / Lecture, A = Amali / Laboratory

Nota Penting / Notes :

Pelajar diwajibkan memilih 2 kredit daripada kursus ko-kurikulum yang ditawarkan oleh university. / Students are required to select 2 credits from the co-curriculum courses offered by the university.

SKEMA PENGAJIAN/ STUDY SCHEME

TAHUN 1 / 1ST YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
AKU3103	Iktiologi / <i>Ichthyology</i>	3	2	1
BBI2423	Interaksi Akademik dan Pembentangan / <i>Academic Interaction and Presentation</i>	3	2	1
AKU3105	Biologi Invertebrat Akuatik / <i>Agriculture Production System</i>	3	2	1
AKU3602	Ekologi Akuatik / <i>Aquatic Ecology</i>	3	2	1
SKP2101	Kenegaraan Malaysia / <i>Malaysian Nationhood</i>	3	3	0
SKP2203	Tamadun Islam dan Tamadun Asia / <i>Islamic Civilization and Asian Civilization</i>	2	2	0
QKS2112	Renang Asas / <i>Basic Swimming</i>	1	0	1
JUMLAH /TOTAL		18	13	5

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
PRT2008	Pertanian dan Manusia / <i>Agriculture and Man</i>	2	2	0
AKU3106	Botani Akuatik / <i>Aquatic Botany</i>	3	2	1
BBI2424	Academic Writing	3	2	1
AKU3109	Fisiologi Ikan dan Biokimia / <i>Fish Physiology and Biochemistry</i>	4	3	1
SKP2204	Hubungan Etnik / <i>Ethnic Relations</i>	2	2	0
QKXxxxx	Kokurikulum / <i>Cocurriculum</i>	1	0	1

PPT3301	Prinsip Pengurusan dan Pemasaran Pertanian / <i>Principles of Agricultural Management and Marketing</i>	3	3	0
	JUMLAH / TOTAL	18	14	4

TAHUN 2 / 2ND YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
PPT3701	Keusahawanan Pertanian / <i>Agricultural Entrepreneurship</i>	3	2	1
AKU3201	Prinsip Akuakultur / <i>Principles of Aquaculture</i>	3	2	1
AKU4402	Pengeluaran Makanan Hidup dalam Akuakultur / <i>Live Food Production in Aquaculture</i>	3	2	1
AKU3601	Kualiti Air dan Tanah dalam Akuakultur / <i>Water and Soil Quality in Aquaculture</i>	3	2	1
AKU3501	Pengurusan Kesihatan Ikan / <i>Fish Health Management</i>	3	2	1
EPT3102	Ekonomi Pertanian / <i>Agricultural Economics</i>	3	2	1
	JUMLAH / TOTAL	18	13	5

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
TKP3206	Pengembangan Akuakultur / <i>Aquaculture Extension</i>	2	1	1
AKU3301	Genetik dan Pembiakbakaan Ikan / <i>Fish Genetics and Breeding</i>	3	2	1
AKU3302	Teknologi Pembenihan Ikan dan Pengurusan Fri / <i>Fish Seed Technology and Fry Management</i>	3	2	1
AKU3401	Pemakanan Akuakultur / <i>Aquaculture Nutrition</i>	3	2	1
AKU3210	Kultur Ikan / <i>Finfish Culture</i>	3	1	2
	Elektif / Electives	3	2	1
	JUMLAH / TOTAL	17	10	7

TAHUN 3 / 3RD YEAR**SEMESTER 1 / 1ST SEMESTER**

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
AKU3802	Inovasi dalam Akuakultur / <i>Innovation in Aquaculture</i>	3	1	2
AKU3108	Statistik Dan Penyelidikan Dalam Akuakultur / <i>Statistics and Research in Aquaculture</i>	4	3	1
AKU3801	Pasca Tuai Dalam Akuakultur / <i>Postharvest In Aquaculture</i>	2	1	1
	Elektif / <i>Electives</i>	3	2	1
	Elektif / <i>Electives</i>	3	2	1
JUMLAH / TOTAL		15	9	6

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
AKU4959A	Disertasi Bacelor / <i>Bachelor Dissertation</i>	3	0	3
	Elektif / <i>Electives</i>	14	8	6
JUMLAH / TOTAL		17	8	9

TAHUN 4 / 4TH YEAR**SEMESTER 1 / 1ST SEMESTER**

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
AKU4959B	Disertasi Bacelor / <i>Bachelor Dissertation</i>	3	0	3
	Elektif / <i>Electives</i>	9	7	3
JUMLAH / TOTAL		12	7	6

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
AKU4901	Latihan Industri / <i>Industrial Training</i>	12	0	12
JUMLAH / TOTAL		12	0	12

Nota/Notes :

1. Pelajar diwajibkan memilih 2 kredit daripada kursus kokurikulum yang ditawarkan oleh universiti. / *Students are required to select 2 credits from the cocurriculum courses offered by the university.*
2. Pelajar perlu melengkapkan pakej keperluan Bahasa Inggeris seperti jadual di bawah: Butiran lanjut mengenai CEL dan LAX sila rujuk di muka surat 3 buku panduan ini./ *Students need to complete the*

english package as the table below : For more details on CEL and LAX please refer to page 3 of this book.

MUET Band	TOEFL/IELTS Score	CIEP Level	Graduation Requirements
1 & 2	-	107	3 BBI + 3 CEL + 24 LAX points
3 & 4	TOEFL 500 - 599 IELTS 5.5 - 6.5	108 – 109	2 BBI + 2 CEL + 24 LAX points
5 & 6	TOEFL 600 - 677 IELTS 7.0 – 9.0	-	2 LPE + 1 CEL + 24 LAX points atau 1 LPE + 1 CEL + 24 LAX points (+1 Global Language)

STRUKTUR KURIKULUM / CURRICULUM STRUCTURE

Nama Program : **Bachelor Sains Perhutanan / Bachelor of Forestry Science**

Jumlah Kredit Bergraduat : **129 Jam Kredit / Credit Hours**

Tempoh Pengajian : **8 Semester / Semesters (4 Tahun/ Years)**

- Matlamat Program** :
1. Melahirkan graduan yang berpengetahuan tentang sains perhutanan dan bidang berkaitan perhutanan bagi menjamin kehidupan manusia yang lebih baik seimbang dengan pembangunan fizikal.
 2. Melahirkan graduan yang berkebolehan, profesional dan berkeupayaan dalam penyelidikan, merancang, mengurus, melaksana dan mengaplikasikan teknologi terkini berkaitan sektor perhutanan.
 3. Melahirkan graduan yang beretika dan bertanggungjawab ke atas masyarakat, budaya, sumber hutan dan alam semula jadi.

RINGKASAN HASIL PEMBELAJARAN PROGRAM

Program	Pengetahuan	Kemahiran Teknikal/ Praktikal/ Psikomotor	Pendekatan Kemahiran Berfikir dan Saintifik	Kemahiran Berkommunikasi	Kemahiran Sosial dan Bertanggungjawab	Professionalisme, Nilai, Sikap dan Etika	Pendidikan Sepanjang Hayat dan Pengurusan Informasi	Kemahiran Pengurusan dan Keusahawanan	Kemahiran Kepimpinan
	P1	P2	P3	P4	P5	P6	P7	P8	P9
Bachelor Sains Perhutanan	41	31	30	10	10	19	14	8	9

1. Kursus Universiti / University Courses (25 Kredit / Credits)

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A	PRASYARAT / PREREQUISITE
BBI2423	Interaksi Akademik dan Pembentangan / Academic Interaction and Presentation	3	2	1	CEL2102
BBI2424	Penulisan Akademik / Academic Writing	3	2	1	BBI2423
FCE3204	Kemahiran Berfikir / Thinking Skills	2	2	0	Tiada / None
MGM3180	Asas Keusahawanan / Basic Entrepreneurship	3	2	1	Tiada / None
KOM3403	Pengucapan Awam / Public Oration	3	3	0	Tiada / None
PRT2008	Pertanian dan Manusia / Agriculture and Man	2	2	0	Tiada / None
SKP2101	Kenegaraan Malaysia / Malaysian Nationhood	3	3	0	Tiada / None

SKP2203	Tamadun Islam dan Tamadun Asia / <i>Asian and Islamic Civilization</i>	2	2	0	Tiada / None
SKP2204	Hubungan Etnik / <i>Ethnic Relation</i>	2	2	0	Tiada / None
QKK2101	Bakti Siswa	1	0	1	
QKXxxxx	Kokurikulum / Co-curriculum	1	0	1	

2. Kursus Teras / Core Courses (68 Jam Kredit / Credit Hours)

KOD KURSUS / COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A	PRASYARAT / PREREQUISITE
FHH3101	Sains Kayu / <i>Wood Science</i>	3	2	1	Tiada / None
FHM3112	Kaedah Kuantitatif Dalam Perhutanan/ <i>Quantitative Methods in Forestry</i>	4	3	1	Tiada / None
FHM3201	Survei Hutan / <i>Forest Survey</i>	3	2	1	Tiada / None
FHM3206	Sistem Maklumat Geografi Dalam Perhutanan / <i>Geographic Information System in Forestry</i>	3	2	1	Tiada / None
FHM3303	Pengurusan Hidupan Liar / <i>Wildlife Management</i>	3	2	1	Tiada / None
FHM3108	Entomologi Hutan / <i>Forest Entomology</i>	2	1	1	Tiada / None
FHM3109	Patologi Hutan / <i>Forest Pathology</i>	2	1	1	Tiada / None
FHM3203	Sivikultur Hutan / <i>Forest Silviculture</i>	4	3	1	Tiada / None
FHM3107	Tanah Hutan / <i>Forest Soil</i>	3	2	1	Tiada / None
FHM3103	Dendrologi Dipterokarpa / <i>Dendrology of Dipterocarps</i>	2	1	1	Tiada / None
FHM3104	Dendrologi Bukan Dipterokarpa / <i>Dendrology of Non-Dipterocarps</i>	2	1	1	Tiada / None
FHM3105	Fisiologi Pokok / <i>Tree Physiology</i>	3	2	1	Tiada / None
FHM3106	Ekologi Hutan / <i>Forest Ecology</i>	3	2	1	Tiada / None
FHS4959	Disertasi Bacelor / <i>Bachelor Dissertation</i>	6	0	6	Tiada / None
FHS4903	Latihan Industri / <i>Industrial Training</i>	8	0	8	Tiada / None
FHS4904	Kem Perhutanan / <i>Forestry Camp</i>	1	0	1	Tiada / None
FHM3202	Sukatan Hutan / <i>Forest Mensuration</i>	3	2	1	Tiada / None
FHM3301	Pengurusan Hutan / <i>Forest Management</i>	3	2	1	Tiada / None
FHM3306	Undang-Undang Dalam Perhutanan / <i>Laws in Forestry</i>	3	3	0	Tiada / None
FHM3110	Ekonomi Perhutanan / <i>Forestry Economics</i>	3	3	0	Tiada / None
FHM3305	Pengurusan Kawasan Legeh / <i>Watershed Management</i>	3	2	1	Tiada / None

3. Kursus Elektif / *Elective Courses* (36 Kredit / *Credits*)

Pelajar perlu mengambil sebanyak 30 kredit (9 kredit dari kursus generik dan 21 kredit dari pakej) daripada senarai kursus yang dipakejkan dan 6 kredit elektif bebas

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A	PRASYARAT / PREREQUISITE
KURSUS ELEKTIF GENERIK / GENERIC ELECTIVE COURSES (Pilih / Choose 9 kredit / credits)					
PAKEJ ELEKTIF PERHUTANAN LADANG / ELECTIVE PACKAGE (Pilih / Choose 21 kredit / credits)					
FHM3204	Kejuruteraan Hutan / <i>Forest Engineering</i>	3	2	1	Tiada / <i>None</i>
FHH3201	Hasil Hutan Bukan Kayu / <i>Non-Wood Forest Products</i>	3	2	1	Tiada / <i>None</i>
FHM4206	Pengukuran Dan Pemantauan Karbon/ <i>Carbon Measurement and Monitoring</i>	3	2	1	Tiada / <i>None</i>
FHM4101	Biodiversiti dan Pemuliharaan / <i>Biodiversity and Conservation</i>	3	2	1	Tiada / <i>None</i>
FHM4202	Penilaian Ekonomi Sumber Hutan Dan Biodiversiti / <i>Economic Valuation of Forest Resource and Biodiversity</i>	3	2	1	Tiada / <i>None</i>
FHM3217	Sistem Penuaian Dalam Ladang Hutan/ <i>Harvesting System in Forest Plantations</i>	3	2	1	Tiada / <i>None</i>
FHM3307	Penyelenggaraan Dan Pengurusan Tapak Semaian / <i>Nursery Management and Maintenance</i>	2	1	1	Tiada / <i>None</i>
FHM3304	Pengurusan Hutan Ladang / <i>Forest Plantation Management</i>	3	2	1	Tiada / <i>None</i>
FHM3309	Pensijilan Ladang Hutan / <i>Forest Plantation Certification</i>	2	1	1	Tiada / <i>None</i>
FHM4201	Penderiaan Jauh Dalam Perhutanan / <i>Remote Sensing in Forestry</i>	3	2	1	Tiada / <i>None</i>
FHM3308	Pengurusan Kebakaran Dalam Ladang Hutan / <i>Fire Management in Forest Plantations</i>	2	1	1	Tiada / <i>None</i>
FHH3230	Kualiti Dan Hasil Kayu / <i>Wood Quality and Products</i>	3	2	1	Tiada / <i>None</i>
FHM4304	Pengurusan Konflik Dalam Ladang Hutan / <i>Conflict Management in Forest Plantations</i>	3	2	1	Tiada / <i>None</i>
FHM4302	Konflik Manusia Dan Hidupan Liar / <i>Human and Wildlife Conflicts</i>	3	3	0	Tiada / <i>None</i>
FHM3218	Penghasilan Bahan Tanaman Hutan Ladang / <i>Planting Material Production for Forest Plantation</i>	3	2	1	Tiada / <i>None</i>
FHM3214	Teknologi Biji Benih / <i>Seed Technology</i>	2	1	1	Tiada / <i>None</i>

FHM4203	Perhutanan Antarabangsa / <i>International Forestry</i>	2	2	0	Tiada / None
FHM3213	Perhutanan Tani / Agroforestry	3	2	1	Tiada / None

Nota/ Notes : Kr = Jam Kredit / Credit Hour, K = Kuliah / Lecture, A = Amali / Laboratory

Nota / Notes :

Pelajar diwajibkan memilih 2 kredit daripada kursus kokurikulum yang ditawarkan oleh universiti./ It is *compulsory for students to take 2 credits of co-curriculum courses offered by the university.*

SKEMA PENGAJIAN/ STUDY SCHEME

TAHUN 1 / 1ST YEAR

SEMESTER 1/ 1ST SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
BBI2423	Interaksi Akademik dan Pembentangan / <i>Academic Interaction and Presentation</i>	3	2	1
PRT2008	Pertanian dan Manusia / <i>Agriculture and Man</i>	2	2	0
SKP2101	Kenegaraan Malaysia / <i>Malaysian Nationhood</i>	3	3	0
SKP2203	Tamadun Islam dan Tamadun Asia / <i>Asian and Islamic Civilization</i>	2	2	0
FHM3103	Dendrologi Dipterokarpa / <i>Dendrology of Dipterocarps</i>	2	1	1
FHH3101	Sains Kayu / <i>Wood Science</i>	3	2	1
FHM3105	Fisiologi Pokok / <i>Tree Physiology</i>	3	2	1
QKK2101	Bakti Siswa (Kokurikulum 1 / Cocurriculum 2)	1	0	1
JUMLAH / TOTAL		19	14	5

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
BBI2424	Penulisan Akademik / <i>Academic Writing</i>	3	2	1
KOM3403	Pengucapan Awam / <i>Public Oration</i>	3	2	1
SKP2204	Hubungan Etnik / <i>Ethnic Relation</i>	2	2	0
FCE3204	Kemahiran Berfikir / <i>Thinking Skills</i>	2	2	0
FHM3104	Dendrologi Bukan Dipterokarpa / <i>Dendrology of Non-Dipterocarps</i>	2	1	1
FHM3107	Tanah Hutan / <i>Forest Soil</i>	3	2	1
FHM3108	Entomologi Hutan / <i>Forest Entomology</i>	2	1	1
QKXxxxx	Kokurikulum 2 / <i>Cocurriculum 2</i>	1	0	1
JUMLAH / TOTAL		18	12	6

TAHUN 2 / 2ND YEAR**SEMESTER 1 / 1ST SEMESTER**

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
FHM3106	Ekologi Hutan / Forest Ecology	3	2	1
FHM3201	Survei Hutan / Forest Survey	3	2	1
FHM3202	Sukatan Hutan / Forest Mensuration	3	2	1
FHM3203	Sivikultur Hutan / Forest Silviculture	4	3	1
FHM3112	Kaedah Kuantitatif Dalam Perhutanan / <i>Quantitative Methods in Forestry</i>	4	3	1
FHS4904	Kem Perhutanan / Forestry Camp	2	0	2
JUMLAH / TOTAL		19	12	7

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
FHM3109	Patologi Hutan / Forest Pathology	2	1	1
FHM3110	Ekonomi Perhutanan / Forestry <i>Economics</i>	3	3	0
FHM3206	Sistem Maklumat Geografi Dalam Perhutanan / <i>Geographic Information System in Forestry</i>	3	2	1
FHM3301	Pengurusan Hutan / Forest Management	3	2	1
FHM3303	Pengurusan Hidupan Liar / Wildlife <i>Management</i>	3	2	1
FHM3305	Pengurusan Kawasan Legeh / Watershed <i>Management</i>	3	2	1
FHM3306	Undang-Undang Dalam Perhutanan / <i>Laws in Forestry</i>	3	3	0
JUMLAH / TOTAL		20	15	5

TAHUN 3 / 3RD YEAR**SEMESTER 1 / 1ST SEMESTER**

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
FHM3204	Kejuruteraan Hutan / Forest Engineering (Elektif Generik 1)	3	2	1
FHM3304	Pengurusan Hutan Ladang / Forest <i>Plantation Management</i> (Elektif Paket 1)	3	2	1
FHM3307	Penyelenggaraan Dan Pengurusan Tapak Semaian / <i>Nursery Management and Maintainance</i> (Elektif Paket 2)	3	2	1
FHM4201	Penderiaan Jauh Dalam Perhutanan / <i>Remote Sensing in Forestry</i> (Elektif Paket 3)	3	2	1

FHXxxxx	Elektif Generik 2 / Generic Elective 2	3	2	1
FHXxxxx	Elektif Generik 3 / Generic Elective 3	3	2	1
JUMLAH / TOTAL		18	12	6

SEMESTER 2/ 2ND SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
FHS4959A	Disertasi Bacelor / Bachelor Dissertation	3	0	3
FHM3217	Sistem Penuaian Dalam Ladang Hutan / <i>Harvesting System in Forest Plantations</i> (Elektif Paket 4)	3	2	1
FHM3309	Pensijilan Ladang Hutan / <i>Forest Plantation Certification</i> (Elektif Paket 5)	2	1	1
XXXxxxx	Elektif Bebas 1 / Open Elective 1	3	2	1
XXXxxxx	Elektif Bebas 2 / Open Elective 2	3	2	1
JUMLAH / TOTAL		14	7	7

TAHUN 4 / 4TH YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
FHS4959B	Disertasi Bacelor / Bachelor Dissertation	3	0	3
MGM3180	Asas Keusahawanan / <i>Basic Entrepreneurship</i>	3	2	1
FHH3230	Kualiti Dan Hasil Kayu / <i>Wood Quality and Products</i> (Elektif Paket 6)	3	2	1
FHM3308	Pengurusan Kebakaran Dalam Ladang Hutan / <i>Fire Management in Forest Plantations</i> (Elektif Paket 7)	2	1	1
FHXxxxx	Elektif Paket 8	2	1	1
JUMLAH / TOTAL		13	6	7

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS / COURSE CODE	NAMA KURSUS / COURSE NAME	Kr	K	A
FHS4903	Latihan Industri / <i>Industrial Training</i>	8	0	8
JUMLAH / TOTAL		8	0	8

Nota / Notes :

1. Pelajar diwajibkan memilih 2 kredit daripada kursus kokurikulum yang ditawarkan oleh universiti. / *Students are required to select 2 credits from the cocurriculum courses offered by the university.*

2. Pelajar perlu melengkapkan pakej keperluan bahasa inggeris seperti jadual di bawah: Butiran lanjut mengenai CEL dan LAX sila rujuk di muka surat 3 buku panduan ini./ *Students need to complete the english package as the table below : For more details on CEL and LAX please refer to the page 3 of this book.*

MUET Band	TOEFL/IELTS Score	CIEP Level	Graduation Requirements
1 & 2	-	107	3 BBI + 3 CEL + 24 LAX points
3 & 4	TOEFL 500 - 599 IELTS 5.5 - 6.5	108 – 109	2 BBI + 2 CEL + 24 LAX points
5 & 6	TOEFL 600 - 677 IELTS 7.0 – 9.0	-	2 LPE + 1 CEL + 24 LAX points atau 1 LPE + 1 CEL + 24 LAX points (+1 Global Language)

SINOPSIS KURSUS / COURSE SYNOPSIS

Jabatan Sains Tanaman / Department Of Crop Science

AFS2001 Program Buku Hijau / *Green Book Programme* 2(0+2)

Prasyarat : Tiada

Kursus ini meliputi latihan dan kerja lapangan berkaitan pengeluaran hasil sayur-sayuran, kekacang, tapak semaihan, tanaman buah-buahan, pastura dan hidupan akuatik. Latihan dan kerja lapangan dilaksanakan dalam dua semester dan dikendalikan bersama oleh pegawai akademik dan sokongan.

This course covers training and fieldwork in the production of vegetables, legumes, nursery, orchard, pasture and aquatic life. Training and fieldwork are conducted in two semesters by the academicians and supporting staff.

SKP2101 Kenegaraan Malaysia / *Malaysian Nationhood* 3(3+0)

Prasyarat : Tiada

Kursus ini merangkumi sejarah negara, perjuangan mencapai kemerdekaan, penubuhan Persekutuan Malaysia, sejarah, ciri dan masalah masyarakat majmuk, Sistem Demokrasi Berparlimen, sistem pilihanraya, Perlembagaan Malaysia, Rukunegara, Sistem Raja Berpelembagaan, pentadbiran awam dan dasar-dasar negara.

This course covers nation's history, the struggle for independence, the formation of the Federation of Malaysia, history, characteristics and problems of plural society, Parliamentary Democracy system, electoral system, Malaysian Constitution, Rukunegara, Constitutional, Monarchy, Public Administration and national policies.

SKP2203 Tamadun Islam dan Tamadun Asia / *Islamic Civilization and Asian Civilization* 2(2+1)

Prasyarat : Tiada

Kursus ini meliputi ilmu ketamadunan yang mencukupi pengajian ketamadunan, interaksi antara pelbagai tamadun (Melayu, Cina dan India), Islam dalam Tamadun Melayu serta peranannya dalam pembinaan Tamadun Malaysia, isu-isu kontemporari Tamadun Islam dan Tamadun Asia dalam proses pembangunan negara

This course covers civilizational studies which include introduction to civilization, interaction between civilizations (Malay, Chinese, Indian), Islam in Malay Civilization and its role in building Malaysian Civilization, contemporary issues in Islamic Civilization and Asian Civilization in the process of national development

SKP2204 Hubungan Etnik / *Ethnic Relation* 2(2+0)

Prasyarat : Tiada

Kursus ini meliputi konsep-konsep asas budaya dan hubungan etnik, perkembangan hubungan etnik di Malaysia, cabaran global dalam hubungan budaya dan etnik di peringkat Malaysia dan Asia dan hubungan etnik menurut perspektif Islam

This course covers basic concepts of cultural and ethnic relations, development of ethnic relations in Malaysia, global challenges in cultural and ethnic relations in Malaysia and Asia and ethnic relations from Islamic perspective

CES2241 Pengembangan Pertanian / *Agricultural Extension* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkum perancangan, perlaksanaan dan penilaian program pengembangan pertanian. Faktor yang mempengaruhi keberkesanan program pengembangan dan kaedah penyampaian yang berkesan bagi kumpulan sasaran yang berlainan turut ditekankan. Kajian kes di kawasan dan kumpulan sasaran terpilih, demonstrasi kaedah dan pemindahan teknologi adalah berdasarkan kepada keperluan sebenar.

This course covers the planning implementation and evaluation of agricultural extension programmes. Factors that influence the effectiveness of an extension programme and delivery methods for different target groups are also emphasised. Case studies in selected areas and targetted groups, method demonstration and technology transfer are based on actual needs.

BIP3301 Prinsip Pemrosesan Bioproduk / *Principles in Bioproduct Processing* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi prinsip yang terlibat dalam pemrosesan sumber semulajadi dan bahan hasilan industri pertanian untuk membentuk produk yang mempunyai nilai tambah berdasarkan kos yang efektif. Penekanan diberi terhadap aspek fermentasi, biokatalis, dehidrasi dan proses pemanasan, penyejukan dan pembekuan, teknik pemisahan, penyamakan, iradiasi, proses kimia dan proses pemampatan dan pembungkusan.

This course covers principles involved in processing of natural resources and agro-industrial materials into value-added products in a cost-effective system. Emphasis is on fermentation, biocatalyst, dehydration and thermal processing, freezing and refrigeration, separation techniques, tanning, irradiation, chemical processes and pressing and packaging.

BIP3302 Bioteknologi Bioindustri / *Bioindustrial Biotechnology* 3(2+1)

Prasyarat : Tiada

Kursus ini meliputi bioteknologi bioindustri termasuk sejarah dan latarbelakang, kegunaan masa kini dan arah tuju masa hadapan. Teknologi yang digunakan dan aplikasinya dalam bidang bioindustri dihuraikan, yang merangkumi teknologi *in vitro*, teknologi DNA rekombinan, kejuruteraan genetik, teknik penanda molekul dan bioproduk. Aplikasi bioteknologi dalam bioindustri diberi penekanan. Isu budaya dan etika berkaitan bioteknologi juga ditekankan.

*This course covers bioindustrial biotechnology which includes historical background, current applications and future directions. Technologies employed and their applications in bioindustry are discussed, which include *in vitro* technology, recombinant DNA technology, genetic engineering, molecular marker techniques and bioproducts. The application of biotechnology in bioindustry is emphasized. Cultural and ethical issues pertaining to biotechnology are also highlighted.*

BIP3402 Rekabentuk Eksperimen dan Analisis / *Experimental Design and Analysis* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi prinsip dan peraturan dalam melakukan eksperimen dengan menggunakan rekabentuk eksperimen dan kaedah analisis statistik yang sesuai. Penekanan diberi kepada pengetahuan dan kemahiran menggunakan rekabentuk eksperimen termasuk rawak lengkap (CRD), blok rawak lengkap (RCBD), dan plot belahan berserta dengan kaedah statistik dan interpretasinya. Teknik-teknik analisis termasuk ujian-t, analisis varians (ANOVA) bagi menguji kesan perlakuan, perbandingan min (menggunakan LSD, ujian julat berganda Duncan dan kontras berortogonal), analisis regresi linear dan kurvilinear untuk menguji tren, kesan utama dan interaksi dalam eksperimen faktoran dan kaedah tak berparameter juga diperjelaskan.

This course covers principles and procedures in experimentation using proper experimental design and statistical analysis. Emphasis is on knowledge and skills on the use of important experimental design that include completely randomized design (CRD), randomized complete block design (RCBD), and split plot design together with statistical analysis including t-test, analysis of variance (ANOVA) to

compare treatment effects, mean comparisons (least significant different of LSD, Duncan's multiple range test or DMRT and orthogonal contrast), linear and curvilinear regression analyses to detect trends, main and interaction effects in factorial experiments, and non-parametric methods are also explained.

CFP4999 Projek Ilmiah Tahun Akhir / Final Year Academic Project 6(0+6)

Prasyarat : Tiada

Kursus ini merangkumi perancangan, perlaksanaan, analisis dan penterjemahan data, menyedia, dan membentangkan laporan saintifik. Pelajar dikehendaki mengenalpasti topik penyelidikan dengan bimbingan penyelia

This course covers planning, implementation, data analysis and interpretation, preparation, and presentation of scientific report. Students are required to identify a research topic with guidance from the supervisor

CHM3010 Kimia Fizik dan Tak Organik / Physical and Inorganic Chemistry 4(3+1)

Prasyarat : Tiada

Kursus ini merangkumi beberapa aspek asas dalam kimia fizik dan tak organik meliputi teori atom moden, jadual berkala dan sifat berkala, kimia kumpulan utama, teori pengikatan, sifat-sifat gas, cecair dan pepejal, keseimbangan kimia, elektrokimia, termodinamik, kinetik dan kimia nucleus.

This course covers basic aspects of physical and inorganic chemistry, which covers modern atomic theory, periodic table and periodic properties, main group element, theory of bonding, properties of gas, liquid and solids, kinetics and nuclear chemistry.

CSS3702 Sumber Air dan Iklim / Water Resources and Climate 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi jenis sumber air dan kitaran hidrologi. Kesan faktor perubahan iklim seperti hujan, suhu, lembapan udara, angin dan sinaran ke atas sumber air, tanah dan pertanian turut ditekankan

This course covers different types of water resources and hydrologic cycle. The effects of changing climate factors such as precipitation, temperature, humidity, wind and radiation on water resources, land and agriculture are also emphasised

SEC3101 Ekonomi Bioindustri / Bioindustrial Economics 3(3+0)

Prasyarat : Tiada

Kursus ini membincangkan mengenai skop ekonomi, teori pengeluaran dan kos, ekonomi sumber, pemasaran, dan perdagangan antarabangsa

This course discusses about the scope of economics, production and cost theories, resource economics, marketing, and international trade

AHP3507 Pengeluaran dan Pengurusan Hasilan Ternakan / Production and Management of Livestock Products 3(2+1)

Prasyarat : Tiada

Kursus ini meliputi produksi ternakan ruminan dan bukan ruminan secara ekstensif dan intensif, kepentingan industri ternakan, kaedah penternakan moden, serta pengendalian dan pemprosesan hasil ternakan. Penekanan diberi kepada amalan penternakan baik dalam pengeluaran ternakan

This course covers extensive and intensive ruminant and non-ruminant livestock production, the importance of animal industry and modern livestock husbandry, and handling and processing of livestock products. Emphasis is on good husbandry practices in livestock production

BGY3201 Struktur dan Fungsi Tumbuhan / *Plant Structure and Function* 3(2+1)

Prasyarat : Tiada

Kursus ini meliputi kepelbagaiannya morfologi dan anatomi, pertumbuhan primer dan sekunder akar dan batang, serta penyesuaian organ tumbuhan. Perkembangan debunga dan pundi embrio, persenyawaan, pembentukan buah dan biji benih serta penyebarannya turut dibincangkan.

This course covers the diversity of the morphology and anatomy, primary and secondary growth of the root and stem, and adaptation of plant organs. Development of pollen and embryo sac, fertilization, formation of fruit and seed, as well as dispersal are also discussed.

CAG3000 Diversiti Mikroorganisma dan Tumbuhan / *Microorganism and Plant Diversity* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi filum utama organisme yang hidup di dunia. Penekanan diberikan kepada pengelasan organisme berdasarkan ciri-ciri ketara pada mereka. Kepentingan interaksi antara spesies dan persekitarannya juga dibincangkan

The course covers major phylum of organisms on earth. Emphasize is given to differentiate organisms based on their distinct characteristics. The importance of interspecific interactions and its surroundings are also discussed

CAG3001 Amalan Perladangan Tanaman Tahunan / *Annual Crop Farming Practices* 1(0+1)

Prasyarat : Tiada

Kursus ini meliputi latihan amali pelbagai tanaman jangka pendek. Penekanan diberi kepada perancangan, perlaksanaan dan pengendalian perusahaan pengeluaran tanaman, sikap dan etika pertanian di samping kemahiran mengurus tanaman tahunan

This course covers practical training in various short-term crops. Emphasis is on planning, implementation and handling of crop production enterprises, attitudes and agriculture ethics, besides skills in managing annual crops

CAG3002 Amalan Perladangan Tanaman Industri / *Plantation Practices in Industrial Crops* 1(0+1)

Prasyarat : Tiada

Kursus ini merangkumi amalan pengurusan komersil bagi tanaman industri termasuk pengendalian hasil lepastuai, penggredan dan pemprosesan. Latihan amali meliputi pengendalian serta operasi mesin dan peralatan pertanian yang diperlukan dalam pembangunan perladangan

This course covers commercial management practices in industrial crops including postharvest handling, grading and processing. The practical training includes handling and operating agriculture machineries and equipments required in plantation development

CAG3003 Pengeluaran dan Pengurusan Tanaman / *Crop Production and Management* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi prinsip dan amalan dalam pengurusan tanaman. Faktor yang mempengaruhi tumbesaran tanaman seperti tanah, cahaya, air, nutrien, perosak dan penyakit diberi penekanan. Amalan perladangan mesra alam turut dibincangkan

This course covers principles and practices in managing crops. Factors influencing crop growth such as soil, light, water, nutrients, pests and diseases are emphasised. Environmental friendly farming practices are also discussed

CAG3004	Pembibitan Tumbuhan dan Pengurusan Semaian / <i>Plant Propagation and Nursery Management</i>	3(2+1)
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Prasyarat : Tiada

Kursus ini merangkumi faktor berkenaan kejayaan pembibitan tanaman dari segi faktor biotik dan juga abiotik. Penekanan diberi kepada penggunaan hormon, manipulasi air, media dan kemudahan tapak semaian, dan pengurusan benih semaian di peringkat tapak semaian

This course covers factors associated with propagation success from the aspect of biotic and abiotic factors. Emphasis is on application of hormones, water manipulation, media and nursery facilities, and seedling management in the nursery stage

CPP3600	Perlindungan Tumbuhan / <i>Plant Protection</i>	3(2+1)
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Prasyarat : Tiada

Kursus ini merangkumi asas perlindungan tumbuhan termasuk entomologi, patologi tumbuhan, sains rumpai dan nematologi. Penekanan diberi kepada biologi, fisiologi, ekologi dan epidemiologi perosak dan penyakit utama, pengecaman dan klasifikasi, perosak biotik dan abiotik serta beberapa spesies berguna, diagnosis dan penyelesaian masalah perosak dan penyakit dalam pertanian dan bioindustri serta pengurusannya

This course covers basic plant protection including entomology, plant pathology, weed science and nematology. Emphasis is on the biology, physiology, ecology and epidemiology of major pests and diseases, identification and classification, biotic and abiotic pests and some beneficial species, diagnosis and solving pest and disease problems in agriculture and bioindustry as well as their management

CIT4901	Latihan Industri / <i>Industrial Training</i>	12(0+12)
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Prasyarat : Tiada

Kursus ini melibatkan latihan industri selama 24 minggu di salah satu daripada agensi kerajaan, syarikat atau kilang yang terpilih. Latihan ini dikendalikan oleh penyelia atau pengurus agensi, syarikat atau kilang dengan penyalarasan oleh penyalaras kursus

This course involves industrial training for a period of 24 weeks at any one of selected government agencies, company or factory. The training is organised by the course coordinator and conducted by the supervisor or manager of the agency, company or factory

CSS3700	Sains Tanah / <i>Soil Science</i>	3(2+1)
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Prasyarat : Tiada

Kursus ini merangkumi pembentukan tanah, sifat kimia, fizikal dan biologi tanah, pemakanan tumbuhan dan baja, survei tanah, pengelasan dan penilaian tanah

This course covers soil formation, chemical, physical and biological characteristics of soil, plant nutrition and fertilizer, soil survey, classification and soil evaluation

CSS3701	Pengurusan Kesuburan Tanah dan Tanaman / <i>Crop and Soil Fertility Management</i>	3(2+1)
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Prasyarat : Tiada

Kursus ini meliputi ciri tanah di Malaysia dan kaitannya dengan sektor pertanian. Ekologi tanah dan hubungannya dengan tanaman serta pengurusan kesuburan tanah diberi penekanan

This course covers characteristics of Malaysian soils and their relationship to agriculture sector. Ecology of soils in relation to plants and the management of soil fertility are emphasised

MGM3180 Asas Keusahawanan / *Basic Entrepreneurship* 3(2+1)

Prasyarat : Tiada

Kursus ini meliputi pelbagai aspek ilmu keusahawanan dan merangkumi kaedah melaksanakan aktiviti keusahawanan dan kemahiran pengurusan asas yang diperlukan untuk pengendalian perusahaan perniagaan.

The course covers various aspects entrepreneurial knowledge and includes techniques to carry out entrepreneurial activities and basic management skills required in a business undertaking.

MTH3003 Statistik bagi Sains Gunaan / *Statistics for Applied Sciences* 4(3+1)

Prasyarat : Tiada

Kursus ini merangkumi pemerihalan data, kebarangkalian, pembolehubah rawak, beberapa taburan yang penting dan pentakbiran statistik yang meliputi taburan pensampelan, penganggar titik, penganggar selang dan ujian hipotesis. Analisis varians, reka bentuk ujikaji, regresi dan korelasi diberi penekanan.

This course covers data descriptive, probability, random variables, several important distributions and inferential statistics including the sampling distribution, point estimation, confidence intervals and hypothesis testing. Analysis of variance, experimental designs, simple linear regressions and correlations are emphasized.

PRT3402 Biokimia Pertanian / *Agricultural Biochemistry* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi proses biokimia dalam sistem eukariot termasuk organel sel, sifat air dan interaksi molekul dalam persekitaran akueus, struktur dan peranan biomolekul, pemangkinan dan kawalan tindakbalas biokimia, peranan membran dan hormon, metabolism dan bioenergetik serta aliran maklumat biologi

This course covers biochemical processes in eukaryotic system which include cell organization, properties of water and molecular interactions in aqueous environment, structure and roles of biomolecules, catalysis and control of biochemical reactions, structure and roles of membranes and hormones, metabolism and bioenergetics and flow of biological information

CAT4100 Pertanian Persis / *Precision Agriculture* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi konsep dan amalan pertanian persis dalam konteks pertanian moden yang lestari berhubung perkembangan teknologi pertanian dalam era maklumat. Aspek-aspek yang penting dalam mengukur variabiliti amalannya meliputi prosedur pensampelan, pemetaan nutrien, hasil dan perosak, interpolasi corak ruang dan sistem maklumat geografi (GIS); model dan simulasi pertumbuhan tanaman, penggunaan data remote sensing dan kaedah statistik analisis data; operasi dan penggunaan peralatan seperti GPS (Global Positioning System), kamera infra-red satelit bumi, satelit angkasa, pengesan hasil dan pelbagai perisian komputer

This course covers concepts and practices on precision agriculture in the context of modern sustainable agriculture in relation to agricultural development technologies in the information age. The important aspects in measuring variability of its practice covers sampling procedures, nutrient, yield and pest mapping, interpolation of spatial patterns and geographical information system (GIS); modeling and simulation of crop growth, use of remote sensing data and statistical methods of data analysis; operation and usage of instruments such as GPS (Global Positioning System), earth satellite infra-red camera, space satellites, yield sensors and various computer software

CAG4101 Teknologi Biji Benih / Seed Technology 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi proses pembentukan, perkembangan, percambahan, kedormenan, ujian dan penyimpanan biji benih. Pengeluaran dan pemprosesan biji benih juga diberi keutamaan

This course covers the process of formation, development, germination, dormancy, testing and storage of seeds. Seed production and processing are also emphasized

CAT4106 Pengurusan Sisa Pertanian / Agricultural Waste Management 3(2+1)

Prasyarat : Tiada

Kursus ini meliputi jenis-jenis sisa pertanian, masalah pencemaran alam sekitar dan pengurusan pelupusan dan/atau penggunaan semula secara mesra alam, kitaran semula sisa hijau sebagai sungkupan dan sumber nutrien, pengkomposan dan aspek peraturan penguatkuasaan alam sekitar

This course covers different types of agricultural wastes, environmental problems and environmental friendly waste management for disposal and/or utilization, recycling of green wastes as mulches and source of nutrients, composting and environmental regulatory enforcement aspects

CPP4600 Sains Racun Perosak / Pesticide Science 3(2+1)

Prasyarat : Tiada

Kursus ini meliputi ciri fiziko-kimia racun perosak, penggunaan, cara tindakan, interaksi dengan sistem hidupan sasaran, ketoksikan, pemilihan, keresistanan, penggunaan agen biologi, formulasi, peranan surfaktan/adjuvan, teknologi aplikasi racun perosak serta kaedah mengkaji dan mengukur gerakbalas perosak kepada racun perosak

This course covers the physico-chemical properties of pesticides in relation to their usage, activities, interaction with living systems, toxicity, selectivity, resistancy, use of biological agents, formulation, role of surfactants/adjuvants, pesticide application technology as well as methods of studying and measuring pest response to pesticide

CPT4800 Kimia dan Pemprosesan Hasilan Komoditi Tumbuhan / Chemistry and Processing of Plant Based Commodities 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi perubahan fisiko-kimia dan biokimia komoditi berasaskan tumbuhan semasa pengendalian, pemprosesan dan penyimpanan. Kandungan kursus meliputi teknologi pemprosesan hasilan tumbuhan seperti lemak dan minyak, buah, sayuran, kekacang dan bijirin

This course covers physico-chemical and biochemical changes of plant based commodities during handling, processing and storage. The course content encompasses processing technology for plant products such as fats, oils, fruits, vegetables, cereals and legumes

CPT4801 Kimia dan Pemprosesan Hasilan Komoditi Haiwan / Chemistry and Processing of Animal Based Commodities 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi perubahan fisiko-kimia dan biokimia komoditi berasaskan haiwan semasa pengendalian, pemprosesan dan penyimpanan. Kandungan kursus meliputi teknologi pemprosesan daging, ayam, ikan, tenusu dan berbagai hasilan haiwan

This course covers physico-chemical and biochemical changes of selected commodities based on food of animal origin during handling, processing and storage. The course content encompasses the technology for the processing of meat, poultry, fish, dairy and other animal products

AHP4401 Pemakanan Ternakan / *Animal Nutrition* 3(2+1)

Prasyarat : Tiada

Kursus ini meliputi pemakanan makro, mineral dan makanan sampingan yang lain yang diperlukan oleh ternakan. Penekanan adalah diberi dalam penghasilan makanan ternakan menggunakan sumber-sumber sedia ada dan menumpu kepada perumusan makanan ternakan

The course covers macro nutrition, minerals and complimentary supplements in producing livestock. Emphasis is given on the production of livestock feed using available resources and focus on formulation of animal feeds

AHP4504 Sistem Penternakan Bersepadu / *Integrated Livestock Systems* 3(2+1)

Prasyarat : Tiada

Kursus ini meliputi prinsip dan konsep dalam sistem integrasi ternakan. Penekanan diberi terhadap aspek pembangunan sistem ternakan bersepadu dalam pengeluaran ternakan yang berdaya saing dan mesra alam yang mengambil kira kesan biologi serta ekonomi

This course covers the principles and concepts in integrated livestock systems. Emphasis is on the development aspect of integrated farming system that is competitive and environmental friendly that takes into account biological and economic effect

CAG4000 Pemakanan Tanaman / *Crop Nutrition* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi peranan dan fungsi unsur pemakanan utama, metabolism, penyerapan, interaksi antaranya dan keupayaan media untuk membekal nutrien, kesan kekurangan berlebihan dan ketoksikan kepada tumbesaran, penghasilan tanaman dan alam sekitar serta pengaruh kandungan nutrien terhadap penggunaan produk tumbuhan

This course encompasses the role and function of major nutrient elements, metabolism, absorption, interactions amongst nutrients and the capacity of media to supply nutrients, effect of nutrient deficiencies, excesses and toxicity on growth, yield of crops and the environment, as well as influence of nutrient composition on the utilization of plant products

CAG4001 Pembibakan Tumbuhan / *Plant Breeding* 3(2+1)

Prasyarat : Tiada

Kursus ini meliputi sistem pembibakan tumbuhan, pewarisan sifat kuantitatif dan kualitatif, heritabiliti, kaedah pemilihan tanaman pendebungaan sendiri dan kacuk, kaedah pembibakan melalui kacukan, mutasi, kacukan antara individu berpertalian genetik jauh dan kaedah pembibakan yang lain

The course covers plant reproductive systems, inheritance of qualitative and quantitative characters, heritability, selection methods for self and cross-pollinated crops, breeding through hybridization, mutation, wide hybridization and other breeding methods

CAG4002 Botani Tumbuhan / *Plant Botany* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi tanaman pertanian dan bertumpu kepada morfologi, anatomi dan taksonomi tumbuhan. Morfologi tumbuhan meliputi morfologi vegetatif dan reproduktif manakala anatomi berhubungkait dengan struktur dan fungsi sel dan tisu tumbuhan. Taksonomi tumbuhan meliputi proses-proses yang terlibat di dalam penamaan dan pengelasan tumbuhan

This course covers agricultural crops and focuses on plant morphology, anatomy and taxonomy. Plant morphology includes vegetative and reproductive morphology while anatomy relates to structure and function of plant cells and tissues. Plant taxonomy covers processes of nomenclature and classification of plants

CAG4003 Ekonomi Botani / *Economic Botany* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi sejarah pengkomersialan tanaman, proses manupulasi tumbuhan, pengecaman bahagian bernilai dalam tumbuhan dan sumbangan tanaman kepada manusia sejagat. Ini termasuk penilaian jenis-jenis tumbuhan penting dalam industri rempah ratus, makanan, minuman, perubatan dan kosmetik

This course covers history of crop commercialization, plant manipulation process, identification of valuable parts of plants and the benefit of crops to humans worldwide. This includes the evaluation of plants important in the spice, food, beverage, medical and cosmetic industries

CAT4102 Kultur Tisu Tumbuhan / *Plant Tissue Culture* 3(2+1)

Prasyarat : Tiada

Kursus ini meliputi prinsip dan teknik pembiakan tumbuhan secara *in vitro*, dengan penekanan kepada sistem pengeluaran dan pengurusan semasa dan aplikasinya dalam pembiakan tanaman hortikultur terpilih

This course covers principles and techniques of in vitro plant propagation, with emphasis on current production and management systems and their application in the propagation of selected horticultural crops

CAT4103 Mikrobiologi Gunaan / *Applied Microbiology* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi morfologi dan sifat-sifat pertumbuhan bakteria, mikoplasma, kulat, aktinomiset, alga dan virus; metabolism, biokimia dan genetik mikrob, teknik-teknik mikrobiologi dan aseptik. Penekanan adalah kepada pengenalpastian dan membezakan kepelbagaiannya biologi mikrob dengan kaedah serta peralatan yang bersesuaian

This course covers morphological and growth characteristics of bacteria, mycoplasma, fungi, actinomyocycets, algae and viruses, metabolism, biochemistry and genetics of microbes, microbiological and aseptic techniques. Emphasis is on identification and differentiate diversify of microbes using suitable methods and equipment

CAT4104 Mikrobiologi Makanan / *Food Microbiology* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi peranan mikroorganisma dalam pemprosesan makanan dan pengawetan, perkaitan mikroorganisma dengan kerosakan makanan, penyakit dan keracunan, kualiti makanan secara umum dan peranan mikroorganisma dalam meningkatkan kesihatan

This course covers role of microorganisms in food processing and preservation, relation of microorganisms to food spoilage, foodborne illness and intoxication, general food quality, and role of microorganisms in health promotion

CAT4105 Teknologi Fermentasi / *Fermentation Technology* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi aspek penting teknologi fermentasi seperti pemencilan dan peningkatan strain mikrob untuk kegunaan di dalam industri, penyimpanan mikroorganisma, formulasi media, proses pensterilan, penyediaan inokulum, rekaan bioreaktor, kawalan proses untuk fermentasi, berbagai mod operasi fermentasi dan aspek asas kinetik fermentasi dan permodelan. Penekanan adalah terhadap penghasilan produk fermentasi dari sumber mikrob, haiwan dan tumbuhan

This course covers important aspects of fermentation technology such as isolation of microbes and improvement of strains for industrial applications, storage of microorganisms, media formulation, sterilization process, inocula preparation, bioreactor design, process control in fermentation, various

modes of fermenter operation and basic aspects of fermentation kinetics and modeling. Emphasis is on fermentation products from microbial, animal and plant sources

CAT4107 Rawatan Air dan Air Kumbahan / Water and Waste Water Treatment 3(2+1)

Prasyarat : Tiada

Kursus ini memberi penumpuan kepada kaedah penganalisaan dan perawatan air dan air kumbahan. Penekanan adalah kepada penggunaan teknologi yang mesra alam dan berkesan dalam mengawal punca pencemaran sumber-sumber air

This course focuses on the methods of analyzing and treatment of water and waste water. Emphasis is on application of technologies that are environmental friendly and effective in controlling sources of pollution of water resources

CAT4108 Pengurusan Sisa Perbandaran, Berbahaya dan Bioperubatan / Municipal, Hazardous and Biomedical Waste Management 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi pelbagai aspek dalam mengatasi masalah pelupusan dan perawatan sisa. Penekanan adalah kepada aspek perawatan sisa berasaskan bioteknologi

This course covers various aspects in waste disposal and treatment. Emphasis is on the aspects of waste treatment based on biotechnology

CPP4601 Pengurusan Perosak / Pest Management 3(2+1)

Prasyarat : Tiada

Kursus ini meliputi prinsip dan kaedah pengawalan perosak (serangga, penyakit dan nematod parasit) pada tanaman-tanaman pertanian. Penekanan adalah dibuat terhadap aspek ekologi pengawalan perosak, kaedah penilaian infestasi perosak, kerugian tanaman dan penggunaan langkah kawalan sesuai terutama sekali kawalan perosak secara bersepada

This course covers principles and methods in pest control (insects, diseases and nematode parasite) of agricultural crops. Emphasis is on ecological aspects of pest control, pest infestation evaluation, crop loss and adoption of suitable control measures especially on integrated pest management

CPT4802 Teknologi Lepastuai / Postharvest Technology 3(2+1)

Prasyarat : Tiada

Kursus ini meliputi prinsip dan teknologi yang digunakan dalam pengendalian lepastuai hasil tanaman. Fokus adalah kepada hormon, manipulasi suhu dan kelembapan bagi mengawal pemasakan serta penyimpanan. Penggunaan teknologi bersesuaian dalam penggredan, pemprosesan dan penyimpanan diutamakan

This course covers principles and technology in postharvest handling of crop product. Focus is on hormone, temperature and moisture manipulation for controlling ripening and storage. Suitable technology for grading, processing and storing are emphasised

CPT4804 Pengendalian dan Pengangkutan Produk Bioindustri / Handling and Transportation of Bioindustry Product 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi kaedah dalam pengendalian dan pengangkutan produk hasilan bioindustri dengan menfokuskan kepada kualiti dan jangka hayat produk. Penekanan adalah kepada terhadap aspek pengekalan kualiti bioproduk

This course covers methods in handling and transportation of bioindustrial product by focusing on product quality and life span. Emphasis is on aspects of quality conservation of the bioproduct

CPT4805 Teknologi Pemprosesan Hiliran / *Downstream Processing Technology* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi prinsip dan kaedah dalam aktiviti pemprosesan hiliran bio-produk. Penekanan adalah kepada penghasilan produk hiliran yang berkualiti

This course covers the principles and methods in downstream processing of bio-products. Emphasis is on production of quality downstream products

CPT4806 Teknologi Pemprosesan Hasilan Tanaman / *Crop Produce Processing Technology* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi pemprosesan hasil tanaman, sifat hasil tanaman, prinsip teknologi pemprosesan, pemprosesan hasilan tanaman komoditi dan makanan dengan menekankan kepada penggunaan teknologi

This course covers processing of crop produce, characteristics of crop produce, principle of processing technology, processing of commodity and food crops with emphasis on utilization of technology

CSS4700 Ekologi Pencemaran / *Pollution Ecology* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi aspek ekologi, ekotoksikologi dan biodiversiti yang tertumpu kepada punca serta kesan pencemaran. Penekanan dibuat terhadap kesan pencemaran, kaedah pengukuran dan kaedah pemuliharaan.

This course covers ecology, ecotoxicology and biodiversity aspects that focuses on the sources and effects of pollution. Emphasis is on the effects of pollution, methods of assessment and conservation

CSS4701 Pengurusan Tanah Lestari / *Sustainable Land Management* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi konsep penggunaan tanah secara lestari, cara menilai kualiti tanah dan keperluan pemuliharaan serta peranan tanah sebagai singki untuk bahan pencemaran. Penekanan dibuat terhadap cara pengurusan dan penggunaan tanah

This course encompasses the concept of sustainable land use, methods of assessing land quality and improvement requirement as well as land purpose as sink for pollutants. Emphasis is given on the management and uses of land

SAB4401 Pemasaran Produk Agri-Bio / *Marketing of Agro-bio Product* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi prinsip pemasaran, arah aliran dan masalah pemasaran produk agro-bio. Struktur, gelagat dan sistem aktiviti pemasaran meliputi risiko pasaran juga diberi tumpuan. Kursus ini juga menekankan pengurusan aktiviti pemasaran dalam industri agro-bio dengan menekankan penggunaan campuran pemasaran dalam membentuk pelan pemasaran lestari

This course covers principles of marketing, trends and problems in marketing of agro-bio products. Structure, behaviour, and system of marketing activities, which include marketing risk are also being emphasised. This course also focuses on the management of marketing activities in agro-bio industries which emphasises on the application of marketing mix in the formation of a sustainable marketing plan

SFC3200 Kaedah Instrumentasi / *Instrumental Methods*

3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi pengetahuan secara teori dan praktik tentang pelbagai kaedah instrumentasi. Kursus ini menumpukan kepada penggunaan instrumen moden yang biasa digunakan di dalam makmal penyelidikan dan industri. Teori dan aplikasi teknik instrumen seperti spektroskopi, kromatografi, analisis terma dan bioteknologi turut dibincangkan. Teknik membangunkan kaedah, penyediaan sampel, mengoptimumkan keadaan operasi untuk mendapatkan ketepatan tinggi, mendapatkan keputusan yang boleh diulangi dan analisis data juga diperkenalkan

This course covers theoretical and practical knowledge of a variety of analytical instrumentation. The course concentrates on the modern instrumentation commonly use in industrial and research laboratories. The theory and application of instrumental techniques such as spectroscopy, chromatography, thermal analysis and biotechnology are discussed. The techniques of method development, sample preparation, optimization of operating conditions to obtain high accuracy, reproducible results and data analysis are also introduced

Jabatan Sains Haiwan dan Perikanan / Department of Animal Science and Fishery

PPT3301 Prinsip Pengurusan dan Pemasaran Pertanian / *Principles of Agricultural Management and Marketing* 3 (3+0)

Prasyarat : Tiada

Kursus ini merangkumi konsep asas pengurusan dan pemasaran pertanian, persekitaran pasaran serta kesan dasar kerajaan terhadap perniagaantani.

This course encompasses basic concepts of agricultural marketing and management, marketing environment and influence of government policies on agribusiness.

PPT3701 Keusahawanan Pertanian / *Agricultural Entrepreneurship* 3 (1+2)

Prasyarat : Tiada

Kursus ini merangkumi konsep keusahawanan, ciri usahawan, penyediaan pelan perniagaan, pelaksanaan projek, pemasaran, kredit, strategi dan pengurusan sumber serta isu semasa mengenai keusahawanan dalam pertanian.

This course covers the concepts of entrepreneurship, the characteristics of an entrepreneur, preparation of a business plan, implementation of project marketing, credit, business strategies, management of resources and current issues of entrepreneurship in agriculture.

EPT3102 Ekonomi Pertanian / *Agricultural Economics* 3 (2+1)

Prasyarat : ECN3100

Kursus ini merangkumi aplikasi konsep asas teori ekonomi dalam bidang pertanian serta kaitannya dengan struktur pasaran, penawaran dan permintaan, dasar kerajaan, dan perdagangan antarabangsa.

This course covers the application of basic concept of economic theory in the field of agriculture and its relation to market structure, supply and demand, government policies, and international trade.

TKP3206 Pengembangan Akuakultur / *Aquaculture Extension* 2 (1+1)

Prasyarat : Tiada

Kursus ini merangkumi kemahiran dan pengetahuan untuk membangunkan program dan latihan yang berkesan dalam khidmat pengembangan akuakultur kepada komuniti. Projek pengembangan dalam akuakultur dilaksana berdasarkan pembangunan ekonomi dan komuniti.

This course covers the skills and knowledge to develop effective programs and training in aquaculture extension services to community. Extension projects in aquaculture are conducted based on economics and community development.

AKU3103 Iktiologi / *Ichthyology* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi kepelbagaian biologi dan ekologi ikan. Perbandingan struktur, tabiat dan keupayaan penyesuaian ikan di ruang geografi yang berbeza dibincangkan.

This course covers the diversity of fish biology and ecology. Comparison in structural, behavioural and adaptive ability of fishes in diverse geographical spaces are discussed.

AKU3105 Biologi Invertebrat Akuatik / *Biology of Aquatic Invertebrates*

3 (2+1)

Prasyarat : Tiada

Kursus ini meliputi diversiti dan ciri biologi kumpulan dan spesies invertebrat akuatik yang hidup dalam ekosistem marin dan air tawar. Pertalian ciri adaptasi dan kemandirian invertebrat dengan struktur dan sistem biologinya ditekankan.

The course covers diversity and biological characteristics of groups and species of aquatic invertebrates living in marine and freshwater ecosystems. Relationship between adaptation and survival of invertebrates with its structure and biological system is emphasised.

AKU3106 Botani Akuatik / *Aquatic Botany*

3 (2+1)

Prasyarat : Tiada

Kursus ini meliputi taksonomi dan pengelasan, ciri morfologi penting bagi setiap kumpulan utama tumbuhan akuatik berdasarkan persekitaran air tawar dan marin. Kegunaan, kepentingan dan ancaman terhadap tumbuhan akuatik dibincangkan.

This course covers the taxonomy and classification, important characteristic for each main group of aquatic plants based on the freshwater and marine environments. Utilization, importance and threats to aquatic plants are discussed.

AKU3108 Statistik Dan Penyelidikan Dalam Akuakultur / *Statistics and Research in Aquaculture* 4 (3+1)

Prasyarat : Tiada

Kursus ini merangkumi asas statistik dan analisis data dalam akuakultur dan perikanan. Kursus ini menekankan interpretasi hasil analisis data dalam situasi sebenar, selain menekankan rekabentuk eksperimen dengan menggunakan formulasi statistik yang sesuai.

This course covers the fundamental of statistics and data analysis in aquaculture and fisheries. This course emphasises on interpretation of results of data analysis in the real-life situation, besides emphasises on the experimental design using appropriate statistical formulation.

AKU3109 Fisiologi Ikan dan Biokimia / *Fish Physiology and Biochemistry*

3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi sistem, fungsi dan komponen utama fisiologi untuk homeostasis berterusan dalam hidupan akuatik. Proses biokimia dan fisiologi ikan yang relevan dengan persekitaran dan pelbagai laluan metabolisme dalam organisme akuatik ditekankan.

This course covers the main system, function and physiological components for continuous homeostasis in aquatic life. Biochemical and fish physiological processes relevant to the environment and various metabolic pathways in aquatic organisms are emphasized.

AKU3201 Prinsip Akuakultur / *Principles Of Aquaculture*

3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi prinsip asas akuakultur untuk sekuriti makanan. Proses yang terlibat dalam pra-produksi, produksi, dan pasca-produksi akuakultur yang lestari mengikut piawaian yang ditetapkan dibincangkan.

This course covers basic principle of aquaculture for food security. The processes involved in pre-production, production and post-production of sustainable aquaculture according to standard practices are discussed.

AKU3210 Kultur Ikan / *Finfish Culture* 3 (1+2)

Prasyarat : Tiada

Kursus ini merangkumi pengkulturan dan pengurusan ikan makanan air tawar dan marin. Penekanan diberi kepada penjagaan, pengurusan pemakanan, pengurusan air, amalan akuakultur baik dan pengendalian pasca tuai.

This course covers culture and management of food fish both in fresh and seawater. This course emphasises husbandry, feed management, water management, good aquaculture practices and post harvest handling.

AKU3301 Genetik dan Pembiakbakaan Ikan / *Fish Genetics And Breeding* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi konsep genetik, pembiakbakaan ikan, penghibridan dan kejuruteraan genetik. Penyelesaian masalah dalam pemilihan baka ikan dibincangkan.

This course covers concepts of fish genetics, breeding, hybridisation and genetic engineering. Problem solving for selective breeding in fish are discussed.

AKU3302 Teknologi Pemberian Ikan dan Pengurusan Fri / *Fish Seed Technology And Fry Management* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi biologi pembiakan ikan, teknik pemberian ikan, larvikultur, pengurusan, pembungkusan dan pengangkutan fri. Permasalahan dalam pembiakan ikan dibincangkan

This course covers fish reproductive biology, fish seed production techniques, larviculture, management, packaging and transportation of fry. Issues in fish breeding are discussed.

AKU3401 Pemakanan Akuakultur / *Aquaculture Nutrition* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi amalan penyediaan dan pemberian makanan dalam akuakultur. Nutrisi dalam bahan makanan untuk pertumbuhan optima haiwan akuatik, isu semasa dan kekangan dalam pemakanan akuakultur diberi penekanan.

This course covers preparation and feeding practices in aquaculture. Nutrition in feed ingredients for optimal growth of aquatic animals, current issues and limitations in aquaculture nutrition are emphasized.

AKU3501 Pengurusan Kesihatan Ikan / *Fish Health Management* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi konsep patologi, mikrobiologi dan parasitologi berhubung dengan penyakit ikan, tatacara diagnosis, kawalan dan rawatan. Kepentingan amalan pengurusan yang baik, pengawalan dan pencegahan penyakit dalam akuakultur dibincangkan.

This course covers concepts of pathology, microbiology and parasitology in relation to fish diseases, diagnostic procedures, control and treatment. The importance of good husbandry, control and prevention of diseases in aquaculture are discussed.

AKU3601	Kualiti Air dan Tanah dalam Akuakultur / <i>Water and Soil Quality in Aquaculture</i>	3 (2+1)
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Prasyarat : Tiada

Kursus ini merangkumi teori dan penentuan kualiti air dan tanah untuk pemilihan tapak. Analisis dan tafsiran kimia dan fizikal air dan tanah diberi penekanan.

This course covers theory and determination of water and soil quality for site selection. Analysis and interpretation of physico chemical of water and soil are emphasized.

AKU3602	Ekologi Akuatik / <i>Aquatic Ecology</i>	3 (2+1)
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Prasyarat : Tiada

Kursus ini meliputi komponen utama ekologi akuatik dan teknik ukuran parameter ekologi. Impak negatif terhadap ekosistem akuatik dan kaedah pemantauan serta pemulihan dibincangkan.

This course covers the major components of aquatic ecology and ecological parameters measurement techniques. Negative impacts towards aquatic ecosystem as well as the monitoring and the remediation techniques are discussed.

AKU3801	Pasca Tuai Dalam Akuakultur/ <i>Postharvest In Aquaculture</i>	3 (2+1)
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Prasyarat : Tiada

Kursus ini merangkumi pengendalian pelbagai produk akuakultur, pemprosesan dan pengawalan kualiti. Produk akuatik ditambah nilai dan sampingan dibincangkan.

This course covers handling of various types of aquatic produce, processing and quality control. Value added product and byproduct of aquatic produce are discussed.

AKU3802	Inovasi dalam Akuakultur / <i>Innovation in Aquaculture</i>	3 (1+2)
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Prasyarat : Tiada

Kursus ini merangkumi teori dan inovasi produk, kekangan dan cabaran dalam sektor akuakultur. Kreativiti dan inovasi produk dan teknologi akuakultur ditekankan.

This course covers theory and product innovation, constraint and challenges in aquaculture sector. Creativity and innovation of product and aquaculture technology are emphasized.

AKU4101	Penilaian dan Pengurusan Sumber Perikanan / <i>Fisheries Resource Assessment and Management</i>	3(2+1)
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Prasyarat : Tiada

Kursus ini merangkumi pengelasan sumber perikanan, teknik penangkapan ikan dan polisi, dinamik populasi dan pengurusan perikanan. Aplikasi perisian komputer dalam penilaian stok ikan dan pengurusan sumber perikanan yang lestari dibincangkan.

This course covers the classification of fishery resources, fishing techniques and policies, population dynamics and management of fisheries. Application of computer software in fish stock assessment and sustainable fisheries resource management are discussed.

AKU4102 Limnologi / Limnology 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi komponen biotik dan produktiviti biologi dalam ekosistem air tawar serta proses fiziko-kimia yang mempengaruhinya. Kepentingan dan aplikasi limnologi dalam pengurusan Perikanan darat dan akuakultur ditekankan.

This course covers the biotic components and biological productivity of fresh water ecosystems and the physico-chemical processes affecting them. The importance and application of limnology in inland fisheries and aquaculture management are emphasized.

AKU4103 Oseanografi / Oceanography 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi faktor fizikal, kimia dan biologi dalam ekosistem lautan. Impak aktiviti antropogenik, perubahan iklim dan penyelesaian kepada kesan tersebut dibincangkan untuk kelestarian perikanan dan akuakultur.

This course covers physical, chemical and biological factors in marine ecosystems. Impacts of anthropogenic activities, climate change and the solutions are discussed for the sustainability of fisheries and aquaculture.

AKU4202 Kultur Ikan dan Tumbuhan Hiasan Akuatik / Culture of Ornamental Fish and Aquatic Plants 3 (1+2)

Prasyarat : Tiada

Kursus ini merangkumi pengkulturan ikan dan tumbuhan hiasan akuatik terpilih. Kaedah dan manipulasi dalam pengkulturan serta pengurusan ikan dan tumbuhan hiasan akuatik yang berpotensi untuk pengkomersialan dibincangkan.

This course covers the cultures of selected ornamental fishes and aquatic plants. Methods and manipulation of cultures as well as management of potential ornamental fishes and plants for commercialization are discussed.

AKU4203 Sistem Pengeluaran Akuakultur / Aquaculture Production Systems 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi reka bentuk, pemilihan peralatan asas dan pembinaan pelbagai sistem akuakultur. Pengurusan dan kecekapan sistem untuk operasi optima dibincangkan.

This course covers design, basic equipment selection and construction of various aquaculture systems. The management and efficiency of the systems for optimal operation are discussed.

AKU4204 Kultur Spesies Unik / Unique Species Culture 2 (2+0)

Prasyarat : Tiada

Kursus ini merangkumi teknik kultur dan pengurusan pelbagai spesies akuatik unik di perairan Malaysia. Spesies unik marin dan air tawar yang belum dikultur secara komersial dalam industri akuakultur di Malaysia ditekankan. Kegunaan produk dari setiap spesies unik dibincangkan.

The course encompasses the culture techniques and management of various unique aquatic species in Malaysian waters. Marine and fresh water unique species which are yet to be cultured commercially in Malaysian aquaculture industry are emphasised. Usage of product from each unique species are discussed.

AKU4221 Kultur Krustasea / Crustacean Culture 3 (1+2)

Prasyarat : Tiada

Kursus ini merangkumi biologi dan kemahiran pengkulturan krustasea komersial terpilih. Isu dan permasalahan dalam industri kultur haiwan krustasea dibincangkan.

This course covers the biology and skills of culture on selected commercial crustaceans. Issues and problems in crustacean culture industry are discussed.

AKU4231 Kultur Molusk / *Mollusc Culture* 3 (1+2)

Prasyarat : Tiada

Kursus ini meliputi kultur spesies moluska komersial. Penambahbaikan spesies yang dikultur melalui pemilihan genetik dan manipulasi prosedur pengkulturan ditekankan. Pemuliharaan dan pengurusan dalam akuakultur ekstraktif organik dibincangkan.

The course covers the culture of commercial mollusc species. Improvement of cultured species through genetic selection and manipulation of culture procedures are emphasised. Conservation and management in organic extractive aquaculture are discussed.

AKU4301 Endokrinologi Ikan / *Fish Endocrinology* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi biosintesis kimia, struktur dan fungsi hormon daripada kelenjar endokrin. Permasalahan berkaitan dengan endokrinologi ikan ditekankan. Tindakbalas dan peranan hormon terhadap tekanan fizikal dan kimia dalam persekitaran akuatik dibincangkan.

This course covers the chemical biosynthesis, structures and functions of hormones from the endocrine glands. Problems related to fish endocrinology are emphasised. Reaction and roles of hormones on physical and chemical stresses in aquatic environment are discussed.

AKU4401 Teknologi Makanan Akuakultur / *Aquafeed Technology* 3 (1+2)

Prasyarat : Tiada

Kursus ini meliputi pelbagai rumusan makanan ikan dan teknologi pembuatan. Setiap peringkat pemprosesan dan pengawalan mutu makanan untuk industri akuakultur ditekankan.

This course covers various formulation and technologies for fish feed production. Every stage of feed processing and quality control for aquaculture industry are emphasized.

AKU4402 Pengeluaran Makanan Hidup dalam Akuakultur /
Live Food Production in Aquaculture 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi kepentingan pengeluaran makanan hidup dalam akuakultur. Jenis, teknik pengeluaran serta penyediaan makanan hidup dalam industri akuakultur diberi penekanan.

This course covers the importance of live food production in aquaculture. Types, production techniques and preparation of live food in aquaculture industry are emphasized.

AKU4243 Kultur Alga / *Algae Culture* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi pelbagai teknik pembiakan dan pengkulturan mikroalga dan makroalga. Alga komersial terpilih dari segi kepentingan ekologi dan ekonomi dibincangkan.

This course covers various propagation and culture techniques for microalgae and macroalgae culture. Selected commercial algae based on ecological and economical importance are discussed.

AKU4501 Mikrobiologi Akuatik / *Aquatic Microbiology* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi peranan, kesan, teknik pengesanan dan hubungan mikroorganisma dalam akuakultur. Kepentingan, aplikasi dan isu semasa mikrobiologi dalam akuakultur dibincangkan.

This course covers the roles, effects, identification techniques and relations of microorganisms in aquaculture. The importance, applications and current issues of microbiology in aquaculture are discussed.

AKU4502 Imunologi Ikan / *Fish Immunology* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi konsep, jenis, tindak balas dan pengawal ubah imun dalam sistem imuniti ikan. Kepentingan dan aplikasi imunologi ikan untuk pencegahan penyakit dalam akuakultur dibincangkan.

This course covers the concepts, types, responses and immunomodulators in fish immune system. The importance and application of fish immunology for diseases prevention in aquaculture are discussed.

AKU4601 Ekologi dan Pengurusan Tanah Basah / 3 (2+1)
Ecology and Management of Wetlands

Prasyarat : Tiada

Kursus ini merangkumi pelbagai ekosistem tanah basah semulajadi dan buatan, fungsi dan kepentingannya. Pengurusan pelbagai ekosistem tanah basah dan faktor yang mempengaruhi sumber hidupannya akibat perubahan iklim dan persekitaran dibincangkan.

This course covers the various natural and constructed wetland ecosystems, function and their importance. Management of various wetland ecosystems and factors affecting their living resources due to climate change and environment are discussed.

AKU4701 Teknologi Maklumat dan Komunikasi Dalam Akuakultur / 3 (1+2)
Information and Communications Technology in Aquaculture

Prasyarat : Tiada

Kursus ini merangkumi kegunaan dan kepentingan teknologi maklumat dan komunikasi (ICT) dalam akuakultur. Kesesuaian teknologi maklumat dan komunikasi dalam operasi dan pengurusan akuakultur dibincangkan.

This course covers the utilization and importance of information and communications technology in aquaculture. The suitability of communications and information technology in aquaculture operation and management is discussed.

AKU4801 Perikanan Rekreasi Dalam Ekopelancongan Perairan Darat / 3 (2+1)
Recreational Fisheries in Inland Waters Ecotourism

Prasyarat : Tiada

Kursus ini merangkumi konsep biologi dan sosio-ekonomi pengurusan perikanan rekreasi sebagai alternatif dalam pengurusan sumber. Pelaksanaan dan operasi perikanan rekreasi di Malaysia dan aspek eko-pelancongan dibincangkan.

This course covers on the concept of biology and socio-economic in recreational fisheries management as alternatives for resource management. Implementation and operation of recreational fisheries in Malaysia and aspect of eco-tourism are discussed.

AKU4802 Biologi Molekul Dalam Akuakultur / *Molecular Biology in Aquaculture* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi konsep dan teknik biologi molekul untuk sel tumbuhan, haiwan dan mikrob akuatik. Aplikasi teknologi kejuruteraan genetik dan isu semasa bioteknologi dalam akuakultur dibincangkan.

This course covers concepts and molecular biology techniques for cells of plants, animals and aquatic microbes. Application of genetic engineering and current issues of biotechnology in aquaculture are discussed.

AKU4804	Polisi dan Akta Untuk Perikanan dan Akuakultur / <i>Policy and Acts for Fisheries and Aquaculture</i>	2(2+0)
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Prasyarat : Tiada

Kursus ini merangkumi polisi, akta dan perundangan dalam bidang perikanan dan akuakultur. Pelaksanaan peraturan dan undang-undang perikanan dan akuakultur ditekankan. Kepentingan penguatkuasaan dalam mengurus sumber perikanan dan akuakultur dibincang.

This course covers the policy, act and legislation in fisheries and aquaculture. Implementation of rules and law in fisheries and aquaculture are emphasised. The importance of enforcement in fisheries and aquaculture resource management are discussed.

AKU4901	Latihan Industri / <i>Industrial Training</i>	12 (0+12)
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Prasyarat : Persetujuan Penyelaras

Kursus ini melibatkan penempatan pelajar di ladang akuakultur swasta atau kerajaan. Pendedahan praktikal kepada keadaan pekerjaan dan amalan pengurusan sebenar dalam bidang akuakultur dan perikanan diberikan penekanan melalui projek jangka pendek.

This course involves student attachment at a private or government aquaculture farm. A practical exposure to the actual working conditions and management practices carried out in the field of aquaculture and fisheries are emphasised through short term projects.

AKU4959	Disertasi Bacelor / <i>Bachelor Dissertation</i>	6 (0+6)
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Prasyarat : Tiada

Kursus ini merangkumi sorotan bahan rujukan, penggunaan teknik penyelidikan yang sesuai, pengumpulan dan analisis data, penafsiran keputusan, perbincangan, kesimpulan dan keaslian kajian saintifik dalam projek penyelidikan.

This course covers literature review, use of appropriate research techniques, data collection and analyses, interpretation of results, discussion, conclusion and originality of scientific studies in research project.

Jabatan Sains Perhutanan/ Department of Forestry Science

FHH3101 Sains Kayu / Wood Science

4 (3+1)

Prasyarat : Tiada

Kursus ini memperkenalkan kepada pelajar berkenaan kepentingan kayu dalam kehidupan manusia. Pengajaran akan menumpu kepada sifat anatomi, kimia, fizikal, dan mekanikal kayu serta perkaitannya dalam pemprosesan dan penghasilan produk berasas kayu. Pelajar akan didedahkan kepada teknik pengecaman pelbagai spesies kayu komersil

This course introduces student on the importance of wood to human life. The teaching will focus on the anatomical, chemical, physical, and mechanical properties of wood in relation to the processing and production of wood-based products. The student is exposed to the identification technique of various commercial wood species

FHH3201 Hasil Hutan Bukan Kayu / Non-Wood Forest Products

3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi sejarah, jenis hasil hutan bukan kayu seperti rotan, buluh, fitokimia tumbuhan ubatan dan palma. Proses pengumpulan dan agihan menggunakan teknologi sesuai dalam proses pembuatan produk akhir untuk pembangunan industri desa serta sosio-ekonomi

This course covers the history, types of non-wood forest products, i.e., rattan, bamboo, phytochemicals, medicinal plants and palms. Collection and its distribution process by means of appropriate technology in manufacturing end products towards the development of cottage industries as well as socio-economic development.

FHH3230 Kualiti Dan Hasil Kayu / Wood Quality and Products

3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi pengetahuan asas tentang kayu hutan ladang dan penggunaannya. Struktur dan sifat kayu serta kaedah untuk meningkatkan mutu kayu ditekankan. Kesan dan pengaruh penanaman semula termasuk kaedah pemangkasan, pemilihan dan pengeluaran balak ke atas kualiti kayu dibincangkan.

This course encompasses the basic knowledge about forest plantation woods and its utilization. Wood structure and properties as well as methods to improve wood quality are emphasized. Impact and effects of replanting including pruning, selection and production of quality timbers are discussed

FHM3103 Dendrologi Dipterokarpa / Dendrology of Dipterocarps

3 (2+1)

Prasyarat : Tiada

Kursus ini memperkenalkan kepada pelajar dendrologi dalam perhutanan dan taksonomi tumbuhan. Pengajaran menumpu kepada morfologi untuk pengecaman tumbuhan Gimnosperma dan Angiosperma. Pelajar juga didedahkan kepada nilai kepelbagaiannya tumbuhan dan habitatnya.

This course introduces student to dendrology in forestry and plant taxonomy. The teaching focuses on morphological characters for identification of Gymnosperm and Angiosperm. Students are also exposed to value of diversities of plants and its habitats.

FHM3104 Dendrologi Bukan Dipterokarpa / Dendrology of Non-Dipterocarps

2 (1+1)

Prasyarat : Tiada

Kursus ini membincangkan dendrologi famili bukan Dipterokarpa. Penekanan diberikan kepada tatanama moden, habitat tumbuhan, kekunci pengecaman, petunjuk botani dan pengumpulan spesimen herbarium. Huraihan famili dan genus bukan dipterokarpa serta kepentingannya dalam perhutanan dibincangkan.

This course discuss on the dendrology of family non-Dipterocarps. Emphasizes are on modern nomenclature, plant habitats, keys identification, botanical indicators and collection of herbarium specimens. Description on family and genera for non-dipterocarps and its importance in forestry is discussed.

FHM3105 Fisiologi Pokok / Tree Physiology 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi peranan, fungsi dan proses fisiologi pokok dalam ekosistem perhutanan seperti fotosintesis, metabolism karbohidrat, asimilasi dan respirasi. Hubungkait antara proses fisiologi pokok dengan faktor persekitaran seperti penyerapan, pergerakan dan kehilangan air dari pokok dan pembiakan seksual dan aseksual dibincangkan. Kursus ini menumpukan kepada teknik pengukuran fisiologi pokok yang bersesuaian.

This course covers the role, function and process of tree physiology within forest ecosystem includes photosynthesis, carbohydrate metabolism, assimilation and respiration. The relationship between tree physiological processes with environmental factor such as absorption, movement and loss of water, and sexual and asexual reproductions is discussed. This course focusses on the appropriate techniques for tree physiological measurement.

FHM3106 Ekologi Hutan / Forest Ecology 3 (2+1)

Prasyarat : Tiada

Kursus ini memberi penekanan kepada konsep ekologi yang mencakupi faktor persekitaran seperti faktor edafik, iklim dan biotik yang mempengaruhi perkembangan tumbuhan, pengelasan hutan serta dinamik komuniti tumbuhan dan proses seperti pengeluaran bahan organik, aliran tenaga dan kitaran nutrient.

This course emphasises on ecological concept, including environmental factors such as edaphic, climatic and biotic variables that influence the growth and development of vegetation, forest classification as well as community dynamics and processes such as organic matter production, energy flow and nutrient cycling.

FHM3107 Tanah Hutan / Forest Soil 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi topik sains tanah termasuk sifat kimia, fizikal dan biologi; pengecaman dan pengelasan tanah, kesan aktiviti hutan terhadap ciri tanah serta indeks tapak.

This course covers topics in soil sciences including chemical, physical and biological properties, soil classification and identification, effects of forest activities on soil properties as well as site index.

FHM3108 Entomologi Hutan / Forest Entomology 2 (1+1)

Prasyarat : Tiada

Kursus ini merangkumi kaedah mengenal pasti dan pengelasan serangga hutan terpilih. Pelajar dapat memahami ekologi, biologi dan kepentingan serangga berkaitan dengan pokok hutan asli, hutan ladang dan hutan bandar. Penelitian kaedah diagnosis, persampelan dan pengawalan serangga perosak pokok berdasarkan kepada prinsip pengurusan serangga perosak bersepadu ditekankan.

This course encompasses the identification and classification of selected forest insects. Students will understand the ecology, biology and importance of insects associated with natural forest, plantation and urban forest. Methods of diagnosing, sampling and tree insect pest control based on insect pest management principles are emphasized.

FHM3109 Patologi Hutan / Forest Pathology 2 (1+1)

Prasyarat : Tiada

Kursus ini merangkumi konsep penyakit pokok, simptom dan tanda penyakit. Penekanan diberi kepada faktor di dalam pembentukan penyakit, diagnosis penyakit, pengelasan kulat patogen, biologi patogen yang penting, dan patogenesis. Hubung kait hos dan patogen, mekanisme pertahanan dan kaedah pengawalan bagi penyakit pokok hutan juga dibincangkan.

This course covers plant disease concept, disease symptoms and signs. Empasis is given on factors in disease formation, disease diagnosis, classification of fungal pathogen, biology of important pathogens and pathogenesis. Host and pathogen interaction, defense mechanism, and control methods for forest tree diseases are also discussed.

FHM3110 Ekonomi Perhutanan / Forestry Economics 3 (3+0)

Prasyarat : Tiada

Kursus ini merangkumi konsep dan teori dalam ekonomi perhutanan. Ini termasuklah struktur pasaran, ekonomi pengeluaran, permintaan dan penawaran barang perkhidmatan hutan. Penekanan diberikan kepada penilaian ekonomi sumber hutan dan bayaran ke atas perkhidmatan ekosistem (PES). Analisis pelaburan projek perhutanan, serta peranan sektor perhutanan dalam pembangunan ekonomi dibincangkan.

This course covers concepts and theories in forest economic. These include of market structure, production economics, demand and supply of forest goods and services. Economic valuation of forest resources and payment for ecosystem services (PES) are emphasized. Investment analysis of forestry projects, and the role of forestry sector in national economic development are discussed.

FHM3112 Kaedah Kuantitatif Dalam Perhutanan / Quantitative Methods in Forestry 4 (3+1)

Prasyarat : Tiada

Kursus ini merangkumi pemerihalan dan analisis data parametrik dan bukan parametrik dalam perhutanan. Penekanan diberikan kepada pola pembolehubah rawak dan taburan umum parametrik. Teknik pensampelan, rekabentuk ujikaji, ralat ujikaji, korelasi dan regresi linear dibincangkan.

This course covers parametric and non-parametric of data description and analyses in forestry. The pattern of random variables and some common distributions of parameters are emphasized. Sampling techniques, experimental designs, experimental errors, correlations and linear regression are discussed

FHM3201 Survei Hutan / Forest Survey 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi prinsip asas survei hutan, teknik ukuran linear dan sudut yang digunakan dalam perhutanan. Kandungan kursus termasuk kaedah pengukuran kawasan hutan dan penyediaan pelan. Teknik pengiraan ketepatan data dan pembetulan yang bersesuaian dibincangkan.

This course covers the basic principles of forest survey, technique of linear and angular measurements which are applied in forestry. The content of this course includes methods of forest area measurement and plan preparation. Calculation technique for data accuracy and appropriate corrections are discussed

FHM3202 Sukatan Hutan / Forest Mensuration 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi prinsip pengukuran dan pengukuran pokok, dengan memberi penekanan kepada perkaitan antara , penaksiran dan pembolehubah pokok dan dirian hutan., Pertambahan dan pertumbuhan hasil, indeks tapak, stok, kepadatan dirian, termasuk perancangan dan pelaksanaan inventori sumber hutan berdasarkan teknik pensampelan yang digunakan di Malaysia turut dibincangkan.

This course covers the principles of measurement and tree measurement with emphasis on relationship between assessment and tree and stand variables. Growth and yield increment, site index, stocking, stand density including planning and conducting forest resource inventory according to sampling techniques used in Malaysia are also discussed.

FHM3203 Sivikultur Hutan / Forest Silviculture 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi konsep dan teori silvikultur, sistem silvikultur am yang diamalkan dalam perhutanan tropika. Penekanan diberikan kepada perkembangan sistem silvikultur di Malaysia termasuk sistem dan kaedah terkini. Diantara aspek yang dibincangkan adalah pengenalan dan penubuhan lading hutan serta rawatan silvikultur yang bersesuaian.

This course encompasses the concepts and theory of silviculture, general silvicultural systems practiced in tropical forest., Emphasized is given to the development of silviculture system in Malaysia that includes the current systems and methods. Aspects of introduction and establishment of forest plantation as well as appropriate silviculture treatments are discussed.

FHM3204 Kejuruteraan Hutan / Forest Engineering 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi kejuruteraan hutan, sains bahan binaan, penganalisaan kestabilan tebing dan dinding penahan, torque, rimpul, jentera perhutanan terpilih serta ekonomi kejuruteraan hutan yang merangkumi kos mesin dan penggantian termasuk penilaian kos alternatif.

This course encompasses forest engineering, building material science, analysis of slope stability and retaining wall, torque, rimpull, selected forest machinery as well as economics of forest engineering including costs of machinery and replacement, including evaluation of alternative costs.

FHM3206 Sistem Maklumat Geografi Dalam Perhutanan / Geographic Information System in Forestry 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi konsep asas sistem maklumat geografi (GIS). Kandungan kursus termasuk kaedah reka bentuk dan pembangunan pengkalan data, automasi, pemprosesan, analisis, paparan dan pemodelan data. Ia penting untuk menyokong proses membuat keputusan, termasuk kajian kes sistem maklumat geografi dalam perhutanan.

This course covers basic concepts of geographic information system (GIS). The content of this course includes method of design and data base development, automation, processing, analysis, display, and modelling of data. It is to support decision making, including case studies of GIS in forestry.

FHM3213 Perhutanan Tani / Agroforestry 3 (2+1)

Prasyarat : Tiada

Kursus ini memperkenalkan prinsip dan amalan perhutanan tani di kawasan tropika. Pengajaran akan memfokuskan kepada jenis amalan perhutanan tani, interaksi sistem perhutanan tani dengan alam sekitar dan sosial. Analisa ekonomi digunakan untuk menentukan hasil pulangan yang positif terhadap sistem perhutanan tani yang diamalkan.

This course introduces principle of tropical agroforestry system in tropic. The teaching focuses on appropriate systems and the interactions of the agroforestry system with the environment and social. Economic analysis is used to assess the positive return of the agroforestry system.

FHM3214 Teknologi Biji Benih / Seed Technology 2 (1+1)

Prasyarat : Tiada

Kursus ini merangkumi isu berkaitan dengan pengeluaran biji benih bagi spesis pokok hutan terpilih dan tanaman serat. Penekanan terhadap teknologi biji benih dan kesannya kepada hasil dan kualiti biji

benih akan dibincangkan. Aspek fisiologi pengeluaran biji benih termasuk fenologi, dormansi dan penyimpanan; serta keputusan sistem sokongan seperti pensijilan biji benih dan penyelidikan biji benih diberi penekanan.

The course discussed issue related to seed production of selected forest species and fibre crops. Seed technology and its potential effects on the yield and quality of seeds are emphasized. Physiological aspects of seed production including phenology, dormancy and storage; and the decision support system such as seed certification and seed research are emphasized

FHM3217 Sistem Penuaian Dalam Ladang Hutan / *Harvesting System in Forest Plantations* 3 (2+1)

Prasyarat : Tiada

Kursus ini membincangkan penyediaan pelan penuaian ladang hutan secara berkekalan. Ia merangkumi proses menganalisa kadar pengeluaran balak, kos penuaian, dan pengawalan kos. Aspek penting dalam pembinaan jalan ladang hutan, sistem dan teknik penuaian ladang hutan dan kitaran tebangan di ladang hutan dibincangkan.

This course will discuss the preparation of sustainable forest plantation harvesting plan. It includes analyzing the rate of timber production, harvesting costs, and controlling costs. Important aspects within the construction of forest plantations roads, planted forest harvesting systems and techniques, and cutting cycle in forest plantation are discussed.

FHM3218 Penghasilan Bahan Tanaman Hutan Ladang / *Planting Material Production for Forest Plantation* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi pelbagai kaedah biologi dalam menghasilkan bahan tanaman ladang hutan. Ini termasuklah pembiakan semula jadi tumbuhan, kultur tisu, pemilihan genetik, DNA rekombinan dan tumbuhan transgenik. Penekanan diberikan dalam menghasilkan produk yang berkualiti bagi mencapai matlamat operasi ladang hutan.

The course comprises various techniques in producing plant material for forest plantations. These includes natural breeding, tissue culture, genetic selection, DNA recombinant and transgenic plant. Emphasis is given in producing a quality product to achieve the operational goals of forest plantations.

FHM3301 Pengurusan Hutan / *Forest Management* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi fungsi dan kepentingan pengurusan hutan secara berkekalan di Malaysia. Amalan dan piawaian pengurusan hutan antarabangsa berkaitan dengan hasil berkekalan, giliran dan pusingan tebangan, pengendalian stok, hasil dan kawalan tebangan berkaitan sistem pengurusan hutan di Malaysia dibincangkan. Penekanan diberi kepada keperluan pensijilan hutan dan pengesahan produk kayu dari sumber yang berkekalan.

This course covers the functions and importance of sustainable forest management in Malaysia. The principles and standard of international forest management related to the sustainable yield, rotation and cutting cycle, the manipulation of growing stock, yield, and regulation of fellings related to forest management system in Malaysia are discussed. Forest certification and verification of forest products from sustainable forest are emphasized.

FHM3303 Pengurusan Hidupan Liar / *Wildlife Management* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi pengelasan dan aspek ekologi hidupan liar di Malaysia termasuk dinamik populasi, keperluan habitat, tekanan dan gangguan kepada habitat asal. Pengukuran populasi melalui teknik pensampelan bagi anggaran populasi ditekankan. Prinsip pengurusan hutan bagi hidupan liar termasuk pemuliharaan, status kini dan masa hadapan, fungsi agensi, dasar dan polisi negara dan kesedaran umum dibincangkan

The course encompasses classification and ecological aspect of wildlife in Malaysia includes population dynamics, habitat requirement, pressure and disturbance of original habitat. Population measurement through sampling techniques for population estimation is emphasized. Principles of forest management towards wildlife, conservation, current and future status, functions of agencies, national policies and public awareness is discussed.

FHM3304 Pengurusan Hutan Ladang / Forest Plantation Management 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi penubuhan dan pengurusan tapak semaihan sehingga tempoh kematangan hutan ladang. Penekanan diberikan kepada aktiviti hutan ladang termasuklah pengurusan sumber biji benih, penyediaan tapak, penanaman, jarak tanaman, pembajaan, perlindungan, penjarangan, pemangkasan dan giliran. Isu dan amalan baik dalam pengurusan hutan ladang.

This course encompasses the establishment and nursery management until maturity of forest plantation. Activities of forest plantation includes management of seed sources, site preparation, planting, espacement, fertilization, protection, thinning, pruning and rotation are emphasized. Issues and good practices in forest plantation management are covered

FHM3305 Pengurusan Kawasan Legeh / Watershed Management 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi masalah air dan langkah untuk mengatasinya, edaran hidrologi, kawasan tadahan hutan dan hubungannya dengan air hujan, air tanah, pemeluapan, air larian, banjir dan hakisan, kaedah kawalan kuantiti dan kualiti air dalam pengurusan kawasan legeh serta masalah sosial yang berkaitan.

This course covers water problems and approaches to their solutions, hydrological cycle, water catchment area and its relation to rainfall, ground water, evapotranspiration, runoff, floods and soil erosion, control methods for water quality and quantity in watershed management as well as related social problems.

FHM3306 Undang-Undang Dalam Perhutanan / Laws in Forestry 3 (3+0)

Prasyarat : Tiada

Kursus ini merangkumi peruntukan undang-undang dalam sektor perhutanan termasuk undang-undang berkaitan sumber semula jadi, alam sekitar, hidupan liar, taman negara dan air serta industri hilir. Perbezaan undang-undang di negeri-negeri berkaitan akan ditekankan. Penggunaan undang-undang dalam menangani masalah pengurusan hutan semasa dibincangkan.

This course encompasses provisions of laws in forestry sectors including natural resource, environment, wildlife, national parks, water and upstream industries. Differences between related state laws are emphasized. Application of laws to solve current forest management are discussed.

FHM3307 Penyelenggaraan Dan Pengurusan Tapak Semaian / Nursery Management and Maintenance 2 (1+1)

Prasyarat : Tiada

Kursus ini membincangkan asas penubuhan tapak semaihan mengikut amalan baik bagi tujuan pemuliharaan dan perniagaan. Penekanan diberi kepada teknik penubuhan tapak semaihan, penyelenggaraan tumbuhan dan infrastruktur tapak semaihan. Teknik menghasilkan stok tanaman dan pemasaran tumbuhan dibincangkan.

This course discusses basic of nursery establishment based on good practices for conservation and business purposes. Emphasized are given on nursery establishment techniques, plant and infrastructure maintenance. Plant propagation techniques and plant marketing are discussed

FHM3308 Pengurusan Kebakaran Dalam Ladang Hutan / *Fire Management in Forest Plantations* 2 (1+1)

Prasyarat : Tiada

Kursus ini meliputi konsep dan punca kebakaran ladang hutan. Ia menghuraikan kesan kebakaran kepada tanah, tumbuhan dan hidupan liar. Pelajar didedahkan kepada Fire Danger Rating System untuk Asia Tenggara dan aplikasinya dalam pengurusan kebakaran ladang hutan.

This course covers the concept and causes of fire in forest plantations. It explains effects of forest fire on soil, plants and wildlife. Students are exposed to Fire Danger Rating System for Southeast Asia and its application in the management of fire in forest plantations.

FHM3309 Pensijilan Ladang Hutan / *Forest Plantation Certification* 2 (1+1)

Prasyarat : Tiada

Kursus ini memberikan satu gambaran mengenai tujuan dan keperluan Kriteria dan Petunjuk Bagi Pensijilan Pengurusan Ladang Hutan Malaysia (MC&I Forest Plantations). Ia menerangkan pemahaman dan pentafsiran 10 prinsip dan 55 kriteria MC&I Forest Plantations. Peranan badan pentadbir national dalam membangunkan standard pensijilan dan proses pensijilan lain dikaji.

This course provides an overview of the purpose and requirements of the Malaysian Criteria and Indicators for Forest Plantation Management Certification (MC&I Forest Plantations). It explains on the understanding and interpretation of the 10 principles and 55 criteria of MC&I Forest Plantations. Role of national governing body in developing certification standards and other certification processes are studied.

FHM4101 Biodiversiti dan Pemuliharaan / *Biodiversity and Conservation* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi teori dan prinsip dalam skop biodiversiti dan pemuliharaan termasuk definisi, aras biodiversiti, definisi spesies, habitat, ekosistem dan kepentingan biodiversiti. Penekanan diberikan pada teknik pengukuran, penilaian dan pemantauan biodiversiti bagi tujuan pemuliharaan. Isu semasa, dasar biodiversiti kebangsaan, pengurusan dan mekanisme dalam pemuliharaan biodiversiti turut diliputi.

This course encompasses theory and principle in biodiversity and conservation that includes definition, level in biodiversity, definition of species, habitat, ecosystems and importance of biodiversity. Emphasis is given on measuring technique, assessment and biodiversity monitoring for conservation. Current issues, national biodiversity policy, management and mechanism for biodiversity conservation are covered.

FHM4201 Penderiaan Jauh Dalam Perhutanan / *Remote Sensing in Forestry* 3 (2+1)

Prasyarat : Tiada

Kursus ini memperkenalkan kepada pelajar teori asas penderiaan jauh dan prinsip asas pemprosesan imej satelit. Pengajaran akan memfokus kepada penggunaan perisian pemprosesan imej yang bersesuaian dengan aktiviti perhutanan. Pelajar akan diberi peluang untuk menganalisis data lapangan.

This course introduces students to basic theory on remote sensing and basic principles of satellite image processing. The teaching focuses on appropriate used image processing software. The student will be given the opportunity to analyze field data.

FHM4202	Penilaian Ekonomi Sumber Hutan Dan Biodiversiti / <i>Economic Valuation of Forest Resource and Biodiversity</i>	3 (2+1)
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Prasyarat : Tiada

Kursus ini merangkumi konsep asas dan kaedah dalam menjalankan penilaian ekonomi sumber hutan dan biodiversiti. Penekanan diberikan ke atas pembangunan mampan, kepentingan sumber hutan dan biodiversiti, masalah berkaitan dengan nyah hutan, konsep dan teori utiliti dan ekonomi kebajikan, jenis-jenis nilai ekonomi, pendekatan penilaian ekonomi, langkah terlibat dan kaedah penilaian ekonomi, perakaunan sumber hutan dan aplikasi penilaian ekonomi dalam perhutanan. Kajian kes dalam penilaian ekonomi sumber hutan dan biodiversiti dibincangkan.

This course covers the basic concepts and methods in conducting economic valuation of forest and biological resources. Emphasized are given on sustainable development, the importance of forest and biological resources, problems related to deforestation, concept and theory of utility and welfare economics, types of economic value, approaches in economic valuation, steps involved and methods of economic valuation, forest resource accounting and applications of economic valuation. Case studies in economic valuation of forest resources and biodiversity are covered.

FHM4203	Perhutanan Antarabangsa / <i>International Forestry</i>	2 (2+0)
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Prasyarat : Tiada

Kursus ini merangkumi status, klasifikasi hutan dunia dan isu semasa global berkaitan dengan sektor perhutanan. Perbincangan berkisar kepada organisasi perhutanan global dan nasional dan perjanjian antarabangsa serta kaitannya dengan pengurusan hutan.

This course covers status, classification of forest and current global issues related to forestry sectors. Discussion on global and national forestry organizations, and international treaty related to forest management.

FHM4206	Pengukuran Dan Pemantauan Karbon / <i>Carbon Measurement and Monitoring</i>	3 (2+1)
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Prasyarat : Tiada

Kursus ini merangkumi peranan hutan dengan perubahan iklim. Kerjasama antarabangsa oleh pelbagai pihak berkaitan untuk mengurangkan kesan perubahan iklim dunia dibincangkan. Penekanan diberikan keatas kaedah pengukuran dan pemantauan karbon di kawasan berhutan.

This course encompasses the role of forests in climate change. International cooperation by various related agencies in reducing the impact of global climate change is discussed. Emphasized is given on methods in measurement and monitoring of carbon in the forested area.

FHM4302	Konflik Manusia Dan Hidupan Liar / <i>Human and Wildlife Conflicts</i>	3 (3+0)
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Prasyarat : Tiada

Kursus ini merangkumi konsep pengurusan konflik dan peranan manusia dan hidupan liar. Pemahaman fungsi ekosistem dan keupayaan daya tampung sesuatu habitat ditekankan dalam penilaian konflik. Kaedah mitigasi untuk menangani konflik antara manusia dan hidupan liar ditekankan.

This course covers concept of conflict management and roles of human and wildlife. The understanding of ecosystem functions and carrying capacity are emphasized in evaluating human and wildlife conflicts. Mitigation methods for solving human and wildlife conflicts are emphasized.

FHM4304	Pengurusan Konflik Dalam Ladang Hutan / <i>Conflict Management in Forest Plantations</i>	3 (2+1)
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Prasyarat : Tiada

Kursus ini merangkumi konsep pengurusan konflik serta peranan manusia dalam mengurus ladang hutan. Kursus ini memberi fokus kepada konflik manusia dengan hidupan liar di ladang hutan. Kaedah untuk menangani konflik antara manusia dan sumber hutan serta isu tuntutan tanah dibincangkan.

This course covers conflict management concept, roles of human in managing forest plantations. The course focuses on human conflicts to wildlife in forest plantation. Methods for dealing with conflicts between human and forest resources and land claims issues are discussed.

FHS4903	Latihan Industri / <i>Industrial Training</i>	8 (0+8)
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Prasyarat : Tiada

Melalui kursus ini, pelajar didedahkan kepada persekitaran kerja yang sebenar di industri/organisasi. Latihan merangkumi aspek aplikasi teori dan praktikal yang telah dipelajari dengan amalan semasa di tempat kerja. Kemahiran menyelesaikan masalah dan komunikasi turut diberi penekanan.

In this course, students are exposed to real working environment in industries/organizations. Training includes application of the theoretical and practical aspects that have been studied with current practices in the workplace. Problem solving and communication skills are also emphasized.

FHS4904	Kem Perhutanan / <i>Forestry Camp</i>	2 (0+2)
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Prasyarat : Tiada

Kursus ini meliputi pendedahan awal kepada pelajar berkenaan kepentingan ekosistem hutan kepada masyarakat dan negara. Pelajar juga dilatih dengan pelbagai kemahiran perhutanan di lapangan, di samping membentuk sahsiah dan nilai dalam diri pelajar.

This course covers early exposure to the students on the importance of forest ecosystem towards the society and nation. Students are also trained with various forestry skills in the field, as well as developing students' character and values.

FHS4959A/FHS4959B	Disertasi Bacelor / <i>Bachelor Dissertation</i>	6 (0+6)
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Prasyarat : Tiada

Kursus ini merangkumi penyediaan cadangan, pelaksanaan dan penulisan saintifik untuk sesuatu projek penyelidikan. Pendekatan saintifik bagi menjana data secara sistematik melalui rekabentuk, pengumpulan dan analisis data yang sesuai diberi penekanan.

This course covers the preparation of proposal, implementation and scientific writing of research project. Scientific approach to generate data systematically through appropriate design, data collection and analysis are emphasized

KURSUS TAWARAN FAKULTI LAIN

(**Sila rujuk sinopsis pada fakulti berkenaan**)

1. FAKULTI PERTANIAN

1.1	PRT2008	Pertanian dan Manusia / <i>Agriculture and Man</i>	2(2+0)
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2. FAKULTI EKOLOGI MANUSIA

2.1	SKP2101	Kenegaraan Malaysia / <i>Malaysian Nationhood</i>	3(3+0)
2.2	SKP2203	Tamadun Islam dan Tamadun Asia / <i>Islamic Civilization and Asian Civilization</i>	2(2+0)
2.3	SKP2204	Hubungan Etnik / <i>Ethnic Relation</i>	2(2+0)

3. FAKULTI EKONOMI PENGURUSAN

3.1	MGM3180	Asas Keusahawanan / <i>Basic Entrepreneurship</i>	3(3+0)
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4. FAKULTI BAHASA MODEN DAN KOMUNIKASI

4.1	KOM3403	Pengucapan Awam / <i>Public Oration</i>	3 (3+0)
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5. PUSAT PEMAJUAN KOMPETENSI BAHASA

5.1	BBI2423	Academic Interaction and Presentation	3 (2+1)
5.2	BBI2424	Academic Writing	3 (2+1)

6. FAKULTI SAINS KOMPUTER DAN TEKNOLOGI MAKLUMAT

6.1	SSK3000	Teknologi Maklumat dan Penggunaannya / <i>Information Technology and its Applications</i>	3 (2+1)
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7. FAKULTI SAINS

7.1	MTH3003	Statistik bagi Sains Gunaan / <i>Statistics for Applied Sciences</i>	4 (3+1)
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8. FAKULTI PENGAJIAN PENDIDIKAN

8.1	FCE3204	Kemahiran Berfikir / <i>Thinking Skills</i>	2 (2+0)
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