

ILMU DEMI FAEDAH INSAN



PANDUAN PRASISWAZAH  
Sesi Akademik 2017/2018  
**Fakulti Biosumber dan  
Industri Makanan**

Universiti Sultan Zainal Abidin



# PANDUAN PRASISWAZAH

## Sesi Akademik 2017/2018

### Fakulti Biosumber dan Industri Makanan

Fakulti Biosumber dan Industri Makanan,  
Universiti Sultan Zainal Abidin, Kampus Besut • 2017

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FAKULTI BIOSUMBER DAN INDUSTRI MAKANAN  
Universiti Sultan Zainal Abidin  
Kampus Besut  
22200 Besut  
Terengganu, MALAYSIA.

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# Kata Alu-aluan Naib Canselor

**Assalamualaikum Warahmatullahi wa Barakatuh salam sejahtera dan salam 1 Malaysia.**



Saya dahului kata aluan dengan memanjatkan kesyukuran ke hadrat Illahi kerana dengan limpah rahmat dan izin-Nya, Buku Panduan Akademik Sesi 2017/2018 Fakulti Biosumber dan Industri Makanan (FBIM) Universiti Sultan Zainal Abidin (UniSZA) dapat diterbitkan.

Saya ingin mengucapkan selamat datang dan setinggi-tinggi tahniah kepada semua pelajar yang terpilih mengikuti pengajian di UniSZA. Sesungguhnya kehadiran saudara/saudari di UniSZA merupakan langkah yang tepat bagi melengkapkan dan mempersiapkan diri sebagai seorang insan cemerlang yang berilmu, berketerampilan serta mempunyai akhlak dan sifat kepimpinan terpuji untuk kesejahteraan agama, bangsa dan negara.

Objektif utama buku panduan ini diterbitkan adalah sebagai bahan rujukan bagi para pelajar FBIM dalam memahami dan mengenali fakulti, sistem akademik dan program pengajian yang ditawarkan. Saudara/saudari akan melalui fasa pengenalan kepada dunia ilmu pengetahuan. Ia bertujuan untuk membina minda dari aspek falsafah, konseptual dan spiritual serta mengukuhkan kepercayaan dan komitmen jitu untuk berbakti sepenuhnya kepada negara.

Akhir kata, syabas dan tahniah kepada semua pihak yang berganding bahu bagi menyiapkan penerbitan Buku Panduan Prasiswazah ini. Usaha yang diberikan sepatutnya menjadi contoh dan teladan yang perlu diikuti oleh semua warga UniSZA dan juga para pelajar sejajar dengan proses merealisasikan Ilmu Demi Faedah Insan.

Sekian, terima kasih.

**Profesor Dato' Dr. Ahmad Zubaidi A. Latif**

Naib Canselor  
Universiti Sultan Zainal Abidin

# Sekapur Sirih Dekan

**Assalamualaikum Wm. Wbt. dan salam sejahtera,**



Alhamdulillah, segala puji dan syukur ke hadrat Allah SWT. Selawat dan salam buat junjungan Nabi Muhammad s.a.w.

Saya ingin merakamkan ucapan tahniah dan syabas kepada saudara/i di atas kejayaan melanjutkan pengajian di Fakulti Biosumber dan Industri Makanan, Universiti Sultan Zainal Abidin. Saudara/i harus bersyukur kerana telah diberi peluang untuk meneruskan pengajian di Universiti Sultan Zainal Abidin dalam bidang yang telah saudara/i pilih demi mencapai cita-cita dan memenuhi harapan ibubapa serta keluarga yang tercinta.

Buku Panduan Prasiswazah Sesi Akademik 2017/2018 ini diterbitkan sebagai panduan dan rujukan kepada saudara/i untuk merancang pengajian dengan sebaik-baiknya sepanjang empat tahun pengajian. Maklumat yang dimuatkan dalam buku panduan ini juga diharapkan agar dapat membantu saudara/i untuk mengenali fakulti dan pusat pengajian serta program pengajian yang akan diikuti.

Saudara/i dinasihatkan untuk memanfaatkan sepenuhnya peluang yang diberikan semasa berada di kampus untuk meningkatkan kemampuan diri secara proaktif, bergiat aktif dalam aktiviti ko-kurikulum, melengkapkan diri dengan ilmu sains dan teknologi serta bidang kemahiran sesuai dengan keadaan semasa yang semakin mencabar.

Saudara/i juga dinasihatkan untuk menjalin hubungan yang baik dan bersefahaman dengan Penasihat Akademik yang telah dilantik untuk menangani perkara-perkara yang berkaitan dengan bidang masing-masing. Saudara/i juga perlu memahami dan sentiasa mematuhi Kaedah-kaedah dan Peraturan-peraturan yang telah ditetapkan oleh pihak pengurusan Universiti Sultan Zainal Abidin.

Selaras dengan misi dan visi universiti, fakulti berhasrat untuk melahirkan graduan yang cemerlang dalam aspek akademik dan bersahsiah tinggi. Oleh itu, saya berharap agar saudara/i dapat memberikan komitmen dan memanfaatkan sepenuhnya peluang pengajian semasa berada di kampus untuk meningkatkan ilmu pengetahuan. Sekian, terima kasih dan semoga berjaya. Sekian, terima kasih

**Prof Madya Dr Kamarul 'Ain Mustafa**

Dekan Fakulti Biosumber dan Industri Makanan

# Kalendar Akademik

## Program Ijazah Sarjana Muda

### Sesi 2017/2018

| Semester Pertama                                                     |                           |           |
|----------------------------------------------------------------------|---------------------------|-----------|
| Pendaftaran Diri Pelajar Ijazah Sarjana Muda Sesi Akademik 2016/2017 | 4 Sept 2017               | 1 Hari    |
| Minggu Mesra Siswa                                                   | 5 Sept – 9 Sept 2017      | 5 Hari    |
| Kuliah                                                               | 10 Sept – 2 Nov 2017      | 8 Minggu  |
| Cuti Pertengahan Semester                                            | 5 Nov – 9 Nov 2017        | 1 Minggu  |
| Kuliah                                                               | 12 Nov – 21 Dis 2017      | 6 Minggu  |
| Cuti Ulangkaji                                                       | 16 Dis – 19 Dis 2016      | 5 Hari    |
| Peperiksaan Akhir                                                    | 22 Dis 2017 – 26 Dis 2017 | 17 Hari   |
| Cuti Semester                                                        | 14 Jan – 27 Jan 2018      | 2 Minggu  |
| Semester Kedua                                                       |                           |           |
| Kuliah                                                               | 28 Jan – 15 Mac 2018      | 7 Minggu  |
| Cuti Pertengahan Semester                                            | 18 Mac – 22 Mac 2018      | 1 Minggu  |
| Kuliah                                                               | 25 Mac – 10 Mei 2018      | 7 Minggu  |
| Cuti Ulangkaji                                                       | 11 Mei – 15 Mei 2018      | 5 Hari    |
| Peperiksaan Akhir                                                    | 16 Mei – 31 Mei 2018      | 16 Hari   |
| Cuti Semester                                                        | 3 Jun – Sept 2018         | 13 Minggu |

**\*\* tertakluk kepada pindaan**

## Universiti Sultan Zainal Abidin Sepintas Lalu

Tradisi ilmu di Terengganu bersemarak dengan peranan umara' yang meletakkan ulama sebagai penasihat di Istana. Imbauan sejarah Islam di Terengganu menyaksikan semenjak dari zaman Sultan Zainal Abidin I telah menjadikan ulama sebagai penasihat istana, tetamu Diraja, guru, mufti dan syeikhul ulama. Apa jua gelaran yang diberi, hubungan rapat antara pemerintah dengan ulama menyemarakkan perkembangan Islam di Terengganu. Kemuncak penyebaran Islam di Terengganu adalah zaman pemerintahan Sultan Zainal Abidin III, di mana istana telah menjadi penyebaran ilmu agama. Berdamping rapat dengan ulama seperti Tok Ku Paloh dan Tok Syeikh Duyong untuk sama-sama mewarnai citra keislaman di Terengganu. Baginda sendiri mencemari menuntut ilmu di rumah-rumah ulama dan dikatakan selalu berulang-alik ke Paloh untuk berguru dengan Tok Ku Paloh.

Sebilangan ulama dan ilmuan mengakui Sultan Zainal Abidin III adalah antara Sultan Melayu yang paling alim pada zamannya. Dua ulama yang berasal dari dunia Melayu di Mekah yang paling dekat dan menjadi rujukan pelbagai masalah Baginda ialah Sheikh Muhammad bin Ismail al-Fathani (Syeikh Nik Mat Kecil) dan Syeikh Ahmad bin Muhammad Zain al Fathani.

Pertumbuhan dan perkembangan Islam di Terengganu memberi ruang kepada pertumbuhan institusi pondok yang diasaskan oleh Tok Pulau Manis pada zaman pemerintahan Sultan Zainal Abidin I (1726-1733M) sebagai pusat pengajian Islam yang mendorong kepada penubuhan sekolah agama atau madrasah Arab. Pada tahun 1925, sebuah madrasah al-Arabiah ditubuhkan di daerah Kuala Terengganu yang ditukarkan namanya kepada Madrasah Sultan Zainal Abidin pada tahun 1933. Penubuhan madrasah ini mendapat sokongan dan galakan daripada istana dan sultan pada ketika itu iaitu Sultan Terengganu yang ke-13, Sultan Zainal Abidin diambil sempena nama Baginda Almarhum Sultan Zainal Abidin III yang terkenal dengan sifat warak dan berpegang kuat kepada ajaran Islam.

Pada tahun 1980, Kerajaan Negeri Terengganu di bawah pimpinan Y.A.B. Dato' Seri Amar Diraja Tan Sri Haji Wan Mokhtar Ahmad selaku Menteri Besar Terengganu ketika itu telah menubuhkan Kolej Ugama Sultan Zainal Abidin (KUSZA) di Gong Badak, Kuala Terengganu. Penubuhan KUSZA telah memartabatkan pendidikan berorientasikan Islam di Terengganu khususnya dan Malaysia amnya. KUSZA telah melahirkan ramai ilmuan yang telah memberi sumbangan besar kepada negara terutama dalam pembangunan modal insan.



Pada tahun 2006, KUSZA telah dimansuhkan dan digantikan dengan Universiti Darul Iman Malaysia (UDM) sebelum ditukar kepada Universiti Sultan Zainal Abidin pada 13 Mei 2010 melalui Perintah Universiti Darul Iman Malaysia (Pemerbadanan) (Pindaan) 2010. Dengan pewartaan ini, sekali lagi mengabadikan nama Sultan Zainal Abidin yang alim, berperibadi mulia serta berjiwa rakyat pada sebuah Universiti Awam. Semoga legasi ketokohan Baginda Sultan Zainal Abidin khususnya Sultan Zainal Abidin III dapat dijadikan contoh oleh seluruh warga UniSZA dalam meletakkan UniSZA di persada antarabangsa.

# **Visi, Misi, Moto, Nilai Teras dan NIC UniSZA**

## **VISI**

Universiti Pilihan Dunia

## **MISI**

Menzahirkan insan holistik melalui kecemerlangan akademik

## **MOTO**

Ilmu Demi Faedah Insan  
(Knowledge for the Benefit of Humanity)

## **NILAI TERAS**

- i. Beretika dan berakhlak
- ii. Kompeten dan berkemahiran
- iii. Profesionalisme
- iv. Permuafakatan telus/kerja berpasukan
- v. Kreatif dan inovatif
- vi. Fokus pelanggan
- vii. Kebertanggungjawaban
- viii. Kecaknaan dan kekitaan
- ix. Kebolehpercayaan

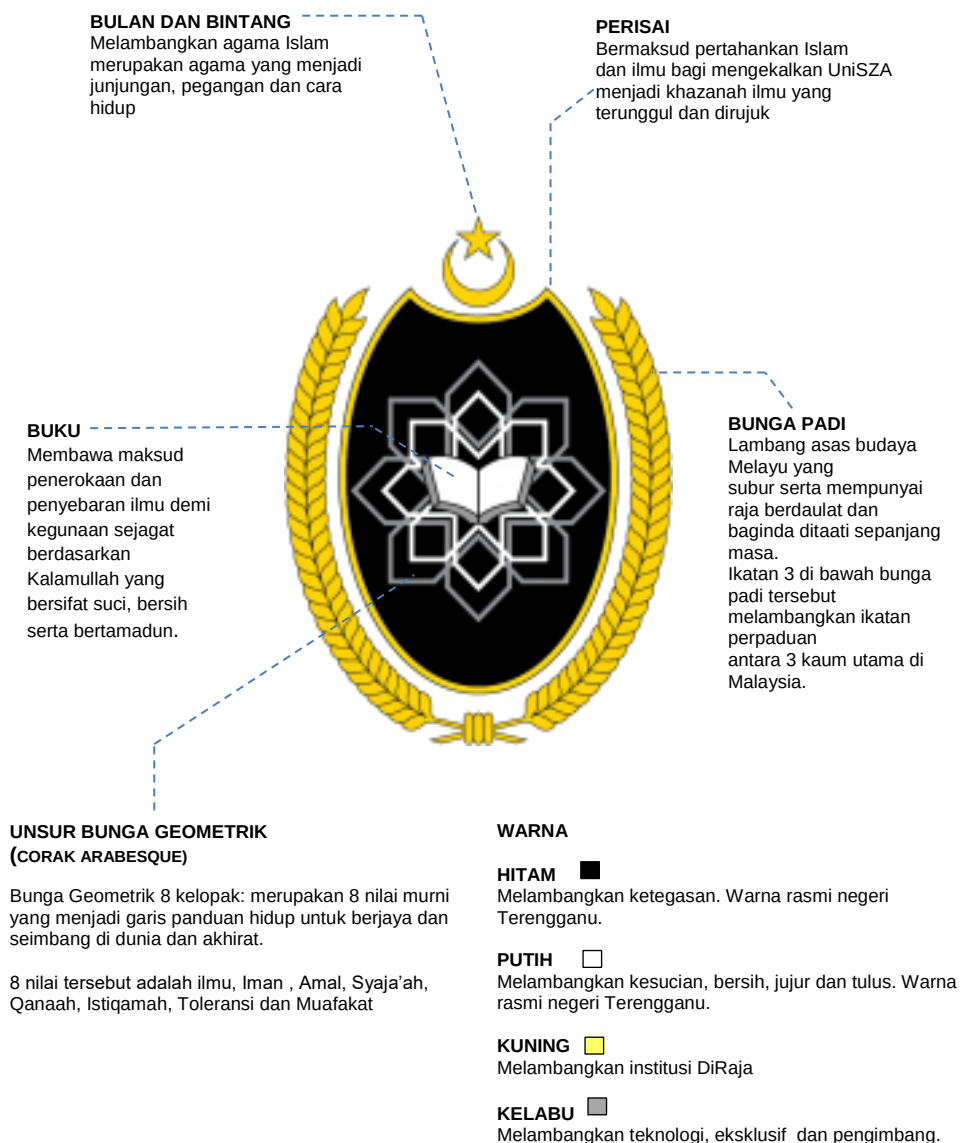
## **NIC**

Peradaban Insan dan Teknologi Pengurusan

# Logo Universiti Sultan Zainal Abidin

## RASIONAL REKA BENTUK LOGO

### LOGO UTAMA



## Pihak Berkuasa dan Pegawai Universiti

**CANSELOR**

**Kebawah Duli Yang Maha Mulia Sultanah Terengganu**

**Sultanah Nur Zahirah**

*D.K. (Terengganu), D.M.N., S.S.M.Z., S.S.M.T. (Terengganu), D.K. (Kedah),  
Knight Grand Cross (First Class) of the Most Illustrious Order of Chula Com Klao  
(Thailand)*



**PRO CANSELOR**

**YBHG TAN SRI DATO' DR. MOHAMAD YUSOF BIN HAJI MOHAMED NOR**  
P.S.M., S.P.M.T., D.S.S.A., J.M.N., P.P.T.



## **Lembaga Pengarah Universiti**

### **(A) PENERUSI**

Brig. Jen. Datuk Prof. Emeritus Dr. Kamarudin bin Hussin

### **(B) AHLI-AHLI LEMBAGA**

1. YBhg. Profesor Dato' Dr. Ahmad Zubaidi bin A. Latif
2. YBhg. Prof. Dato' Wira Dr. Ismail bin Ibrahim
3. YBhg. Dr. Azmi bin Omar
4. YBhg. Dato' Wan Ismail bin Wan Yusoh
5. YBhg. En. Suhaili bin Ahmad
6. YBhg. Dato Haji Osman bin Muda
7. YBhg. Profesor Dr. Ahmad Shukri bin Yazid
8. YBhg. Dato' Rosol bin Haji Wahid

### **(C) SETIAUSAHA**

En. Ismail bin Ahmad  
Pendaftar

# Pengurusan Tertinggi Universiti

## **(A) NAIB CANSELOR**

1. YBhg. Profesor Dato' Dr. Ahmad Zubaidi bin A. Latif

## **(B) TIMBALAN NAIB CANSELOR**

1. YBhg. Profesor Dr. Mahadzirah binti Mohamad  
Timbalan Naib Canselor (Akademik dan Antarabangsa)
2. YBhg. Profesor Dr. R. Badlishah bin Ahmad  
Timbalan Naib Canselor (Penyelidikan dan Inovasi)
3. YBhg. Profesor Dr. Nik Wan bin Omar  
Timbalan Naib Canselor (Hal Ehwal Pelajar dan Alumni)

## **(C) PEGAWAI KANAN UNIVERSITI**

1. YBrs. En. Ismail bin Ahmad  
Pendaftar
2. YBrs. Pn. Hajjah Shakimah binti Endut  
Bendahari
3. YBrs. Profesor Dr. Zuhairah Ariff binti Abd. Ghadass  
Penasihat Undang-Undang
4. YBrs. Ir. Haji Yasim bin A. Ghani  
Pengarah Jabatan Pengurusan Pembangunan
5. YBrs. Pn. Rohani binti Othman  
Ketua Pustakawan

# Latar Belakang Fakulti

Fakulti ini ditubuhkan secara rasminya pada 1 Julai 2006, dengan pelantikan Dekan Pengasas Profesor Dr Abdul Manaf Ali, dengan pengambilan pertama seramai 25 orang pelajar Program Sarjana Muda Bioteknologi Pertanian ke Fakulti Biosumber dan Industri Makanan, Universiti Sultan Zainal Abidin.

Penubuhan fakulti ini adalah bertujuan untuk melahirkan sumber insan profesional dalam bidang pertanian yang meneruskan kesinambungan bekalan sumber makanan di Malaysia. Ini bagi menyokong usaha kerajaan yang telah mengenalpasti bidang pertanian sebagai "*third engine of growth*" yang berupaya memacu ekonomi negara ke arah Wawasan 2020. Pengaplikasian bidang teknologi dan sains dalam pertanian adalah dikenalpasti sebagai perangsang bagi peningkatan dalam memenuhi keselamatan makanan negara. Selari dengan usaha ini fakulti berperanan aktif menjalankan tiga teras kefungsiannya iaitu pengajaran, penyelidikan dan perkhidmatan bagi pengembangan dalam masyarakat.

Ketiga-tiga teras kefungsiannya ini memacu pembangunan kepakaran kumpulan profesional berdasarkan bidang tujahan kritikal pertanian dan bioteknologi bagi mencapai kecemerlangan ilmu dan praktis. Usaha ini diperlengkapi dengan pembangunan sumber manusia semua lapisan ahli fakulti yang strategik, sistematik dan berterusan.

Fakulti Biosumber dan Industri Makanan menawarkan tiga program pengajian iaitu Sarjana Muda Bioteknologi Pertanian (2006), Sarjana Muda Teknologi Makanan (2007) dan Sarjana Muda Produksi dan Kesihatan Haiwan (2008).

Pendekatan pengajaran di fakulti menggabungkan teori dan praktikal serta pendedahan secara langsung dalam industri pertanian berintegrasikan bioteknologi dan mempelajari semua aspek makanan. Bidang teras penyelidikan berasaskan pertanian, bioteknologi pertanian dan makanan yang dijalankan akan menjadi input kepada ransangan perkembangan industri pertanian setempat khususnya di Terengganu dan di Rantau Ekonomi Pantai Timur amnya. Sumber kepakaran dengan gabungan hasil penyelidikan serta kemudahan sedia ada akan disalurkan kepada khidmat nasihat yang diperlukan oleh komuniti setempat, usahawan tani serta agensi atau industri dalam sektor pertanian.



# Visi dan Misi Fakulti

## Visi

Fakulti Biosumber dan Industri Makanan, berhasrat untuk menjadi pemimpin dan peneraju integrasi bidang Sains Pertanian dan Makanan untuk faedah masyarakat dan negara.

## Misi

Melahirkan graduan yang berkualiti, berhemah tinggi serta berkarisma yang dapat memodenkan sektor pertanian bagi menjamin pengeluaran makanan untuk keperluan negara. Membangun dan memajukan sektor Sains Makanan di Malaysia melalui penyelidikan intensif serta pengembangan teknologi untuk faedah masyarakat dan negara.

# CARTA ORGANISASI PENGURUSAN



**Dekan**

Prof Madya Dr Kamarul 'Ain Mustafa



**Timbalan Dekan**

**(Akademik dan Prasiswazah)**

Prof Madya Dr Nalini Arumugam



**Timbalan Dekan**

**(Penyelidikan dan Siswazah)**

Dr Nadiawati Alias



**Timbalan Dekan**

**(Hal Ehwal Pelajar dan Alumni)**

Dr. Nurul Zaizuliana Binti Rois Anwar



**Ketua Pusat Pengajian Sains  
Pertanian dan Bioteknologi**

Dr Noor Afiza Badaluddin



**Ketua Pusat Pengajian Sains Haiwan**

Prof Madya Dr. Connie Fay Komilus



**Ketua Pusat Pengajian Sains Makanan**

Prof Madya Dr. John Tang Yew Huat



**Penyelaras Jaminan Kualiti dan e-  
Pembelajaran**

Dr Mohd Nizam Haron



**Penyelaras Data dan Latihan  
Industri**

Dr. Ahmad Syazni Kamarudin



**Penolong Pendaftar Kanan**

Fadlina Ismail

**Dekan**

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**Timbalan Dekan (Hal Ehwal Pelajar dan Alumni)**

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**Ketua Pusat Pengajian Industri Makanan**

Prof Madya Dr John Tang Yew Huat  
*PhD (UPM), MSc, BSc (UKM)*

**Penolong Pendaftar Kanan**

Fadlina Ismail  
*BHRM (UUM)*

## Staf Akademik

### Staf Akademik Pusat Pengajian Sains Pertanian & Bioteknologi



Barisan hadapan dari kiri: Prof Madya Dr Nalini Arumugam, Dr Nor Hasima Mahmod, Dr Nurul Aini Kamaruddin, Tuan Syaripah Najihah Tuan Mohd Razali, Dr Nornasuha Yusoff, Dr Noor Afiza Badaluddin (KPP), Salmah Mohamed, Nurul Asma Hasliza Zulkifly, Dr Nadiawati Alias dan Siti Aishah Abu Bakar.

Barisan belakang dari kiri: Tajul Afif Abdullah, Dr Md Amirul Alam, Prof Dr Abdul Manaf Ali, Prof Madya Dr Hasbullah Hj Muhammad, Prof Madya Dr Abd Jamil Zakaria, Dr Mohammad Moneruzzaman Khandaker, Mohamad Hailmi Sajili dan Muhammad Azharuddin Azali

## **Profesor**

Abdul Manaf Ali  
*PhD (St Andrews), MSc (Dundee), SmSn (UKM)*

Nashriyah Mat  
*PhD (St Andrews), SmSn Kep (UKM)*

## **Profesor Madya**

Abd Jamil Zakaria  
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Md Sarwar Jahan  
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Khamsah Suryati Mohd  
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## **Pensyarah Kanan**

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Nor Hasima Mahmood  
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Nornasuha Yusoff  
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Nurul Aini Kamaruddin  
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Wan Musa Wan Muda  
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## **Pensyarah**

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(Cuti belajar, United Kingdom)

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(Cuti belajar, Netherlands)

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Salmah Mohamed  
*MSc, SmSn Kep (UKM)*

Siti Aishah Abu Bakar  
*MSc (UniSZA), BSc (UPM)*

Tajul Afif Abdullah  
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Zanariah Mohd Nor  
*MSc, BFor (UPM)*

## **Penolong Pensyarah**

Bibi Nazihah Mohd Din

Mohd Fahmi Abu Bakar

Muhammad Azharuddin Azali

Muslianie Md Isa

Nur Athiqah Md Yusof

Nur Hanani Mohd Nor

Nurazilah Mustapha

Tuan Syaripah Najihah Tuan Mohd Razali

## Staf Akademik Pusat Pengajian Sains Haiwan



Baris hadapan dari kiri: Dr Nguang Siew Ing, Prof Madya Dr Connie Fay Komilus, Prof Dr Wan Khdiyah Wan Embong dan Dr Asmad Kari

Barisan belakang dari kiri: Dr Nadzifah Yaakub, Ahmad Hanafi Sulong, Dr Mohd Nizam Haron, Dr Ha Hou Chew, Prof Dr Ramli Abdullah, Dr Ahmad Syazni Kamarudin dan Dr Norshida Ismail



## **Profesor**

Ramli Abdullah  
*PhD, MSc, BSc (Louisiana State University)*

Wan Khadijah Wan Embong  
*PhD, MSc, BSc (Louisiana State University)*

## **Profesor Madya**

Connie Fay Komilus  
*PhD (Kagoshima University), MBA (ECU, Australia), BSc (UPM)*

## **Pensyarah Kanan**

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Asmad Kari  
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Mohd Faizal Ghazali  
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Mohd Nizam Haron  
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Norzaida Yusof

Nurhayati Yusof

Tengku Farizan Izzi Che Ku Jusoh

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Nor Afiza Yusoff

Wan Nor saidatul Aida Shazwa Wan Rosli

## **Pembantu Makmal**

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Mohamad Hafizi Mohamad Roni

Mohd Faiz Mohamad

Rostamizi Mohd

## Unit Ladang



Dari kiri: Ahmad Faizal Jaafar, Mohd Jusoh Omar, Nur Nadhirah Abdul Halim, Mohammad Hailmi Sajili, Mohd Sabri Sulaiman dan Mohd Noor Hazwan Noor Azlan.

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*MAgricSc, BSc, Dip Agric (UPM)*

### **Penolong Pegawai Veterinar**

Mohd Noor Hazwan Noor Azlan

Nur Nadhirah Abdul Halim

### **Pembantu Awam**

Mohd Sabri Sulaiman

Mohd Jusoh Omar

Ahmad Faizal Jaafar

## Program Pengajian

Fakulti Biosumber dan Industri Makanan Universiti Sultan Zainal Abidin (UniSZA) menawarkan tiga program di peringkat Pengajian Ijazah Pertama. Program-program yang ditawarkan itu menjurus kepada penganugerahan ijazah:

- **Sarjana Muda Bioteknologi Pertanian**
- **Sarjana Muda Teknologi Makanan**
- **Sarjana Muda Produksi dan Kesihatan Haiwan**
- **Sarjana Muda Sains (Kepujian) Sains Akuatik**
- **Sarjana Muda Perniagaantani dengan Kepujian**

# Program Pengajian

## Sarjana Muda Bioteknologi Pertanian

### Pendahuluan

Sarjana Muda Bioteknologi Pertanian adalah persediaan terbaik untuk kerjaya dalam bidang pertanian dan bioteknologi pertanian. Program ini menyediakan pelajar dengan pengetahuan asas dan lanjutan dalam pengeluaran produk pertanian dan bioteknologi melalui pelbagai kursus universiti, bidang pengkhususan teras, elektif dan audit.

Semasa tahun pertama pengajian, para pelajar didedahkan kepada kursus-kursus seperti mikrobiologi, kimia organik, biokimia, prinsip pengeluaran tanaman sayuran dan ladang, botani pertanian dan ekonomi pertanian. Pada tahun kedua dan ketiga pengajian, kursus-kursus seperti prinsip pengeluaran ternakan, agroteknologi tanaman industri, sains tanah, kultur tisu tumbuhan, amalan ladang ternakan, prinsip perlindungan tanaman, mekanisasi ladang, fisiologi tanaman, sains rumpai, biologi sel dan molekul, prinsip kultura tisu sel haiwan, pembiakbakaan tumbuhan, teknologi pasca-tuai, proses pemindahan dan pengeluaran tanaman secara komersial, bioinformatik, biostatistik, keusahawanan tani dan pengembangan pertanian diajar. Pada tahun akhir pengajian, pelajar akan melaksanakan projek penyelidikan tahun akhir, pembentangan seminar, agroteknologi tanaman komoditi, sistem pengairan, teknologi penapaian, bioteknologi tumbuhan lanjutan, isu etika dan harta intelek dalam bioteknologi dan pertanian, pemasaran pertanian dan komunikasi dalam pertanian.

### Peluang Kerjaya

Graduan pengajian ini mempunyai peluang kerjaya profesional yang luas dalam bidang pertanian dan bioteknologi. Ini adalah kerana gabungan pengajian yang berteraskan pengaplikasian teknik moden bioteknologi bagi meningkatkan kesuburan dan produktiviti tanaman. Di antara peluang kerjaya graduan ini adalah pegawai pertanian, pegawai pengembangan pertanian, pegawai agronomi dan pengurusan ladang, pegawai pembiakbakaan tanaman, pegawai perlindungan tanaman dan keselamatan biologi. Bagi sektor kerajaan, graduan ini juga boleh menceburi kerjaya berasaskan makmal dan lapangan, seperti pegawai penyelidik atau pegawai teknikal di institusi penyelidikan pertanian dan universiti bagi sektor swasta dan juga sektor industri berteraskan bioteknologi pertanian.

Di samping itu, graduan juga boleh menjadi pegawai di sektor pendidikan atau media berkaitan bioteknologi dan pertanian. Graduan turut berpotensi untuk menjadi usahawantani moden yang mengaplikasikan teknik moden bioteknologi dalam pertanian.

### Jangkamasa

Pengajian ijazah ini mengambil masa selama empat (4) tahun dengan keperluan bergraduasi adalah 130 kredit.

## Syarat kemasukan

| STPM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MATRIKULASI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DIPLOMA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1.Mendapat sekurang-kurangnya <b>PNGK 2.50</b> pada peringkat <b>STPM</b></p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C+</b> pada peringkat <b>STPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Biology</li> <li>• Chemistry</li> <li>• Physics / Mathematics (M) / Mathematics (T)</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat sekurang-kurangnya kepujian <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Bahasa Inggeris</li> <li>• Biology</li> <li>• Chemistry</li> <li>• Mathematics / Physics / Additional Mathematics / Sains Pertanian</li> </ul> <p><b>DAN</b></p> <p>4.Mendapat mana-mana <b>SATU (1) Gred C</b> mata pelajaran lain tidak termasuk Bahasa Melayu dan mata pelajaran diatas</p> <p><b>DAN</b></p> <p>5.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>6. Tiada kecacatan anggota serta pertuturan dan buta warna</p> | <p>1.Mendapat sekurang-kurangnya <b>PNGK 2.50</b> pada peringkat <b>Matrikulasi / Asasi</b></p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C+</b> pada peringkat Matrikulasi / Asasi dalam mata pelajaran berikut :</p> <ul style="list-style-type: none"> <li>• Biology</li> <li>• Chemistry</li> <li>• Physics / Mathematics</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat sekurang-kurangnya <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Bahasa Inggeris</li> <li>• Biology</li> <li>• Chemistry</li> <li>• Mathematics / Additional Mathematics / Physics / Sains Pertanian</li> </ul> <p><b>DAN</b></p> <p>4.Mendapat mana-mana <b>SATU (1) Gred C</b> mata pelajaran lain tidak termasuk Bahasa Melayu dan mata pelajaran diatas</p> <p><b>DAN</b></p> <p>5.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>6. Tiada kecacatan anggota serta pertuturan dan buta warna</p> | <p>1.Mendapat sekurang-kurangnya <b>PNGK 3.50</b> pada peringkat <b>Diploma</b> dalam bidang berkaitan</p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Bahasa Inggeris</li> <li>• Biology / Chemistry/ Mathematics</li> <li>• Physics / Additional Mathematics / Sains Pertanian</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat mana-mana <b>SATU (1) Gred C</b> mata pelajaran lain tidak termasuk Bahasa Melayu dan mata pelajaran diatas</p> <p><b>DAN</b></p> <p>4.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>5. Tiada kecacatan anggota serta pertuturan dan buta warna</p> |

## Struktur Pengajian

| Semester             | Kursus Universiti | KursusTeras | Kursus Elektif | Jumlah Kredit |
|----------------------|-------------------|-------------|----------------|---------------|
| 1                    | 7                 | 12          | -              | 19            |
| 2                    | 4                 | 11          | -              | 15            |
| 3                    | 2                 | 7           | 10             | 19            |
| 4                    | 4                 | 9           | 6              | 19            |
| 5                    | 3                 | 5           | 9              | 17            |
| 6                    | -                 | 8           | 8              | 16            |
| 7                    | -                 | 8           | 5              | 13            |
| 8                    | -                 | 12          | -              | 12            |
| <b>Jumlah Kredit</b> | <b>20</b>         | <b>72</b>   | <b>38</b>      | <b>130</b>    |

## Semester Satu (Tahun 1)

| Kod           | Nama Kursus                                                                   | Jam Kredit |
|---------------|-------------------------------------------------------------------------------|------------|
| KKK xxx       | Co-curriculum<br>Ko-Kurikulum                                                 | 3 (U)      |
| MPU 32012     | English for Communication I<br>Inggeris untuk Komunikasi I                    | 2 (U)      |
| MPU 31022     | Islamic Civilization and Asian Civilization<br>Tamadun Islam dan Tamadun Asia | 2 (U)      |
| ABT 10103     | Agriculture Botany<br>Botani Pertanian                                        | 3 (S)      |
| ABT 10203     | Crop Science<br>Sains Tanaman                                                 | 3 (S)      |
| ABT 10503     | Microbiology<br>Mikrobiologi                                                  | 3 (S)      |
| ABT 10603     | Fundamental Genetics<br>Genetik Asas                                          | 3 (S)      |
| <b>Jumlah</b> |                                                                               | <b>19</b>  |



### Semester Dua (Tahun 1)

| Kod       | Nama Kursus                                                                                       | Jam Kredit |
|-----------|---------------------------------------------------------------------------------------------------|------------|
| MPU 33050 | Talaqqi Qur'an (Muslim)                                                                           | 0 (A)      |
| MPU 33060 | Protocol and Management of Official Function<br>Protokol dan Pengurusan Majlis Rasmi (Non-muslim) |            |
| MPU 33022 | English for Communication II<br>Inggeris untuk Komunikasi II                                      | 2 (U)      |
| MPU 33032 | Islam Wahyu dan Kemasyarakatan (Muslim)                                                           | 2 (U)      |
| MPU 33042 | Comparative Religion II (Non Muslim)<br>Perbandingan Agama II (Bukan Islam)                       |            |
| ABT 12103 | Farm Mechanization and Irrigation System<br>Mekanisasi Ladang dan Sistem Pengairan                | 3 (S)      |
| ABT 21003 | Cell and Molecular Biology<br>Biologi Sel dan Molekul                                             | 3 (S)      |
| FSI 10103 | Analytical Organic Chemistry<br>Kimia Organik Analisis                                            | 3 (S)      |
| FSI 16902 | Fundamental of Food Science<br>Kimia Organik Analisis                                             | 2 (E)      |
| Jumlah    |                                                                                                   | 15         |

### Semester Tiga (Tahun 2)

| Kod       | Nama Kursus                                                 | Jam Kredit |
|-----------|-------------------------------------------------------------|------------|
| MPU 31012 | Ethnic Relations<br>Hubungan Etnik                          | 2 (U)      |
| ABT 10303 | Biochemistry<br>Biokimia                                    | 3 (S)      |
| ABT 22204 | Soil Science and Fertility<br>Sains Tanah dan Fertiliti     | 4 (E)      |
| ABT 25003 | Plant Physiology<br>Fisiologi Tumbuhan                      | 3 (E)      |
| ABT 27704 | Crop Production Technology<br>Teknologi Penghasilan Tanaman | 4 (E)      |
| ABT 47003 | Entomology<br>Entomologi                                    | 3 (E)      |
| Jumlah    |                                                             | 19         |

### Semester Empat (Tahun 2)

| Kod       | Nama Kursus                                                           | Jam Kredit |
|-----------|-----------------------------------------------------------------------|------------|
| MPU xxxx  | Foreign Language<br>Bahasa Asing                                      | 2 (U)      |
| MPU 33012 | Ilmu Wahyu dan Sains (Muslim)                                         | 2 (U)      |
| MPU 33022 | Moral and Ethics II (Non-muslim)<br>Moral dan Etika II                |            |
| ABT 10403 | Agricultural Economics<br>Ekonomi Pertanian                           | 3 (S)      |
| ABT 21103 | Principles of Cell and Tissue Culture<br>Prinsip Kultura Sel dan Tisu | 3 (S)      |
| ABT31503  | Bioinformatics<br>Bioinformatik                                       | 3 (S)      |
| ABT 46503 | Aquaculture<br>Akuakultur                                             | 3 (E)      |
| ABT 46903 | Plant Pathology<br>Patologi Tumbuhan                                  | 3 (E)      |
| Jumlah    |                                                                       | 19         |

### Semester Lima (Tahun 3)

| Kod       | Nama Kursus                                                                 | Jam Kredit |
|-----------|-----------------------------------------------------------------------------|------------|
| ABT 22403 | Agricultural Entrepreneurship<br>Keusahawanan Tani                          | 3 (U)      |
| ABT 32402 | Plant Biochemistry<br>Biokimia Tumbuhan                                     | 2 (S)      |
| ABT 31403 | Plant Breeding<br>Pembibakan Tumbuhan                                       | 3 (S)      |
| ABT 46103 | Weed Science<br>Sains Rumpai                                                | 3 (E)      |
| AST 35503 | Animal Production Technology<br>Teknologi Produksi Haiwan                   | 3 (E)      |
| ABT 35303 | Plant Signalling Physiology<br>Fisiologi Isyarat Tumbuhan                   | 3 (E)      |
| ABT 36203 | Commercial Micropropagation<br>Mikropropagasi Komersial                     | 3 (E)      |
| ABT 35503 | Plant Biodiversity and Ecology<br>Kepelbagaian Biologi dan Ekologi Tumbuhan | 3 (E)      |
| ABT 35603 | Molecular Diagnostic<br>Diagnostik Molekul                                  | 3 (E)      |
| Jumlah    |                                                                             | 17         |

### Semester Enam (Tahun 3)

| Kod       | Nama Kursus                                                                                               | Jam Kredit |
|-----------|-----------------------------------------------------------------------------------------------------------|------------|
| ABT 41803 | Research Project I<br>Projek Penyelidikan I                                                               | 3 (S)      |
| ABT 31603 | Agricultural Extension<br>Pengembangan Pertanian                                                          | 3 (S)      |
| ABT 32502 | Agricultural Research Design and Data Analysis I<br>Rekabentuk Penyelidikan Pertanian dan Analisis Data I | 2 (S)      |
| ABT 45803 | Precision Farming<br>Perladangan Jitu                                                                     | 3 (E)      |
| ABT 35203 | Bioreactor Technology<br>Teknologi Bioreaktor                                                             | 3 (E)      |
| ABT 37903 | Special Topics<br>Topik-topik Khas                                                                        | 3 (E)      |
| ABT 35403 | Integrated Pest Management<br>Pengurusan Perosak Bersepadu                                                | 3 (E)      |
| ABT 37802 | Agricultural Waste Management<br>Pengurusan Sisa Pertanian                                                | 2 (E)      |
| Jumlah    |                                                                                                           | 16         |

### Semester Tujuh (Tahun 4)

| Kod       | Nama Kursus                                                                                                                                      | Jam Kredit |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| ABT 42003 | Research Project II<br>Projek Penyelidikan II                                                                                                    | 3 (S)      |
| ABT 41903 | Advanced Plant Biotechnology<br>Bioteknologi Tumbuhan Lanjutan                                                                                   | 3 (S)      |
| ABT 42602 | Agricultural Research Design and Data Analysis II<br>Rekabentuk Penyelidikan Pertanian dan Analisis Data II                                      | 2 (S)      |
| ABT 46703 | Post Harvest Technology<br>Teknologi Pasca Tuai                                                                                                  | 3 (E)      |
| ABT 46002 | Agricultural Marketing<br>Pemasaran Pertanian                                                                                                    | 2 (E)      |
| ABT 46302 | Agricultural Communication<br>Komunikasi Pertanian                                                                                               | 2 (E)      |
| ABT 47602 | Ethical and Intellectual Properties Issues in Biotechnology and Agriculture<br>Isu-isu Etika dan Harta Intelekt dalam Bioteknologi dan Pertanian | 2 (E)      |
| Jumlah    |                                                                                                                                                  | 13         |

### Semester Lapan (Tahun 4)

| Kod       | Nama Kursus                             | Jam Kredit |
|-----------|-----------------------------------------|------------|
| ABT 31712 | Industrial Training<br>Latihan Industri | 12 (S)     |
| Jumlah    |                                         | 12         |

**Nota:** A -Kursus Audit S -Kursus Teras E -Kursus Elektif U -Kursus Umum

# Sinopsis Kursus

## Sarjana Muda Bioteknologi Pertanian

### Semester Satu (Tahun 1)

| Kod Kursus | Nama Kursus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Jam Kredit |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| ABT 10103  | <b>Botani Pertanian</b><br><b>Agricultural Botany</b><br>This course discusses topics on the morphological types and parts of stem, leaf, root, flower, fruit, and seed. The anatomy of the organs; including cell types and distribution in the epidermal, ground, and vascular tissues. Development during primary and secondary growth, pollen grain and embryo sac formation, fertilization, and seed formation will also be discussed. This is followed with the discussion on the principles of identification, nomenclature, and classification.                                                                                                                                                                               | 3          |
| ABT 10203  | <b>Sains Tanaman</b><br><b>Crop Science</b><br>This course discusses production of vegetable, fruit, ornamental, field, and industrial crops which include planning, variety selection, site preparation, propagation, planting, irrigation, fertilization, mulching, staking, pruning, weeding, pest and disease control, fruit thinning and harvesting. Cropping system, hydroponic and organic farming are also included.                                                                                                                                                                                                                                                                                                          | 3          |
| ABT 10503  | <b>Mikrobiologi</b><br><b>Microbiology</b><br>This course serves as an introduction to the principles and concepts of microbiology and includes the following topics: classification of microorganisms, microscopy, organization and structure of prokaryotic and eukaryotic cells, growth and cultivation of microorganisms, sterilization and disinfection, antibiotics and antimicrobial therapy, introduction to microbial genetics, diversity of microbial metabolism, diversity of viruses, prokaryotes and eukaryotic microorganisms, and applications of microbiology in industry, agriculture and the environment.                                                                                                           | 3          |
| ABT 10603  | <b>Genetik Asas</b><br><b>Fundamental Genetics</b><br>This course discusses various aspects of fundamental genetics especially those related to genes, molecules, cells, organisms and population status. It develops the basis of understanding to how life can exist at all levels of complexity, ranging from the molecular to the population level. This course also covers Mendelian and Non-Mendelian principles, inheritance, and related probability methods. Variation in chromosome structure and number are also discussed in relation to plant breeding. Genetic variation deals with the natural diversity that can be observed among members of the same species as well as among different species are also discussed. | 3          |

## Semester Dua (Tahun 1)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                  |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------|
| <b>ABT 12103</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Mekanisasi Ladang dan Sistem Pengairan</b><br><b>Farm Mechanization and Irrigation System</b> | <b>3</b> |
| <p>This course emphasized the use of machinery in agricultural production. The students will expose to the design, type and application of machine. During practical session, the students will be required to understand how to operate the machine, perform calculation on machine efficiency and writes practical report on basic maintenance of agricultural machinery. At the end of the lesson, students will have the knowledge to determine the methods and functions of the irrigation system. Ability to make a selection of equipment, materials and equipment for irrigation systems. Students are exposed to design, testing and method of irrigation system.</p> |                                                                                                  |          |
| <b>ABT 21003</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Biologi Sel dan Molekul</b><br><b>Cell and Molecular Biology</b>                              | <b>3</b> |
| <p>This course emphasizes the principles of cell biology and compares various cell types such as prokaryotes, viruses and eukaryotes in terms of physiology and genome organization. Structure and molecular macromolecules such as DNA, RNA and protein. Replication, transcription and translation stages. Process responsible in gene regulation and expression in prokaryotes and eukaryotes. Application of basic techniques in molecular biology including principle of cloning and DNA manipulation.</p>                                                                                                                                                                |                                                                                                  |          |
| <b>FSI 10103</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Kimia Organik Analisis</b><br><b>Analytical Organic Chemistry</b>                             | <b>3</b> |
| <p>This course is designed to introduce students to the analytical and organic chemistry. It outlines the reactions, some techniques such as analysis and uses of molecules containing one functional group such as alcohols, aldehydes, ketones, carboxylic acids, amines in both aliphatic and aromatic. The course includes compulsory laboratory experiments, and student will be guided to conduct experiments that cover techniques, methods, observations and data collections.</p>                                                                                                                                                                                     |                                                                                                  |          |
| <b>FSI 16902</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Kimia Organik Analisis</b><br><b>Fundamental of Food Science</b>                              | <b>2</b> |
| <p>This course discusses the major components and characteristics of biochemical processes occurring in living system. The topics discussed include: physico-chemical properties and functions of carbohydrates, proteins, lipids and nucleic acids; enzymology including enzyme kinetics, mechanism of reaction and factors that influence enzyme activity; bioenergetics, integration and control of metabolism of carbohydrates, proteins, lipids and nucleic acids; role of nucleic acids in genetics and reproduction; biochemical nature of membranes, hormones and their functions.</p>                                                                                 |                                                                                                  |          |

## Semester Tiga (Tahun 2)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                     |          |
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| <b>ABT 10303</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Biokimia<br/>Biochemistry</b>                                    | <b>3</b> |
| <p>This course discusses the major components and characteristics of biochemical processes occurring in living system. The topics discussed include: physico-chemical properties and functions of carbohydrates, proteins, lipids and nucleic acids; enzymology including enzyme kinetics, mechanism of reaction and factors that influence enzyme activity; bioenergetics, integration and control of metabolism of carbohydrates, proteins, lipids and nucleic acids; role of nucleic acids in genetics and reproduction; biochemical nature of membranes, hormones and their functions.</p> |                                                                     |          |
| <b>ABT 22204</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Sains Tanah dan Fertiliti<br/>Soil Science and Fertility</b>     | <b>4</b> |
| <p>This course is designed to introduce students to some extend of fundamental concepts of soil science and lead to the development of student understands of the properties and processes that are basic to the use and management of soils. This course is also designed to describe biochemical cycling of nutrients, mechanisms of nutrient transport, nutrient uptake from soils, function and nutrient deficiencies, evaluation of the fertility, fertilization, especially of problem soils, interpretation of analytical data, maintenance and improvement of soil fertility.</p>      |                                                                     |          |
| <b>ABT 25003</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Fisiologi Tumbuhan<br/>Plant Physiology</b>                      | <b>3</b> |
| <p>Physiological processes including germination, plant hormone and its application for plantation crop, growth, respiration, photosynthesis, photomorphogenesis, water relation and plant, mineral nutrition, translocation, as well as post-harvest physiology and plant ecology-physiology such as morphological, anatomical and physiological adaptation of plant organs will be discussed in this course.</p>                                                                                                                                                                             |                                                                     |          |
| <b>ABT 27704</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Teknologi Penghasilan Tanaman<br/>Crop Production Technology</b> | <b>4</b> |
| <p>This is an intermediate course that introduce as well as enable the students to practice the present technology of crop production. Aspects of the course are; historical and origin, botany, physiology, agronomy, breeding and seed production, soil suitability, control of pest and diseases, mechanization of all phases of production with reference to the traditional methods and automation potential, and post-harvest handling. The practical sessions includes the planting and management of crop (and the possible harvest).</p>                                              |                                                                     |          |
| <b>ABT 47003</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Entomologi<br/>Entomology</b>                                    | <b>3</b> |
| <p>An introduction to fundamentals of entomology compassing insect development, external morphology and internal system of insect, structure and function, systematic and diversity, distribution, abundance, and insect population dynamics.</p>                                                                                                                                                                                                                                                                                                                                              |                                                                     |          |

## **Semester Empat (Tahun 2)**

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| <b>ABT 10403</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Ekonomi Pertanian<br/>Agricultural Economics</b>                           | <b>3</b> |
| <p>This course covers demand supply, types of markets, international trade and effects of government policies, including government intervention in markets. Problems in the agricultural sector, especially problems in Malaysia, will be emphasized. Project evaluation methods will also be introduced.</p>                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                               |          |
| <b>ABT 21103</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Prinsip Kultura Sel dan Tisu<br/>Principles of Cell and Tissue Culture</b> | <b>3</b> |
| <p>This course explains the development of animal and plant tissue culture, organization and laboratory practices and preparation required to carry out aseptic manipulations. In addition, this course also emphasizes on several important aspects of preparation of stocks and media, concept of totipotency ,juvenility gradient, somaclonal variation; types of cultures such as callus culture, somatic embryogenesis, anther and ovule cultures, meristem culture and protoplast culture. Topics such as principle of large scale culture, generation of hybridoma cells and culture of hemopoietic stem cells will be also discussed.</p>                                                                      |                                                                               |          |
| <b>ABT 31503</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Bioinformatik<br/>Bioinformatics</b>                                       | <b>3</b> |
| <p>This course presents an introduction to bioinformatics, its principles and application in solving biological problems. The course emphasizes on use of appropriate bioinformatics software, the criteria of biological data that is applicable in bioinformatics analysis and the application of bioinformatics tools to laboratory based research. The course features hands on approach and the extensive use of programmers available over the World Wide Web to biologist. Students will be taught on how to access appropriate public databases and utilize correct search strategies and tools used in bioinformatics to topical problem drawn from ongoing research and application in variety of field.</p> |                                                                               |          |
| <b>ABT 46503</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Akuakultur<br/>Aquaculture</b>                                             | <b>3</b> |
| <p>This course will cover the knowledge of the development of aquaculture; good aquaculture practices; the biology of common cultured species and economics of aquaculture. Students will be exposed to the basic system of aquafarm construction and the management of aquafarm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                               |          |
| <b>ABT 46903</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Patologi Tumbuhan<br/>Plant Pathology</b>                                  | <b>3</b> |
| <p>This course emphasizes several aspects of basic plant pathology including the morphology and characteristics of plant pathogens such as bacteria, phytoplasma, fungus, virus and nematodes. Principles of plant pathology; plant disease diagnose.Biodiversity and plant disease pathogen ecology and their diseases.Host-parasite relationship and epidemiology.Methods and principles of plant disease management.</p>                                                                                                                                                                                                                                                                                            |                                                                               |          |



## Semester Lima (Tahun 3)

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| <b>ABT 32402</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Biokimia Tumbuhan<br/>Plant Biochemistry</b>                   | <b>2</b> |
| <p>This course discusses the major components and characteristics of biochemical processes occurring in plant system. The topics discussed include: biochemistry of herbicide action, biochemical mechanisms of plant hormone function, photosynthesis, antibody production in plants, pharmaceutical production in plants, metabolomics, plant micro RNAs and transcriptional regulation of metabolic pathways.</p>                                   |                                                                   |          |
| <b>ABT 31403</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Pembiakbakaan Tumbuhan<br/>Plant Breeding</b>                  | <b>3</b> |
| <p>This course discusses plant breeding principles which include general biological concepts, germplasm issues, genetic analysis and tools commonly used in plant breeding. It also discusses tissue culture aspect and breeding for clonally propagated plants, self-pollinated species, cross pollinated species and hybrid cultivars. Some examples of breeding in oil palm and rubber will be highlighted.</p>                                     |                                                                   |          |
| <b>ABT 46103</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Sains Rumpai<br/>Weed Science</b>                              | <b>3</b> |
| <p>Concept of weeds and weed management, identification of common weeds in crop and non-crop situations, and their control. An introduction to weed ecology also will be discussed.</p>                                                                                                                                                                                                                                                                |                                                                   |          |
| <b>ABT 37703</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Teknologi Produksi Haiwan<br/>Animal Production Technology</b> | <b>3</b> |
| <p>This course emphasizes the important use of water in agricultural production with relationship between soil, plant and water networking. The students will expose on detail knowledge of irrigation pump, irrigation practice for commercial cultivation as well as plans for farm irrigation system and design.</p>                                                                                                                                |                                                                   |          |
| <b>ABT 35303</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Fisiologi Isyarat Tumbuhan<br/>Plant Signalling Physiology</b> | <b>3</b> |
| <p>This course will be focused on concepts, principles and practices of plant stress conditions as well as experimental skill on how plants response and cope to hormonal signalling, environmental stress signalling, photoreceptor signalling. Also understanding key experimental approaches and biological methods related to different stress signaling to the plants and modulation of their growth performance, and sustainable production.</p> |                                                                   |          |

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| <b>ABT 46203</b> | <b>Mikropropagasi Komersial<br/>Commercial Micropropagation</b> | <b>3</b> |
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The course is a continuation of the course on Plant Tissue Culture (ABT 21203 : *In vitro* plant Technology), covering more hands on experience on commercial scale plantlet production. Students are given task and they are guided to plan and design their own experiments to achieve the objectives of the task which is to conduct a plantlet production via micropropagation from the commercial aspect.

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| <b>ABT 35503</b> | <b>Kepelbagaian Biologi dan Ekologi Tumbuhan<br/>Plant Biodiversity and Ecology</b> | <b>3</b> |
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This course provides an exposure to the students about the basic concepts of species, communities and ecosystems. In addition to the principles in ecology and plant taxonomy and systematic reviews will also be presented in this course. The methods of recognition and identification of several plant species of higher plants and lower plants are also being taught. Students will carry out presentations based on the species data obtained during field work.

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|------------------|----------------------------------------------------|----------|
| <b>ABT 35603</b> | <b>Diagnostik Molekul<br/>Molecular Diagnostic</b> | <b>3</b> |
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This course covers the discoveries that have created a field called molecular diagnostic. Scientific concepts that surround the revolution in molecular diagnostic will be examined in details to allow the students to be aware of the strengths and shortcomings of a molecular approach for diagnostic purposes. Selected topics such as cell analysis, gene regulation and expression, molecular detection of microbes, genetic diseases, the immune system and cancer cells, cancer and carcinogenesis will be discussed and examined. New discoveries such as the intelligent molecular diagnostic approach will be covered.

### **Semester Enam (Tahun 3)**

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|------------------|-----------------------------------------------------|----------|
| <b>ABT 41803</b> | <b>Projek Penyelidikan I<br/>Research Project I</b> | <b>3</b> |
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This course involves a practical research project for agricultural biotechnology programme. Student will undergo planning and preparation of a written research project proposal and a research project oral presentation with the help of coordinator and supervisor(s).

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| <b>ABT 31603</b> | <b>Pengembangan Pertanian<br/>Agricultural Extension</b> | <b>3</b> |
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This course is introduced to expose students to the background and extension definition relating to concepts, objectives and the agricultural extension model. The course also addresses the extension strategies, the image of extension agent, understanding of theories and methods and the planning process. Exposure to how extension can play an effective role in the dissemination of the farm practices information will also be discussed. At the end of the course the students are expected to know the real role of agriculture extension.

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| <b>ABT 32502</b> | <b>Rekabentuk Penyelidikan Pertanian dan Analisis Data I<br/>Agriculture Research Design and Data Analysis I</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>2</b> |
|                  | This course involves a practical research project for agricultural biotechnology program. Student will undergo planning and preparation of a written research project proposal and a research project oral proposal presentation with the help of coordinator and supervisor(s).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |
| <b>ABT 45803</b> | <b>Perladangan Jitu<br/>Precision Farming</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>3</b> |
|                  | This course emphasizes on the concept of farm management that based on observation and conservation for handling ever-changing environment nowadays. The students will expose with latest technologies application of satellite, information technology and the detection tool for positioning like Global Positioning System (GPS). The acquired digital information will use to estimate fertilizer requirement and weed information that purposely to increase the quality and quantity of agricultural production.                                                                                                                                                                                                                                                                                                                                                                                 |          |
| <b>ABT 35203</b> | <b>Teknologi Bioreaktor<br/>Bioreactor Technology</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>3</b> |
|                  | This course would emphasis on the fundamental aspect of continuous culture and fed batch fermentation. Students would be exposed to preliminary knowledge required for implementation, advantages and disadvantages between fed batch and continuous culture. This also includes the understanding of specific growth rate and growth associated product formation of desired micro organism cultivation. This course also emphasis on the application of bioreactors in propagation of plant cells, microorganism and animal cell. This would include understanding of formation of cells in liquid suspension and scale up to bioreactor. Students would be exposes to factors determining growth of plant cells in the bioreactor such as inoculums size, $K_La$ and agitation speed. Introduction to monolayer culture system and suspension culture system for animal cell and plant cell growth. |          |
| <b>ABT 37903</b> | <b>Topik-topik Khas<br/>Special Topics</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>3</b> |
|                  | The course will provide the current knowledge and research about agrobiotechnology. The course will also cover emerging issues in the field of agriculture and biotechnology not represented in the main curriculum.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |
| <b>ABT 35403</b> | <b>Pengurusan Perosak Bersepadu<br/>Integrated Pest Management</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>3</b> |
|                  | This course will exposethe students to the methods used in Integrated Pest Management (IPM). This includes the control of weeds, insects and microbes that become pests in crops. Focus will be given to methods of pest control in chemical, biological, cultural, legal and other related. Students will be taught to analyze appropriate methods of pest control which the correct application techniques will be implemented.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |

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| <b>ABT 37802</b> | <b>Pengurusan Sisa Pertanian<br/>Agricultural Waste Management</b> | <b>2</b> |
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This course consist a series of lectures and group discussions in discussing various aspects of fields of waste management. This course also covers the importance of correct disposal of agricultural waste management derived from intensive farming. It includes the application of recent and appropriate technologies and enforcing the relevant regulations and legislation since environmental management issues are considered in a global context. The students manage to know how to do the best management practices in agriculture field based on their lab work and farm visits..

## **Semester Tujuh (Tahun 4)**

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| <b>ABT 42003</b> | <b>Projek Penyelidikan II<br/>Research Project II</b> | <b>3</b> |
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This course involves a practical research project for agricultural biotechnology programme. Student will undergo research project practical (basic data collection and data analysis), planning and preparation of a draft thesis, research project oral presentations (progress reports and also of the thesis) and thesis preparation, correction and submission of a complete thesis; with the help of supervisor(s), coordinator and lecturers.

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| <b>ABT 41903</b> | <b>Bioteknologi Tumbuhan Lanjutan<br/>Advanced Plant Biotechnology</b> | <b>3</b> |
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This course introduces the student to the characteristics and functions of the plant genome including the phenomenon of RNA interference (RNAi). The various techniques available for plant transformation including *Agrobacterium tumefaciens*-mediated transformation and physical transformation techniques will be covered. Typical features of plant transformation vectors and the concept of binary vectors will be discussed, as are the characteristics of plant selectable markers and reporter genes. Various methods for the detection and analysis of transgenic plants will be presented. The second part of the course will describe the various applications of plant genetic engineering in the creation of transgenic crops that are resistant to herbicides and pests, various diseases as well as improvement of crop yield and productivity. The concept of the production of recombinant proteins in plants, or molecular farming will also be described. Various issues on the use and ethics of genetically modified plants will be discussed at the end of the course.

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| <b>ABT 32502</b> | <b>Rekabentuk Penyelidikan Pertanian dan Analisis Data II<br/>Agriculture Research Design and Data Analysis II</b> | <b>2</b> |
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This course introduces students to a basic and practical overview of agricultural experimentation, and to enable students to collect data, summarize, analyze, and draw conclusions from agricultural research data.

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| <b>ABT 46703</b> | <b>Teknologi Pasca-Tuai<br/>Post-Harvest Technology</b> | <b>3</b> |
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This course emphasizes several aspects of basic information about the structure of fruits, vegetables and ornamentals, and how this influences their post-harvest behavior, then summarizes key information about their composition, biochemistry, respiration, and physiology. Managing produce temperature is the core technology for maintaining fresh quality. How this is achieved, and the influence of temperature on relative humidity and water loss, is discussed in depth.

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| <b>ABT 46002</b> | <b>Pemasaran Pertanian<br/>Agricultural Marketing</b> | <b>2</b> |
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This course covers the application of marketing concept in the agribusiness firm and system, evaluation of performance of marketing systems and understanding of marketing environment. It further examines the development of a marketing plan and management of marketing mix.

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|------------------|------------------------------------------------------------|----------|
| <b>ABT 46302</b> | <b>Komunikasi Pertanian<br/>Agricultural Communication</b> | <b>2</b> |
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Introduction to theories, definition and models of individuals and mass groups communications and its role in attitude change and persuasion in the society and agriculture particularly. Familiarize the students with selected variety of social-psychological theories of attitude change and persuasion. Expose on various communication techniques, its' characteristics and applications. This course provide an understanding on how to select appropriate communication techniques in relation to the audiences groups and situations. Students will deliver public speaking, group oral presentation and method demonstration technique.

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| <b>ABT 47602</b> | <b>Isu-isu Etika dan Harta Intelek dalam Bioteknologi dan<br/>Pertanian<br/>Ethical and Intellectual Properties Issues in Biotechnology<br/>and Agriculture</b> | <b>2</b> |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|

The course will provide the current knowledge about genetically engineered products in relation to food safety and environmental conservation. The role of ethical considerations will be highlighted. The course will also provide an understanding in intellectual property, focusing on biotechnology. It is expected the students will have, on completion of the course, a practical understanding of the management of intellectual property rights in the field of biotechnology.

## **Semester Lapan (Tahun 4)**

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| <b>ABT 31712</b> | <b>Latihan Industri<br/>Industrial Training</b> | <b>12</b> |
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This course will expose students to the actual career training and working environment in agriculture related to farming, animal husbandry, aquaculture, biotechnology or agribusiness entrepreneurship. This will develop soft skill after theoretical and practical study in the faculty. Students may choose the various work places including government or private sector.

# Latihan Industri

## Sarjana Muda Bioteknologi Pertanian

(ABT31712)

### Merit

Pelajar Ijazah Sarjana Muda Pertanian dan Bioteknologi diwajibkan menjalani Latihan Industri padasemester keenam dan berjumlah 12 kredit. Nilai grednya akan diambil kira dalam pengiraan Purata Nilai Gred Semester (PNGS) dan Purata Nilai Gred Kumulatif (PNGK).

### Pengenalan Kursus

Latihan industri merupakan satu kursus yang memberi pendedahan kepada dunia kerjaya agar para pelajar diperlengkapi dengan pelbagai amalan kerja serta aspek praktikal dalam bidang pertanian berkaitan tanaman dan haiwan. Melalui pendedahan ini diharap pelajar dapat menghubungkan apa yang dipelajari secara teori dengan realiti suasana pekerjaan dan kerja sebenar supaya mereka lebih bersedia dengan suasana kerja di sektor kerajaan dan swasta yang diceburi kelak. Bagi pelajar yang beraspirasi untuk menjadi usahawan, mereka berpeluang mendapatkan pengalaman suasana dan kerja sendiri melalui latihan industri ini tentang bagaimana sesebuah perusahaan swasta beroperasi.

### Objektif Kursus

Latihan industri mempunyai objektif kursus seperti berikut:

1. Memberi pendedahan kepada pelajar terhadap suasana kerja agar mereka dapat menyesuaikan diri dengan mudah apabila menyertai sektor pekerjaan kelak;
2. Memberi pelajar pengalaman kerja berpasukan dan mencontohi kepimpinan baik pemimpin di tempat kerja;
3. Membangunkan kemahiran insaniah dalam pengurusan sumber manusia daripada peringkat atasan dan bawahan; dan
4. Memperlengkapi dengan pengetahuan mengenai proses industri hulu dan hiliran serta industri menengah dan perkhidmatan pengembangan di organisasi sektor kerajaan dan swasta.

### Penempatan

Pelajar digalakkan untuk mencari tempat latihan industri sendiri yang hampir dengan tempat tinggal bagi mengurangkan kos. Penyelaras kursus akan menentukan kesesuaian dan akan membantu menguruskan penempatan latihan industri. Pelajar boleh menjalani latihan industri di mana-mana organisasi, syarikat, perusahaan, agensi, institut penyelidikan pertanian dan bioteknologi, universiti dan lain-lain dalam sektor kerajaan dan swasta. Penempatan ini akan dapat memberi pendedahan persekitaran kerja dan pelbagai aspek praktikal dalam bidang pertanian berkaitan tanaman dan haiwan di Malaysia.

Semasa latihan industri berlangsung, pelajar akan diletakkan di bawah pengawasan seorang pegawai yang berperanan sebagai penyelia di tempat latihan yang bersesuaian. Penyelia ini akan bertanggungjawab merancang latihan yang diberi dan di akhir sesi latihan, beliau bertanggungjawab untuk menilai dan melaporkan prestasi pelajar kepada penyelaras kursus. Penyelaras kursus atau pensyarah yang dilantik akan melawat pelajar sekurang-kurangnya sekali dalam tempoh latihan bagi memastikan latihan industri pelajar berjalan lancar.

Setelah tamat latihan, pelajar dikehendaki mendokumentasikan pengalaman latihan industri mereka mengikut format laporan yang ditetapkan dan menyerahkan laporan lengkap tersebut

kepada penyelaras kursus. Para pelajar akan membentangkan laporan latihan industri dalam sesi kolokium pembentangan latihan industri seperti yang ditetapkan.

### **Penilaian**

Penilaian keseluruhan latihan industri pelajar adalah gabungan penilaian oleh Penyelia Industri (25%), Penyelia Akademik (25%) dan laporan akhir latihan industri serta pembentangan (50%).

# Program Pengajian

## Sarjana Muda Perniagaantani dengan Kepujian

### Pendahuluan

Sarjana Muda Perniagaantani dengan kepujian adalah persediaan terbaik untuk kerjaya dalam bidang pertanian dan perniagaan. Program ini menggabungkan ilmu perniagaan dengan ilmu sains pertanian, sains makanan serta sains haiwan dengan tujuan supaya graduan bidang ini dapat menjadi usahawantani (*Agropreneur*) dan pengurus-pengurus yang cekap untuk mengendalikan firma-firma yang berasaskan pertanian dan sumber asli. Program ini menyediakan pelajar dengan pengetahuan asas dan lanjutan dalam pengeluaran produk pertanian dan makanan melalui pelbagai kursus universiti, bidang pengkhususan teras, elektif dan audit.

Semasa tahun pertama pengajian, para pelajar didedahkan kepada kursus-kursus seperti prinsip ekonomi, pengenalan kepada perniagaantani, pengurusan perniagaantani, pengenalan kepada sains makanan, prinsip perakaunan, pengurusan sumber manusia, pemasaran perniagaantani serta pengenalan bioteknologi pertanian. Pada tahun kedua dan ketiga pengajian, kursus-kursus seperti ekonomi pertanian, prinsip pengeluaran tanaman, perakaunan pengurusan, prinsip akuakultur, pengenalan kepada produksi haiwan, statistik perniagaan, komunikasi dalam pertanian, teknologi pasca tuai, rantai bekalan makanan, keusahawanan Pertanian, pengurusan kewangan, komunikasi dalam perniagaan, kaedah penyelidikan perniagaan, pengembangan pertanian, polisi dan peraturan agribisnes, pembangunan produk makanan, etika perniagaan, pengurusan strategi, projek penyelidikan I serta perniagaan antarabangsa akan diajar. Pada tahun akhir pengajian iaitu dalam semester ketujuh, pelajar akan melaksanakan projek penyelidikan tahun akhir II, pengurusan ladang, produksi padi, agrostologi serta perancangan dan pengurusan projek perniagaantani. Para pelajar akan menjalani latihan industri pada semester kelapan bagi tujuan memperolehi pengalaman menjalankan perniagaan persendirian.

### Peluang Kerjaya

Graduan pengajian ini mempunyai peluang kerjaya profesional yang luas dalam bidang pertanian dan perniagaan. Di antara peluang kerjaya graduan ini adalah usahawantani, Pengurus dan pegawai pemasaran, pegawai bank, eksekutif kewangan, pegawai ekonomi (FAMA, LPP), pensyarah (Politeknik, Kolej Professional MARA, Kolej Komuniti), pegawai penyelidik, pegawai tadbir, dan pengurus ladang, pegawai pertanian, pegawai pengembangan pertanian, pegawai agronomi dan pengurusan ladang. Graduan turut berpotensi untuk menjadi usahawantani moden yang mengaplikasikan teknik moden bioteknologi dalam pertanian.

### Jangkamasa

Pengajian ijazah ini mengambil masa selama empat (4) tahun dengan keperluan bergraduasi adalah 120 kredit.



## Syarat kemasukan

| STPM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | MATRIKULASI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DIPLOMA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1.Mendapat sekurang-kurangnya <b>PNGK 2.50</b> pada peringkat <b>STPM</b></p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C</b> pada peringkat <b>STPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Biology/Chemistry/ Physics / Mathematics (M) / Mathematics (T)</li> <li>• Mana-mana <b>SATU(1)</b> mata pelajaran lain</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat sekurang-kurangnya kepujian <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Bahasa Inggeris</li> <li>• Biology/ Chemistry/ Prinsip Perakuaunan</li> <li>• Mana-mana <b>DUA (2)</b></li> </ul> <p><b>DAN</b></p> <p>4.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>5. Tiada kecacatan anggota serta pertuturan dan buta warna</p> | <p>1.Mendapat sekurang-kurangnya <b>PNGK 2.50</b> pada peringkat <b>Matrikulasi / Asasi</b></p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C</b> pada peringkat <b>Matrikulasi / Asasi</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Biology</li> <li>• Chemistry</li> <li>• Physics/ Mathematics</li> <li>• Ekonomi /Perakuaunan</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat sekurang-kurangnya kepujian <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Bahasa Inggeris</li> <li>• Biology / Chemistry /Prinsip Perakaunan</li> <li>• Mana- mana <b>DUA (2)</b> mata pelajaran lain</li> </ul> <p><b>DAN</b></p> <p>4.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>5. Tiada kecacatan anggota serta pertuturan dan buta warna</p> | <p>1.Mendapat sekurang-kurangnya <b>PNGK 2.50</b> pada peringkat <b>Diploma</b> dalam bidang berkaitan</p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Bahasa Inggeris</li> <li>• Biology / Chemistry / Prinsip Perakaunan</li> <li>• Mana-mana <b>DUA(2)</b> mata pelajaran lain</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>4. Tiada kecacatan anggota serta pertuturan dan buta warna</p> |

## Struktur Pengajian

| Semester             | Kursus Universiti | KursusTeras | Kursus Elektif | Jumlah Kredit |
|----------------------|-------------------|-------------|----------------|---------------|
| 1                    | 4                 | 12          | -              | 16            |
| 2                    | 6                 | 11          | -              | 17            |
| 3                    | 3                 | 12          | 3              | 18            |
| 4                    | 4                 | 5           | 6              | 15            |
| 5                    | 3                 | 12          | 3              | 18            |
| 6                    | -                 | 3           | 12             | 15            |
| 7                    | -                 | 6           | 9              | 15            |
| 8                    | -                 | 6           | -              | 6             |
| <b>Jumlah Kredit</b> | <b>20</b>         | <b>67</b>   | <b>33</b>      | <b>120</b>    |

## Semester Satu (Tahun 1)

| Kod           | Nama Kursus                                                                   | Jam Kredit |
|---------------|-------------------------------------------------------------------------------|------------|
| MPU 32012     | English for Communication I<br>Inggeris untuk Komunikasi I                    | 2 (U)      |
| MPU 31022     | Islamic Civilization and Asian Civilization<br>Tamadun Islam dan Tamadun Asia | 2 (U)      |
| ECS 10103     | Principles of Economics<br>Prinsip Ekonomi                                    | 3 (S)      |
| ABB 10103     | Introduction to Agribusiness<br>Pengenalan Kepada Perniagaantani              | 3 (S)      |
| ABB 10203     | Agribusiness Management<br>Pengurusan Perniagaantani                          | 3 (S)      |
| ABB 10303     | Introduction to Food Sciences<br>Pengenalan kepada Sains Makanan              | 3 (S)      |
| <b>Jumlah</b> |                                                                               | <b>16</b>  |

## Semester Dua (Tahun 1)

| Kod       | Nama Kursus                                                                                       | Jam Kredit |
|-----------|---------------------------------------------------------------------------------------------------|------------|
| MPU 33050 | Talaqqi Qur'an (Muslim)                                                                           | 0 (A)      |
| MPU 33060 | Protocol and Management of Official Function<br>Protokol dan Pengurusan Majlis Rasmi (Non-muslim) |            |
| MPU 33022 | English for Communication II<br>Inggeris untuk Komunikasi II                                      | 2 (U)      |
| MPU 33032 | Islam Wahyu dan Kemasyarakatan (Muslim)                                                           | 2 (U)      |
| MPU 33042 | Comparative Religion II (Non Muslim)<br>Perbandingan Agama II (Bukan Islam)                       |            |
| MPU 31012 | Ethnic Relations<br>Hubungan Etnik                                                                | 2 (U)      |
| ABS 12303 | Principles of Accounting<br>Prinsip Perakaunan                                                    | 3 (S)      |
| MSS 22203 | Human Resource Management<br>Pengurusan Sumber Manusia                                            | 3 (S)      |
| ABB 10403 | Agribusiness Marketing<br>Pemasaran Perniagaantani                                                | 3 (S)      |
| ABB 10503 | Introduction to Agricultural Biotechnology<br>Pengenalan kepada Bioteknologi                      | 2 (S)      |
| Jumlah    |                                                                                                   | 17         |

## Semester Tiga (Tahun 2)

| Kod       | Nama Kursus                                                            | Jam Kredit |
|-----------|------------------------------------------------------------------------|------------|
| KKK xxxxx | Co-curriculum<br>Ko-Kurikulum                                          | 3 (U)      |
| ABB 20603 | Agricultural Economics<br>Ekonomi Pertanian                            | 3 (S)      |
| ABB 20703 | Principles of Crop Protection<br>Prinsip Pengeluaran Tanaman           | 3 (S)      |
| ACB 10203 | Management Accounting<br>Perakaunan Pengurusan                         | 3 (E)      |
| ASQ 21003 | Principles of Aquacultures<br>Prinsip Akuakultur                       | 3 (S)      |
| ABB 20803 | Introduction to Animal Production<br>Pengenalan kepada Produksi Haiwan | 3 (S)      |
| Jumlah    |                                                                        | 18         |

### Semester Empat (Tahun 2)

| Kod       | Nama Kursus                                             | Jam Kredit |
|-----------|---------------------------------------------------------|------------|
| MPU xxxx  | Foreign Language<br>Bahasa Asing                        | 2 (U)      |
| MPU 33012 | Ilmu Wahyu dan Sains (Muslim)                           | 2 (U)      |
| MPU 33022 | Moral and Ethics II (Non-muslim)<br>Moral dan Etika II  |            |
| MSS 21903 | Business Statistics<br>Statistik Perniagaan             | 3 (S)      |
| ABB 20902 | Agriculture Communication<br>Komunikasi dalam Pertanian | 2 (E)      |
| ABB 25103 | Post Harvest Technology<br>Post Harvest Technology      | 3 (E)      |
| ABB 25203 | Supply Chain Management<br>Rantai Bekalan Makanan       | 3 (E)      |
| Jumlah    |                                                         | 15         |

### Semester Lima (Tahun 3)

| Kod       | Nama Kursus                                                            | Jam Kredit |
|-----------|------------------------------------------------------------------------|------------|
| ABT 22403 | Agricultural Entrepreneurship<br>Keusahawanan Tani                     | 3 (U)      |
| FBF 10103 | Financial Management<br>Pengurusan Kewangan                            | 3 (S)      |
| MSS 11203 | Business Communication<br>Komunikasi Dalam Perniagaan                  | 3 (S)      |
| MSS 22103 | Business Research Methods<br>Kaedah Penyelidikan Perniagaan            | 3 (S)      |
| ABB 35303 | Agriculture Extension<br>Pengembangan Pertanian                        | 3 (E)      |
| ABB 31003 | Agribusiness Policy and Regulations<br>Polisi dan Peraturan Agribisnes | 3 (S)      |
| Jumlah    |                                                                        | 18         |

### Semester Enam (Tahun 3)

| Kod       | Nama Kursus                                            | Jam Kredit |
|-----------|--------------------------------------------------------|------------|
| ABB 35403 | Food Product Development<br>Pembangunan Produk Makanan | 3 (E)      |
| MSS 11203 | Business Ethics<br>Etika Perniagaan                    | 3 (E)      |
| MSS 32403 | Strategic Management<br>Pengurusan Strategi            | 3 (E)      |
| ABB 31103 | Research Project I<br>Projek Penyelidikan I            | 3 (S)      |
| MSS 22003 | International Business<br>Perniagaan Antarabangsa      | 3 (E)      |
| Jumlah    |                                                        | 15         |

### Semester Tujuh (Tahun 4)

| Kod       | Nama Kursus                                                                                      | Jam Kredit |
|-----------|--------------------------------------------------------------------------------------------------|------------|
| ABB 41303 | Perancangan dan Pengurusan Projek Perniagaantani<br>Agribusiness Project Planning and Management | 3 (S)      |
| ABB 45503 | Agrostology<br>Agrostologi                                                                       | 3 (E)      |
| ABB 45603 | Production of Paddy<br>Produksi Padi                                                             | 3 (E)      |
| ABB 41203 | Research Project II<br>Projek Penyelidikan II                                                    | 3 (S)      |
| ABB 45703 | Farm Management<br>Pengurusan Perladangan                                                        | 3 (E)      |
| Jumlah    |                                                                                                  | 15         |

### Semester Lapan (Tahun 4)

| Kod       | Nama Kursus                             | Jam Kredit |
|-----------|-----------------------------------------|------------|
| ABB 41406 | Industrial Training<br>Latihan Industri | 6 (S)      |
| Jumlah    |                                         | 6          |

**Nota:** A -Kursus Audit S -Kursus Teras E\* -Kursus Elektif U -Kursus Umum

## Sinopsis Kursus

### Sarjana Muda Perniagaantani dengan Kepujian

#### Semester Satu (Tahun 1)

| Kod Kursus | Nama Kursus Teras                                                                                                                                                                                                                                                                                                                                                                                        | Jam Kredit |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| ABB 10103  | <b>Pengenalan Kepada Perniagaantani</b><br><b>Introduction to Agribusiness</b>                                                                                                                                                                                                                                                                                                                           | 3          |
|            | <p>This course provides a comprehensive understanding of the business, interests and relationships with the general economic sector and employment opportunities in the field of business in Malaysia. Discussions include the production, processing and marketing of entrepreneurial, consumer, credit and finance products, governmental roles, and future entrepreneurship.</p>                      |            |
| ABB 10203  | <b>Pengurusan Perniagaantani</b><br><b>Agribusiness Management</b>                                                                                                                                                                                                                                                                                                                                       | 3          |
|            | <p>This course discusses the basic principles of business management. The discussions are about covering management functions, strategic management of inventory management, financial management and human resource management. Management of production, processing and marketing in agribusiness is also discussed in details.</p>                                                                    |            |
| ABB 10303  | <b>Pengenalan kepada Sains Makanan</b><br><b>Introduction to Food Sciences</b>                                                                                                                                                                                                                                                                                                                           | 3          |
|            | <p>The course is arranged to introduce basics of food science and technology and to stimulate students' interest in this field. General aspects of up-to-date food science and technology will be covered, including: food industry outlook, food chemistry, nutrition, food processing including food packaging and engineering, food microbiology, food safety, halal food and food biotechnology.</p> |            |

#### Semester Dua (Tahun 1)

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| ABS 12303 | <b>Prinsip Perakaunan</b><br><b>Principles of Accounting</b>                                                                                                                                                                                                                                                                                                                                                                                                           | 3 |
|           | <p>This course will introduce the objectives, concepts, principles, accounting conventions and recording processes. It also focuses on the accounting cycle starting from analyzing and recording business transactions using system notes to prepare financial statements.</p>                                                                                                                                                                                        |   |
| MSS 22203 | <b>Pengurusan Sumber Manusia</b><br><b>Human Resource Management</b>                                                                                                                                                                                                                                                                                                                                                                                                   | 3 |
|           | <p>This course focuses on the concept of 'collaboration' between human resource managers and other managers in implementing human resource management activities such as employment planning, recruitment, selection, training and development, rewards, and employer relationships -employee; It focuses on the techniques and methods of enhancing organizational effectiveness through proper human resource management practices; comparisons are made between</p> |   |

human resource management practices in the private sector and government as well as between human resource management philosophy from western and non-western perspectives like Japan.

**ABB 10403      Pemasaran Pertiagaanani      3**  
**Agribusiness Marketing**

This course covers the application of firm marketing concepts and enterprise systems, performance appraisal of marketing systems and understanding of marketing environments. It also examines the development of marketing mix and marketing mix management.

**ABB 10503      Pengenalan Bioteknologi Pertanian      2**  
**Introduction to Agricultural Biotechnology**

This course will cover most applications of Biotechnology : plant, animal, industrial, medical and environmental. The growth of biotechnology will continue to impact world trade, global economics etc. and it success and growth will depend on consumer perception and acceptance of the technology and applications.

## Semester Tiga (Tahun 2)

**ABB 20603      Ekonomi Pertanian      3**  
**Agricultural Economics**

This course explores the economic foundations for public policy analysis related to agricultural issues in rural areas. The emphasis of this course is on concepts and introduction of various tools required for policy analysis and empirical research in agricultural economics. In particular, the course aims to deepen students' understanding of how economic theory can be applied to analyze policy problems of agricultural sectors. This course is suitable for individuals who have strong interest in economic development and agricultural economics, and want to examine these issues with quantitative and econometric methods as a policy analyst.

**ABB 20703      Prinsip Pengeluaran Tanaman      3**  
**Principles of Crop Production**

This course discusses the factors that influence crop production which include morphology, taxonomy, physiology, genetic, climate, soil, land preparation, planting, fertilizer, water, pests and harvesting. This is followed with the discussion on the general principle of the production of vegetable, fruit, ornamental, field and industrial crop.

**ACB 10203      Perakaunan Pengurusan      3**  
**Management Accounting**

The course is specially designed for non-accounting students. Students will be introduced and exposed to the cost and management accounting and its role in an organizations as an aid to ehe management functions. The course emphasis on the aspects of determining product cost, costs analysis, costs controls and also uses and importance of cost to the managements functions and the decision making process.

|                  |                                                          |          |
|------------------|----------------------------------------------------------|----------|
| <b>ASQ 21003</b> | <b>Prinsip Akuakultur<br/>Principles of Aquacultures</b> | <b>3</b> |
|------------------|----------------------------------------------------------|----------|

This course will cover the knowledge of the development of aquaculture; good aquaculture practices; the biology of common cultured species and economics of aquaculture. Students will be exposed to the basic system of aqua farm construction and the management of aqua farm.

|                  |                                                                         |          |
|------------------|-------------------------------------------------------------------------|----------|
| <b>ABB 20803</b> | <b>Pengenalan Produksi Haiwan<br/>Introduction to Animal Production</b> | <b>3</b> |
|------------------|-------------------------------------------------------------------------|----------|

This course will incorporate an overview of the livestock and poultry industries in Malaysia. It will also include basic requirement of animals, different production systems, the various sectors involved in producing high quality halal products. This course also covers aspects on proper waste disposal, GAHP and role of animals in plantation crops.

## **Semester Empat (Tahun 2)**

|                  |                                                     |          |
|------------------|-----------------------------------------------------|----------|
| <b>MSS 21903</b> | <b>Statistik Perniagaan<br/>Business Statistics</b> | <b>3</b> |
|------------------|-----------------------------------------------------|----------|

The course will introduce the fundamental concepts of statistics and a variety of descriptive and inferential statistical techniques to prepare the students for performing statistical analyses. The topics include fundamental probability theory, T-Test, Chi-square Test, Analysis of Variance, Correlation, Regression and Non-Parametric Analyses. This course focuses on the applied rather than the theoretical aspects of statistics.

|                  |                                                                 |          |
|------------------|-----------------------------------------------------------------|----------|
| <b>ABB 20902</b> | <b>Komunikasi dalam Pertanian<br/>Agriculture Communication</b> | <b>2</b> |
|------------------|-----------------------------------------------------------------|----------|

Introduction to theories, definition and models of individuals and mass groups communications and its role in attitude change and persuasion in the society and agriculture particularly. Familiarize the students with selected variety of social-psychological theories of attitude change and persuasion. Expose on various communication techniques, its' characteristics and applications. This course provide an understanding on how to select appropriate communication techniques in relation to the audiences groups and situations. Students will deliver public speaking, group oral presentation and method demonstration technique.

|                  |                                                         |          |
|------------------|---------------------------------------------------------|----------|
| <b>ABB 25103</b> | <b>Teknologi Pasca Tuai<br/>Post-Harvest Technology</b> | <b>3</b> |
|------------------|---------------------------------------------------------|----------|

This course emphasizes several aspects of basic information about the structure of fruits, vegetables and ornamentals, and how this influences their post-harvest behavior, and then summarizes key information about their composition, biochemistry, respiration, and physiology. Managing produce temperature is the core technology for maintaining fresh quality. How this is achieved, and the influence of temperature on relative humidity and water loss, is discussed in depth.



|                  |                                                                |          |
|------------------|----------------------------------------------------------------|----------|
| <b>ABB 25203</b> | <b>Pengurusan Rantaian Bekalan<br/>Supply Chain Management</b> | <b>3</b> |
|------------------|----------------------------------------------------------------|----------|

This course develops the ability to conceptualize, design, and implements supply chains aligned with product, market, and customer characteristics. Business competition is now between supply networks rather than individual corporations. Managing the flow of products, information, and revenue across supply chains differentiates the ability of supply networks to fulfill customer needs. Students develop the ability to evaluate how information flows can substitute for the stock of physical resources, such as inventory, and why such systems succeed or fail. They assess how internet technologies, dynamic markets, and globalization are impacting supply chain strategies and practices, including logistics, digital coordination of decisions and resources, inventory and risk management, procurement and supply contracting, product and process design, and revenue management.

### **Semester Lima (Tahun 3)**

|                  |                                                                 |          |
|------------------|-----------------------------------------------------------------|----------|
| <b>ABB 22403</b> | <b>Keusahawanan Pertanian<br/>Agricultural Entrepreneurship</b> | <b>3</b> |
|------------------|-----------------------------------------------------------------|----------|

The course covers the role and responsibilities of an entrepreneur, problems and techniques in management, business planning, project evaluation, marketing, credit, business strategies, and management of resources and current issues of entrepreneurship in agribusiness. This course also introduces the participants to the concept of entrepreneurship and its role in economic and business development specifically in the agricultural industry.

|                  |                                                     |          |
|------------------|-----------------------------------------------------|----------|
| <b>FBF 10103</b> | <b>Pengurusan Kewangan<br/>Financial Management</b> | <b>3</b> |
|------------------|-----------------------------------------------------|----------|

This course covers the use of financial management principles to achieve optimum utilization of capital resources in entrepreneurial operations and credit management aspects covering loan, leasing and hire purchase financing discussed to improve student skills in analyzing financial management problems.

|                  |                                                               |          |
|------------------|---------------------------------------------------------------|----------|
| <b>MSS 22103</b> | <b>Komunikasi dalam Perniagaan<br/>Business Communication</b> | <b>3</b> |
|------------------|---------------------------------------------------------------|----------|

Application of business communication principles through creation of effective business documents and oral presentations. Includes study and application of team communication and use of technology to facilitate the communication process.

|                  |                                                         |          |
|------------------|---------------------------------------------------------|----------|
| <b>ABB 35303</b> | <b>Pengembangan Pertanian<br/>Agriculture Extension</b> | <b>3</b> |
|------------------|---------------------------------------------------------|----------|

This course is introduced to expose students to the background and extension definition relating to concepts, objectives and the agricultural extension model. The course also addresses the extension strategies, the image of extension agent, understanding of theories and methods and the planning process. Exposure to how extension can play an effective role in the dissemination of the farm practices information will also be discussed. At the end of the course the students are expected to know the real role of agriculture extension.

|                  |                                                                                |          |
|------------------|--------------------------------------------------------------------------------|----------|
| <b>ABB 31003</b> | <b>Polisi dan Peraturan Agribisnis<br/>Agribusiness Policy and Regulations</b> | <b>3</b> |
|------------------|--------------------------------------------------------------------------------|----------|

This course covers government policies including the National Agriculture Policy (DPN) and Industrial Master plan (IMP), as well as nutritional policies and regulations. The government organizations involved in implementing this policy will be explained. The best production rules and practices such as HACCP principles, certifications and ISO standards will also be discussed. Trade aspects covering AFTA, NAFTA, GATT, WTO and its impact on the business sector will be discussed.

### **Semester Enam (Tahun 3)**

|                  |                                                                |          |
|------------------|----------------------------------------------------------------|----------|
| <b>ABB 35403</b> | <b>Pembangunan Produk Makanan<br/>Food Product Development</b> | <b>3</b> |
|------------------|----------------------------------------------------------------|----------|

This course covers the theory and practical concepts involve in designing and developing new food products. The three major components of food product development steps which are development and evaluation of product concept, development of a prototype food product including packaging, evaluation of product attributes, safety, shelf life, and also market evaluation of the prototype products will be covered. Students will be exposed to various techniques to evaluate sensory attributes of food products. At the end of the course, students will be required to work through a food product development proposal using the product development team approach that is prevalent in the food industry.

|                  |                                             |          |
|------------------|---------------------------------------------|----------|
| <b>MSS 11203</b> | <b>Etika Perniagaan<br/>Business Ethics</b> | <b>3</b> |
|------------------|---------------------------------------------|----------|

This course focusing on the relationships between the business entity and the society as well as the administrator. The discussion covered on the consumerization issues, ecology and environment, community, management and control, as well as social responsibility for profit-oriented company.

|                  |                                                      |          |
|------------------|------------------------------------------------------|----------|
| <b>MSS 32403</b> | <b>Pengurusan Strategik<br/>Strategic Management</b> | <b>3</b> |
|------------------|------------------------------------------------------|----------|

This course contents comprise of analytical aspects of organizational external environment in order to identify any future or current opportunities and threats; analytical aspects of organizational internal environment for strengths and weaknesses analysis; and to project various alternatives for strategic formation and program implementation towards organization objectives and mission achievement.

|                  |                                                     |          |
|------------------|-----------------------------------------------------|----------|
| <b>ABB 31103</b> | <b>Projek Penyelidikan I<br/>Research Project I</b> | <b>3</b> |
|------------------|-----------------------------------------------------|----------|

This course involves a practical research project for agricultural biotechnology programme. Student will undergo planning and preparation of a written research project proposal and a research project oral presentation with the help of supervisor(s).

|                  |                                                           |          |
|------------------|-----------------------------------------------------------|----------|
| <b>MSS 22003</b> | <b>Perniagaan Antarabangsa<br/>International Business</b> | <b>3</b> |
|------------------|-----------------------------------------------------------|----------|

This course covers the introduction of an international business that includes an international environment that covers the economic dimensions, culture, politics and international law. This course also covers the management and regulation of international marketing.

## **Semester Tujuh (Tahun 4)**

|                  |                                                                                                          |          |
|------------------|----------------------------------------------------------------------------------------------------------|----------|
| <b>ABB 41303</b> | <b>Perancangan dan Pengurusan Projek Perniagaantani<br/>Agribusiness Project Planning and Management</b> | <b>3</b> |
|------------------|----------------------------------------------------------------------------------------------------------|----------|

This course covers project evaluation theory and techniques including net present value, internal rate of return and cost benefit ratios. It also includes important steps in planning a business project. Project management processes and techniques such as PERT / CPM and project organizations are also discussed.

|                  |                                    |          |
|------------------|------------------------------------|----------|
| <b>ABB 45503</b> | <b>Agrostologi<br/>Agrostology</b> | <b>3</b> |
|------------------|------------------------------------|----------|

This course discusses the importance of pasture plants as ruminant feed resources. It includes the characteristics of important grasses and legumes species, method of establishment, fertilization and pasture managements. Systems of utilization, nutritive value and conservation of pasture will also be covered.

|                  |                                           |          |
|------------------|-------------------------------------------|----------|
| <b>ABB 45603</b> | <b>Produksi Padi<br/>Paddy Production</b> | <b>3</b> |
|------------------|-------------------------------------------|----------|

This course discusses the basic principles of crop production, improvement and management of PADI. This is an intermediate course that introduce as well as enable the students to practice the present technology of padi production. Aspects of the course are; historical and origin, botany, pshysiology, agronomi, breeding and seedproduction, soilsuitability, control of pest and diseases, mechanization of all phases of production with reference to the traditional methods and automation potential, and post harvest handling. The practical sessions includes the planting and management of padi plant (and the posible harvest). Some operations in the practical activities will be mechanised, otherwise it will be supplemented by practicals at KETARA facilities at Besut.

|                  |                                                       |          |
|------------------|-------------------------------------------------------|----------|
| <b>ABB 41203</b> | <b>Projek Penyelidikan II<br/>Research Project II</b> | <b>3</b> |
|------------------|-------------------------------------------------------|----------|

This course involves a practical research project for agricultural biotechnology programme. Student will undergo research project practical (basic data collection and data analysis), planning and preparation of a draft thesis, research project oral presentations (progress reports and draft of a thesis) and thesis preparation, correction and submission of a complete thesis; with the help of supervisor(s).

|                  |                                              |          |
|------------------|----------------------------------------------|----------|
| <b>ABB 45703</b> | <b>Pengurusan Ladang<br/>Farm Management</b> | <b>3</b> |
|------------------|----------------------------------------------|----------|

This course explains and discusses the use of theory and economic principles in the field decision-making process. Decision making is the basis for the execution of all management functions that include planning, implementation and control. In this course also, students will learn the different approaches, methods and tools used in planning, implementing, controlling and analyzing the performance of a farm business.

## **Semester Lapan (Tahun 4)**

|                  |                                                 |          |
|------------------|-------------------------------------------------|----------|
| <b>ABB 41406</b> | <b>Latihan Industri<br/>Industrial Training</b> | <b>6</b> |
|------------------|-------------------------------------------------|----------|

This industrial training covers some related topics taught during the eight semesters which requires hands-on to give the experience to students to work in the real working condition.

# Latihan Industri

## Sarjana Muda Perniagaantani dengan Kepujian (ABT31712)

### Merit

Pelajar Ijazah Sarjana Muda Perniagaantani dengan Kepujian diwajibkan menjalani Latihan Industri pada semester keenam dan berjumlah 12 kredit. Nilai grednya akan diambil kira dalam pengiraan Purata Nilai Gred Semester (PNGS) dan Purata Nilai Gred Kumulatif (PNGK).

### Pengenalan Kursus

Latihan industri merupakan satu kursus yang memberi pendedahan kepada dunia kerjaya agar para pelajar diperlengkapi dengan pelbagai amalan kerja serta aspek praktikal dalam bidang pertanian berkaitan tanaman dan haiwan. Melalui pendedahan ini diharap pelajar dapat menghubungkan apa yang dipelajari secara teori dengan realiti suasana pekerjaan dan kerja sebenar supaya mereka lebih bersedia dengan suasana kerja di sektor kerajaan dan swasta yang diceburi kelak. Bagi pelajar yang beraspirasi untuk menjadi usahawan, mereka berpeluang mendapatkan pengalaman suasana dan kerja sendiri melalui latihan industri ini tentang bagaimana sesebuah perusahaan swasta beroperasi.

### Objektif Kursus

Latihan industri mempunyai objektif kursus seperti berikut:

1. Memberi pendedahan kepada pelajar terhadap suasana kerja agar mereka dapat menyesuaikan diri dengan mudah apabila menyertai sektor pekerjaan kelak;
2. Memberi pelajar pengalaman kerja berpasukan dan mencontohi kepimpinan baik pemimpin di tempat kerja;
3. Membangunkan kemahiran insaniah dalam pengurusan sumber manusia daripada peringkat atasan dan bawahan; dan
4. Memperlengkapi dengan pengetahuan mengenai proses industri hulu dan hiliran serta industri menengah dan perkhidmatan pengembangan di organisasi sektor kerajaan dan swasta.

### Penempatan

Pelajar digalakkan untuk mencari tempat latihan industri sendiri yang hampir dengan tempat tinggal bagi mengurangkan kos. Penyelaras kursus akan menentukan kesesuaian dan akan membantu menguruskan penempatan latihan industri. Pelajar boleh menjalani latihan industri di mana-mana organisasi, syarikat, perusahaan, agensi, institut penyelidikan pertanian dan bioteknologi, universiti dan lain-lain dalam sektor kerajaan dan swasta. Penempatan ini akan dapat memberi pendedahan persekitaran kerja dan pelbagai aspek praktikal dalam bidang pertanian berkaitan tanaman dan haiwan di Malaysia.

Semasa latihan industri berlangsung, pelajar akan diletakkan di bawah pengawasan seorang pegawai yang berperanan sebagai penyelia di tempat latihan yang bersesuaian. Penyelia ini akan bertanggungjawab merancang latihan yang diberi dan di akhir sesi latihan, beliau bertanggungjawab untuk menilai dan melaporkan prestasi pelajar kepada penyelaras kursus. Penyelaras kursus atau pensyarah yang dilantik akan melawat pelajar sekurang-kurangnya sekali dalam tempoh latihan bagi memastikan latihan industri pelajar berjalan lancar.

Setelah tamat latihan, pelajar dikehendaki mendokumentasikan pengalaman latihan industri mereka mengikut format laporan yang ditetapkan dan menyerahkan laporan lengkap tersebut

kepada penyelaras kursus. Para pelajar akan membentangkan laporan latihan industri dalam sesi kolokium pembentangan latihan industri seperti yang ditetapkan.

### **Penilaian**

Penilaian keseluruhan latihan industri pelajar adalah gabungan penilaian oleh Penyelia Industri (25%), Penyelia Akademik (25%) dan laporan akhir latihan industri serta pembentangan (50%).

# Program Pengajian

## **Sarjana Muda Produksi Dan Kesihatan Haiwan**

### **Pendahuluan**

Sarjana Muda Produksi dan Kesihatan Haiwan adalah persediaan terbaik untuk kerjaya dalam bidang produksi dan kesihatan haiwan. Program ini adalah ijazah sains gunaan yang menggabungkan asas-asas sains dengan bidang-bidang sains haiwan dan diperlengkapi dengan kerja amali yang luas. Pada tahun pertamapengajian, pelajar didedahkan dengan sistem produksi dan kesihatan haiwan melalui pelbagai kursus seperti kimia, biokimia, biologi sel, ekonomi, perakaunan dan genetik. Pada tahun dua dan tiga pengajian, kursus-kursus yang diajar merangkumi asas anatomi, fisiologi, fisiologi reproduksi, pemakanan, pembiakbakaan haiwan, biostatistik, produksi pedaging, produksi tenusu, produksi poltri, produksi kambing, mikrobiologi, penyakit haiwan, parasitologi, keusahawanan dan agen penyebab penyakit. Pada tahun keempat pengajian, pelajar akan melaksanakan projek penyelidikan, pembentangan seminar, amalan veterinar, kesihatan awam veterinar, pengurusan sisa haiwan, tabiat dan kebajikan haiwan, struktur ladang ternakan, pengembangan pertanian dan komunikasi.

### **Peluang Kerjaya**

Graduan pengajian ini mempunyai peluang kerjaya profesional dalam bidang pertanian haiwan, perniagaantani (pakar runding dan perkhidmatan nasihat), kesihatan dan kebajikan haiwan, pemasaran, pengurusan keusahawanan bandar dan luar bandar (termasuk ladang-ladang), industri ternakan dan penyelidikan.

### **Jangkamasa**

Ijazah ini mengambil masa selama empat (4) tahun dengan keperluan bergraduasi ialah 125 kredit.

## Syarat kemasukan

| STPM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MATRIKULASI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | DIPLOMA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1.Mendapat sekurang-kurangnya <b>PNGK 2.50</b> pada peringkat <b>STPM</b></p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C+</b> pada peringkat <b>STPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Biology</li> <li>• Chemistry</li> <li>• Physics / Mathematics (M) / Mathematics (T)</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat sekurang-kurangnya kepujian <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Bahasa Inggeris</li> <li>• Biology</li> <li>• Chemistry</li> <li>• Mathematics / Physics / Additional Mathematics / Sains Pertanian</li> </ul> <p><b>DAN</b></p> <p>4.Mendapat mana-mana <b>SATU (1) Gred C</b> mata pelajaran lain tidak termasuk Bahasa Melayu dan mata pelajaran diatas</p> <p><b>DAN</b></p> <p>5.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>6. Tiada kecacatan anggota serta pertuturan dan buta warna</p> | <p>1.Mendapat sekurang-kurangnya <b>PNGK 2.50</b> pada peringkat <b>Matrikulasi / Asasi</b></p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C+</b> pada peringkat <b>Matrikulasi / Asasi</b> dalam mata pelajaran berikut :</p> <ul style="list-style-type: none"> <li>• Biology</li> <li>• Chemistry</li> <li>• Physics / Mathematics</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat sekurang-kurangnya <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Bahasa Inggeris</li> <li>• Biology</li> <li>• Chemistry</li> <li>• Mathematics / Additional Mathematics / Physics / Sains Pertanian</li> </ul> <p><b>DAN</b></p> <p>4.Mendapat mana-mana <b>SATU (1) Gred C</b> mata pelajaran lain tidak termasuk Bahasa Melayu dan mata pelajaran diatas</p> <p><b>DAN</b></p> <p>5.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>6. Tiada kecacatan anggota serta pertuturan dan buta warna</p> | <p>1.Mendapat sekurang-kurangnya <b>PNGK 3.50</b> pada peringkat <b>Diploma</b> dalam bidang berkaitan</p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Bahasa Inggeris</li> <li>• Biology / Chemistry/ Mathematics</li> <li>• Physics / Additional Mathematics / Sains Pertanian</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat mana-mana <b>SATU (1) Gred C</b> mata pelajaran lain tidak termasuk Bahasa Melayu dan mata pelajaran diatas</p> <p><b>DAN</b></p> <p>4.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>5. Tiada kecacatan anggota serta pertuturan dan buta warna</p> |



## Struktur Pengajian

| Semester             | Kursus Universiti | Kursus Teras | Kursus Elektif | Jumlah Kredit |
|----------------------|-------------------|--------------|----------------|---------------|
| 1                    | 9                 | 3            | 3              | 15            |
| 2                    | 11                | 8            | -              | 19            |
| 3                    | -                 | 20           | -              | 20            |
| 4                    | -                 | 9            | 8              | 17            |
| 5                    | -                 | 11           | 5              | 16            |
| 6                    | -                 | 7            | 5              | 12            |
| 7                    | -                 | 4            | 10             | 14            |
| 8                    | -                 | 12           | -              | 12            |
| <b>Jumlah Kredit</b> | <b>20</b>         | <b>74</b>    | <b>31</b>      | <b>125</b>    |

## Semester Satu (Tahun 1)

| Kod           | Nama Kursus                                                                          | Jam Kredit |
|---------------|--------------------------------------------------------------------------------------|------------|
| KKX xxxx      | Co-Curriculum<br>Kokurikulum                                                         | 3 (U)      |
| MPU 31022     | Islamic Civilization and Asian Civilization<br>Tamadun Islam & Tamadun Asia          | 2 (U)      |
| MPU 32012     | English for Communication<br>Inggeris untuk Komunikasi I                             | 2 (U)      |
| MPU 33012     | Ilmu Wahyu dan Sains (Pelajar Islam)                                                 | 2 (U)      |
| MPU 33022     | Moral and Ethics II (Non Muslim Student)<br>Moral dan Etika II (Pelajar Bukan Islam) |            |
| ASH 12103     | Animal Genetics & Breeding<br>Genetik dan Pembiakan Haiwan                           | 3 (S)      |
| ABS 12303     | Principles of Accounting<br>Prinsip Akaun                                            | 3 (E)      |
| <b>Jumlah</b> |                                                                                      | <b>15</b>  |

### Semester Dua (Tahun 1)

| Kod                    | Nama Kursus                                                                                                                                               | Jam Kredit |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| MPU *****              | Foreign Language I<br>Bahasa Asing I                                                                                                                      | 2 (U)      |
| MPU 31012              | Ethnic Relations<br>Hubungan Etnik                                                                                                                        | 2 (U)      |
| MPU 33022              | English for Communication II<br>Inggeris untuk Komunikasi II                                                                                              | 2 (U)      |
| MPU 33032              | Ilmu Wahyu dan Kemasyarakatan (Pelajar Islam)                                                                                                             | 2 (U)      |
| MPU 33042              | Comparative Religion II (Non Muslim Student)<br>Perbandingan Agama II (Pelajar Bukan Islam)                                                               | 2 (U)      |
| MPU 33050<br>MPU 33060 | Talaqqi Qu'ran (Pelajar Islam)<br>Protocol and Management of Official Function (Non Muslim)<br>Protokol dan Pengurusan Majlis Rasmi (Pelajar Bukan Islam) | 0 (A)      |
| ABT 22403              | Agricultural Entrepreneurship<br>Keusahawan Tani                                                                                                          | 3 (U)      |
| ASH 10202              | Animal Products<br>Produk Haiwan                                                                                                                          | 2 (S)      |
| ASH 10303              | Fundamental Biochemistry in Animal Science<br>Biokimia Asas Sains Haiwan                                                                                  | 3 (S)      |
| ASH 10403              | Agrostology<br>Agrostologi                                                                                                                                | 3 (S)      |
| Jumlah                 |                                                                                                                                                           | 19         |

### Semester Tiga (Tahun 2)

| Kod       | Nama Kursus                                       | Jam Kredit |
|-----------|---------------------------------------------------|------------|
| ASH 20504 | Non Ruminant Production<br>Produksi Bukan Ruminan | 4 (S)      |
| ASH 21004 | Animal Practice I<br>Amalan Haiwan I              | 4 (S)      |
| ASH 22203 | Animal Anatomy<br>Anatomi Haiwan                  | 3 (S)      |
| ASH 22303 | Animal Physiology<br>Fisiologi Haiwan             | 3 (S)      |
| ASH 22403 | Animal Nutrition<br>Pemakanan Haiwan              | 3 (S)      |
| ASH 22503 | Animal Microbiology<br>Mikrobiologi Haiwan        | 3 (S)      |
| Jumlah    |                                                   | 20         |

### Semester Empat (Tahun 2)

| Kod       | Nama Kursus                                                 | Jam Kredit |
|-----------|-------------------------------------------------------------|------------|
| ASH 21203 | Animal Parasitology<br>Parasitologi Haiwan                  | 3 (S)      |
| ASH 21303 | Animal Deases<br>Penyakit Haiwan                            | 3 (S)      |
| ABT 22403 | Animal Reproduction<br>Reproduksi Haiwan                    | 3 (S)      |
| ASH 25203 | Animal Behavior and Welfare<br>Tabiat dan Kebajikan Haiwan  | 3 (E)      |
| ASH 25302 | Biostatistic in Animal Science<br>Biostatistik Sains Haiwan | 2 (E)      |
| ASH 46303 | Equine Science<br>Sains Ekuin                               | 3 (E)      |
| Jumlah    |                                                             | 17         |

### Semester Lima (Tahun 3)

| Kod       | Nama Kursus                                                   | Jam Kredit |
|-----------|---------------------------------------------------------------|------------|
| ASH 31504 | Ruminant/Equine Internship<br>Latihan Sangkut Ruminan/Ekuin   | 4 (S)      |
| ASH 31604 | Research Project I<br>Projek Penyelidikan I                   | 4 (S)      |
| ASH 32703 | Ruminant Production I (Meat)<br>Produksi Ruminan I (Daging)   | 3 (S)      |
| ASH 35603 | Animal Reproduction Technology<br>Teknologi Reproduksi Haiwan | 3 (E)      |
| ASH 46202 | Veterinary Public Health<br>Kesihatan Awam Veterinar          | 2 (E)      |
| Jumlah    |                                                               | 16         |

### Semester Enam (Tahun 3)

| Kod       | Nama Kursus                                                                   | Jam Kredit    |
|-----------|-------------------------------------------------------------------------------|---------------|
| ASH 32803 | Ruminant Production II (Dairy)<br>Produksi Ruminan II (Tenusu)                | 3 (S)         |
| ASH 41804 | Research Project II<br>Projek Penyelidikan II                                 | 4 (S)         |
| ASH 35702 | Agricultural Extension<br>Pengembangan Pertanian                              | 2 (E)<br>atau |
| ABT 46302 | Communication in Agriculture<br>Komunikasi Pertanian                          | 2 (E)         |
| ASH 45503 | Animal Feed and Processing Technology<br>Teknologi Pemprosesan Makanan Haiwan | 3 (E)         |
| Jumlah    |                                                                               | 12            |

### Semester Tujuh (Tahun 4)

| Kod       | Nama Kursus                                                                       | Jam Kredit           |
|-----------|-----------------------------------------------------------------------------------|----------------------|
| ASH 15002 | Animal Farm Practice<br>Amalan Ternakan Ladang                                    | 2<br>E (WBL)         |
| ASH 25403 | Pengurusan Sisa Haiwan<br>Animal Waste Management                                 | 3<br>E (WBL)         |
| ASH 35903 | Aquaculture<br>Akuakultur                                                         | 3<br>E (WBL)<br>atau |
| ASH 36003 | Farm Development and Operation<br>Pembangunan dan Operasi Ladang                  | 3<br>E (WBL)         |
| ASH 41904 | Poultry/Swine/Aquaculture Internship<br>Latihan Sangkut Poltri/Khinzir/Akuakultur | 4<br>S (WBL)         |
| ASH 46102 | Animal Practice II<br>Amalan Haiwan II                                            | 2<br>E (WBL)         |
| Jumlah    |                                                                                   | 14                   |

### Semester Lapan (Tahun 4)

| Kod       | Nama Kursus                               | Jam Kredit           |
|-----------|-------------------------------------------|----------------------|
| ASH 42012 | Industrial Internship<br>Latihan Industri | 12 (0+12) S<br>(WBL) |
| Jumlah    |                                           | 13                   |

**Nota:** A -Kursus Audit S -Kursus Teras E\* -Kursus Elektif U -Kursus Umum  
WBL – Work Based-Learning

# Sinopsis Kursus

## Sarjana Muda Produksi Dan Kesihatan Haiwan

### Semester Satu (Tahun 1)

| Kod Kursus                                                                                                                                                                                                                                                                                                                                                                                                                              | Nama Kursus                                                                   | Jam Kredit |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------|
| ASH 12103                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Genetik dan Pembiakaan Haiwan</b><br><b>Animal Genetics &amp; Breeding</b> | 3          |
| <p>This course introduces the basic principles of genetics as applied to animals. Basic Mendelian Genetics is reviewed with examples from livestock. The course emphasises the fundamentals of gene transmission and expression, especially with reference to qualitative traits. The topics discussed will also address chromosomal and molecular basis of variation and the factors influencing genetic structure of populations.</p> |                                                                               |            |
| ABS 12303                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Prinsip Akaun</b><br><b>Principles of Accounting</b>                       | 3          |
| <p>This course will introduce the objectives of accounting, concepts, principles, conventions of accounting and recording process. It focuses on the accounting cycle starting from analysing and recording the business transactions using the double-entry system to preparing the financial statement.</p>                                                                                                                           |                                                                               |            |

### Semester Dua (Tahun 1)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                        |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---|
| ASH 10202                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Produk Haiwan</b><br><b>Animal Products</b>                                         | 2 |
| <p>This course integrates class discussions and laboratory exercises to introduce the students to the biochemical and physical changes that occur during the conversion of meat, poultry, milk and eggs to finished products, including the traditional processing of meat, poultry, milk and eggs ; equipments, ingredients and additives used in the manufacturing of these products; major problems that can occur in these products and potential solutions and recent advanced technology in meat, poultry, milk and egg processing.</p>                                                                                                                                     |                                                                                        |   |
| ASH 10303                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Biokimia Asas Sains Haiwan</b><br><b>Fundamental Biochemistry in Animal Science</b> | 3 |
| <p>This course discusses various aspects of fundamental genetics especially those related to genes, molecules, cells, organisms and population status. This course covers Mendelian and Non-Mendelian principles, inheritance, and related probability methods. This course also revises the basic principles of qualitative and quantitative genetics. It uses the basic principles of genetics to improve performances of animals. Statistical concepts will be used to predict response to selection, and selection for breeding soundness will be identified. Different breeding methods that can be used to improve quality and quantity of animals will be highlighted.</p> |                                                                                        |   |

|                  |                                    |          |
|------------------|------------------------------------|----------|
| <b>ASH 10403</b> | <b>Agrostologi<br/>Agrostology</b> | <b>3</b> |
|------------------|------------------------------------|----------|

This course discusses the importance of pasture plants as ruminant feed resources. It includes the characteristics of important grasses and legume species, method of establishment, fertilization and pasture managements. System of utilization, nutritive value and conservation of pasture will also be covered.

## **Semester Tiga (Tahun 2)**

|                  |                                                           |          |
|------------------|-----------------------------------------------------------|----------|
| <b>ASH 20504</b> | <b>Produksi Bukan Ruminan<br/>Non Ruminant Production</b> | <b>4</b> |
|------------------|-----------------------------------------------------------|----------|

This course places emphasis on the application of basic knowledge in non-ruminant mainly poultry and swine production in order to identify the problems that normally occur in small and commercial non ruminant production, especially on the aspects of management, nutrition and environment. The course requires the student to discuss the problems in non-ruminant production and ways to overcome the problems. The information obtained from the discussion will be strengthened with lectures related to the subject.

|                  |                                              |          |
|------------------|----------------------------------------------|----------|
| <b>ASH 21004</b> | <b>Amalan Haiwan I<br/>Animal Practice I</b> | <b>4</b> |
|------------------|----------------------------------------------|----------|

This course involves the attachment of student at a governmental or private animal farms. Student will be exposed to the actual working conditions and management practices carried out in the farm.

|                  |                                          |          |
|------------------|------------------------------------------|----------|
| <b>ASH 22203</b> | <b>Anatomi Haiwan<br/>Animal Anatomy</b> | <b>3</b> |
|------------------|------------------------------------------|----------|

This course in anatomy, histology and embryology deals with cell structure, basic tissues, basic embryology, lymphoid tissues, introductory neuroanatomy, cardiovascular and digestive systems, urogenital, respiratory, musculoskeletal, endocrine, arthrology, integumentary system, central nervous system, special senses, postural reactions, and applied and regional anatomy. A coordinated systems approach is applied in the teaching of gross anatomy, histology and embryology.

|                  |                                               |          |
|------------------|-----------------------------------------------|----------|
| <b>ASH 22303</b> | <b>Fisiologi Haiwan<br/>Animal Physiology</b> | <b>3</b> |
|------------------|-----------------------------------------------|----------|

This course in animal physiology aims to establish knowledge of normal function of domestic animals. This course will include the general cellular, cardiovascular, digestive, renal, nervous and endocrine systems, reproduction, respiration, the sense organ and environmental physiology. The practical classes are conducted during this course in which selected principles described in the lectures are illustrated.

|                  |                                              |          |
|------------------|----------------------------------------------|----------|
| <b>ASH 22403</b> | <b>Pemakanan Haiwan<br/>Animal Nutrition</b> | <b>3</b> |
|------------------|----------------------------------------------|----------|

This course covers topics on the characteristics and importance of various nutrients and feed additives in the nutrition of livestock. It encompasses voluntary feed intake, nutrient utilization and nutrient requirements of different types of farm animals as well as the importance of feedstuffs, processing and methods of formulating rations.

|                 |                                                    |          |
|-----------------|----------------------------------------------------|----------|
| <b>ASH22503</b> | <b>Mikrobiologi Haiwan<br/>Animal Microbiology</b> | <b>3</b> |
|-----------------|----------------------------------------------------|----------|

This course covers general microbiology and to provide basic knowledge for students to understand microbes and viruses as biological agents – their physical properties and characteristics, modes of existence in health and diseases, classification of pathogenic microorganisms, microbial genetics, nutrition, metabolism and laboratory methods of isolation and identification.

## **Semester Empat (Tahun 2)**

|                  |                                                    |          |
|------------------|----------------------------------------------------|----------|
| <b>ASH 21203</b> | <b>Parasitologi Haiwan<br/>Animal Parasitology</b> | <b>3</b> |
|------------------|----------------------------------------------------|----------|

This course introduces various species of important parasites present and harmful to the domestic animals with identification of life-cycles of each group of parasites. Morphology of parasites will be studied to identify the common parasite found. Students will conduct various laboratory procedures and diagnosis based on particular parasitic condition.

|                  |                                               |          |
|------------------|-----------------------------------------------|----------|
| <b>ASH 21303</b> | <b>Parasitologi Haiwan<br/>Animal Disease</b> | <b>3</b> |
|------------------|-----------------------------------------------|----------|

This course covers important diseases of ruminants, swine and poultry, with emphasis on important diseases occurring in Malaysia. Diseases are presented according to their animal species and aetiology. Diagnosis, prevention, treatments, control and eradication are stressed.

|                  |                                                  |          |
|------------------|--------------------------------------------------|----------|
| <b>ASH 22603</b> | <b>Reproduksi Haiwan<br/>Animal Reproduction</b> | <b>3</b> |
|------------------|--------------------------------------------------|----------|

This course covers anatomy and physiology of male and female reproductive systems, estrous cycle, pregnancy, parturition and artificial insemination. Factors that influence fertility and sterility of livestock animals are also discussed. The use of biotechnology tools in improving reproductive performance and to increase livestock production as a whole are emphasized.



|                  |                                                                     |          |
|------------------|---------------------------------------------------------------------|----------|
| <b>ASH 25203</b> | <b>Tabiat dan Kebajikan Haiwan<br/>Animal Behaviour and Welfare</b> | <b>3</b> |
|------------------|---------------------------------------------------------------------|----------|

This course covers various aspects of farm, wildlife, laboratory and companion animal behaviour, causes of behaviour and their implications on management, production, health and welfare of animals. Emphasis will be given to the problems, assessments and improvement of livestock welfare. The course also includes the influence of human-animal interaction, domestication and physical environment provided by human beings on behaviour and welfare of animals.

|                  |                                                                       |          |
|------------------|-----------------------------------------------------------------------|----------|
| <b>ASH 25302</b> | <b>Tabiat dan Kebajikan Haiwan<br/>Biostatistic in Animal Science</b> | <b>3</b> |
|------------------|-----------------------------------------------------------------------|----------|

The course will introduce the fundamental concepts of statistics and a variety of descriptive and inferential statistical techniques to prepare the students for performing statistical analyses. The topics include fundamental probability theory, T-Test, Chi-square Test, Analysis of Variance, Correlation, Regression and Non-Parametric Analyses. This course focuses on the applied rather than the theoretical aspects of statistic.

|                  |                                       |          |
|------------------|---------------------------------------|----------|
| <b>ASH 46303</b> | <b>Sains Ekuin<br/>Equine Science</b> | <b>3</b> |
|------------------|---------------------------------------|----------|

This course covers the principles and management practices of the production of healthy horses, both for sport and leisure. It includes the application of concepts in stable management, nutrition, health and reproduction, economics and practical and profitable and sustainable management for horses under tropical conditions.

### **Semester Lima (Tahun 3)**

|                  |                                                                     |          |
|------------------|---------------------------------------------------------------------|----------|
| <b>ASH 31504</b> | <b>Latihan Sangkut Ruminan/Ekuin<br/>Ruminant/Equine Internship</b> | <b>4</b> |
|------------------|---------------------------------------------------------------------|----------|

This course involves the attachment of student at a governmental or private ruminant farms. Student will be exposed to the actual working conditions and management practices carried out in the farm.

|                  |                                                     |          |
|------------------|-----------------------------------------------------|----------|
| <b>ASH 31604</b> | <b>Projek Penyelidikan I<br/>Research Project I</b> | <b>4</b> |
|------------------|-----------------------------------------------------|----------|

This course involves the execution of a research in animal science, either on livestock or non-food animals. The research shall be conducted in two academic semesters of the final year under the supervision of an academic staff. Each student will propose research topics or choose one from the allocated topics. The student will present a seminar on the research proposal at the end of the semester. This course also involves the execution of a research in animal science, either on livestock or non-food animals.

|                  |                                                                     |          |
|------------------|---------------------------------------------------------------------|----------|
| <b>ASH 32703</b> | <b>Produksi Ruminan I (Daging)<br/>Ruminant Production I (Meat)</b> | <b>3</b> |
|------------------|---------------------------------------------------------------------|----------|

This course emphasizes the understanding of good management practice on meat producing ruminant derived from beef cattle and small ruminant (goat/sheep). A wide range of knowledge and application skills on the managements of commercial beef cattle and small ruminant production system are included in the syllabus.

|                  |                                                                       |          |
|------------------|-----------------------------------------------------------------------|----------|
| <b>ASH 35603</b> | <b>Teknologi Reproduksi Haiwan<br/>Animal Reproduction Technology</b> | <b>3</b> |
|------------------|-----------------------------------------------------------------------|----------|

This course is encompassing all current and anticipated uses of technology in animal reproduction to treat infertility and increase productivity of farm animals through enhanced control of reproductive function. The topics in this course include the basic knowledge of anatomy and physiology of male and female reproductive systems, the use of assisted reproductive technology (ART) in domestic animals including artificial insemination, cryopreservation (freezing) of gametes or embryos, induction of multiple ovulations (superovulation), estrous synchronization, embryo transfer, *in vitro* fertilization, sex determination of sperm or embryos, nuclear transfer, cloning and pregnancy diagnosis, and ethical, moral and social aspects of reproductive biotechnology.

|                  |                                                              |          |
|------------------|--------------------------------------------------------------|----------|
| <b>ASH 46202</b> | <b>Kesihatan Awam Veterinar<br/>Veterinary Public Health</b> | <b>2</b> |
|------------------|--------------------------------------------------------------|----------|

This course encompasses zoonotic diseases, especially the occurrence, modes of transmission from animals to human, with emphasis to diseases prevalent in Malaysia. Microbial quality of meat, milk, eggs and fish with principles and procedures of inspections, cleanliness and quality control of the food with toxic residues in foods of animal origin.

### **Semester Enam (Tahun 3)**

|                  |                                                                        |          |
|------------------|------------------------------------------------------------------------|----------|
| <b>ASH 32803</b> | <b>Produksi Ruminan II (Tenusu)<br/>Ruminant Production II (Dairy)</b> | <b>4</b> |
|------------------|------------------------------------------------------------------------|----------|

This is a practical course where students are introduced important aspects of dairy cow management, from calf to lactating cows, milking and drying - off period. Methods of milking and maintaining milk quality will also be covered. This course will be conducted by lectures and practical that will cover all aspects of daily and routine activities related to dairy cattle farming.

|                  |                                                       |          |
|------------------|-------------------------------------------------------|----------|
| <b>ASH 41804</b> | <b>Projek Penyelidikan II<br/>Research Project II</b> | <b>4</b> |
|------------------|-------------------------------------------------------|----------|

This course involves the execution of a research in animal science, either on livestock or non-food animals. The research shall be conducted in two academic semesters of the final year under the supervision of an academic staff. Each student will propose research topics or choose one from the allocated topics. The student will present a seminar on the research progress and conduct the research in the laboratory, field or both. At the end of the research project, the student is required to submit a dissertation of the research and presenting the

finding. Final presentation of the research also will be evaluate at the end of the research project.

**ASH 35702      Pengembangan Pertanian      2**  
**Agricultural Extension**

This course is introduced to expose students to the background and extension definition relating to concepts, objectives ant the agricultural extension model. The course also addresses the extension strategies, the image of extension agent, understanding of theories and methods and the planning process. Exposure to how extension can play an effective role in the dissemination of the farm practices information will also be discussed. At the end of the course, the students are expected to know the real role of agriculture extension.

**ABT 46302      Komunikasi Pertanian      2**  
**Communication in Agriculture**

This course covers Introduction to theories, definition and models of individuals and mass groups' communications and its role in attitude change and persuasion in the society and agriculture particularly. Topics include Introduction to basic theories on attitude change and persuasion, Diffusion on innovations om extension, The teaching and learning of adults in extension, Extension teaching method, Extension teaching methods: individual and group methods, Extension teaching methods: mass communication, Participatory – Oriented Method of Agricultural Extension Strategic Extension Campaign, Using Extension Strategies and Organizing for Extension Communication and Determining Target Groups/Rural Community Needs. Assessments will be by public speaking, group oral presentation and method demonstration. This source will also familiarize the students with selected variety of social-psychological theories of attitude change and techniques, its characteristics and applications. This course provides an understanding on how to select appropriate communication techniques in relation to the audiences groups and situation.

**ASH 45503      Animal Feed Technology and Processing      3**  
**Teknologi Pemrosesan Makanan Haiwan**

This course includes feed resources and the methods of processing to enhance the nutritive value of feedstuffs through physical chemical and biological processes. It includes processing and its effects on the nutritive value of feedstuffs and current processing. This course discusses introduction to animal nutrition, characteristics of conventional feeds, characteristics of non conventional feeds, effects of manufacturing process to nutritive value and feeding, processes of cereals, processes of high fibre, processes of feed made from animal, processes of additional feed supplements from oil palm, paddy, sugarcane and human food, use of preservative and additive in feed formulations, processes of fermentation in improving feed quality, use of nutraceutical in animal feed, factories equipments in feed processing and processed of feeds for aquatic animal. Students will be expected to identify suitable technology and its mechanism in the whole feed production chain. Assessments will be by assignments, field visits, laboratory reports, presentation, mid term exam and final exam. The goal of this course is to build up a team of animal nutritionists who is able to identify, use and manage feed production technology to produce mass production of animal feed.

## Semester Tujuh (Tahun 4)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                           |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|----------|
| <b>ASH 15002</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Amalan Ternakan Ladang<br/>Animal Farm Practice</b>                                    | <b>2</b> |
| <p>This is a practical course, where the students are taken into the animal farms to know various animals. The students would study the production methods, including feeds and feeding, reproductive system, record keeping and finally marketing. The students are required to evaluate the farm at the end of the study.</p>                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                           |          |
| <b>ASH 25403</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Pengurusan Sisa Haiwan<br/>Animal Waste Management</b>                                 | <b>3</b> |
| <p>This course consist a series of lectures and group discussions in discussing various aspects of fields of waste management. This course also covers the importance of correct disposal of agricultural waste management derived from intensive farming of livestock farm. It includes the application of recent and appropriate technologies and enforcing the relevant regulations and legislation since environmental management issues are considered in a global context. At the end of the semester, the students will know how to detect bacteria derived from non-point sources and know how to do the best management practices in agriculture field based on their lab work and farm visits on how to manage the waste.</p> |                                                                                           |          |
| <b>ASH 35903</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Akuakultur<br/>Aquaculture</b>                                                         | <b>3</b> |
| <p>This course will cover the knowledge of the development of aquaculture; good aquaculture practices; the biology of common cultured species and economics of aquaculture. Students will be exposed to the basic system of aquafarm construction and the management of aquafarm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                           |          |
| <b>ASH 36003</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Pembangunan dan Operasi Ladang<br/>Farm Development and Operation</b>                  | <b>3</b> |
| <p>This is a theory and practical course, where the students are taught to develop and operate a livestock or poultry farms. They will learn the various processes involved before a farm is developed from land clearing to construction of various infrastructures. Student will also learn how to operate a farm, audit and evaluate the farm effectively.</p>                                                                                                                                                                                                                                                                                                                                                                       |                                                                                           |          |
| <b>ASH 41904</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Latihan Sangkut Poltri/Khinzir/Akuakultur<br/>Poultry/Swine/Aquaculture internship</b> | <b>4</b> |
| <p>This course involves the attachment of student at a governmental or private poultry farms. Student will be exposed to the actual working conditions and management practices carried out in the farm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                           |          |
| <b>ASH 46102</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Amalan Haiwan II<br/>Animal Practice II</b>                                            | <b>2</b> |
| <p>This is a practical course where students are introduced in clinical examination of animals, managing healthy, sick and diseased animals. Basic sample collection techniques like blood collection and fecal sampling for laboratory</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                           |          |

analysis shall be taught. Euthanasia and post mortem on dead animals is carried out to identified the causal diseases. Students are also taught basic pharmacology, performing treatments together with prevention of diseases occurring in the farm.

## **Semester Lapan (Tahun 4)**

|                  |                                                   |           |
|------------------|---------------------------------------------------|-----------|
| <b>ASH 42012</b> | <b>Industrial Internship<br/>Latihan Industri</b> | <b>12</b> |
|------------------|---------------------------------------------------|-----------|

This course involves the attachment of student at a governmental or private ruminant/ poultry/swine/ aquaculture farms. Student will be exposed to the actual working conditions and management practices carried out in the farm.

# **LATIHAN INDUSTRI**

## **Sarjana Muda Produksi Dan Kesihatan Haiwan**

(ASH 42012)

### **Merit**

Pelajar Ijazah Sarjana Muda Produksi dan Kesihatan Haiwan diwajibkan menjalani latihan industri sebanyak TIGA KALI semasa cuti semester antara sesi iaitu, antara Semester Keempat-Kelima dan Semester Keenam-Ketujuh selama Lapan (8) minggu setiap kali dan latihan industri terakhir selama 24 minggu. Keseluruhan jam kredit latihan industri adalah 20 jam dan pelajar akan diberikan gred. Nilai grednya akan diambil kira dalam pengiraan Purata Nilai Gred Semester (PNGS) atau Purata Nilai Gred Kumulatif (PNGK).

### **Pengenalan Kursus**

Latihan industri merupakan satu kursus yang memberi pendedahan kepada dunia kerjaya agar para pelajar diperlengkapi dengan pelbagai amalan kerja serta aspek praktikal dalam bidang penternakan haiwan ruminan dan bukan ruminan. Pendedahan ini dapat menghubungkan apa yang dipelajari secara teori dan praktikal dengan realiti suasana pekerjaan. Bagi pelajar yang beraspirasi untuk menjadi usahawan, mereka berpeluang mendapatkan pengalaman dan jaringan luar.

### **OBJEKTIF KURSUS**

Latihan industri mempunyai objektif kursus seperti berikut:

1. Memberi pendedahan kepada pelajar terhadap suasana kerja agar mereka dapat menyesuaikan diri dengan mudah apabila menyertai sektor pekerjaan kelak;
2. Memberi pelajar pengalaman kerja berpasukan dan mencontohi kepimpinan baik pemimpin di tempat kerja;
3. Membentuk kemahiran insaniah dalam pengurusan sumber manusia daripada peringkat atasan dan bawahan; dan
4. Pengalaman yang ditimba semasa menjalani latihan menjadikan pelajar lebih berdaya saing dipasaran pekerjaan kerana telah dilengkapi dengan pengetahuan kemahiran, sikap dan pengalaman praktikal yang sesuai.

### **Penempatan**

Pelajar digalakkan untuk mencari tempat latihan industri sendiri yang hampir dengan tempat tinggal bagi mengurangkan kos. Penyelaras kursus akan menentukan kesesuaian dan akan membantu menguruskan penempatan latihan industri ini. Pelajar boleh menjalani latihan industri di mana-mana organisasi, syarikat, perusahaan, agensi, institut penyelidikan dan bioteknologi, universiti dan lain-lain dalam sektor kerajaan dan swasta. Penempatan ini akan dapat memberi pendedahan persekitaran kerja dan pelbagai aspek praktikal dalam bidang penternakan di Malaysia.

### **Latihan Industri I (Ruminan Internship)**

Tumpuan latihan difokuskan kepada produksi dan kaedah dalam pengurusan haiwan ruminan. Pelajar akan didedahkan kepada industri atau ladang ternakan untuk mempelajari perkara yang berkaitan dengan produksi dan pendekatan yang digunakan dalam mengurus ladang tersebut dalam semua aspek termasuk kesihatan haiwan dan pengurusan kewangan. Diantara aktiviti latihan yang akan dilakukan termasuklah dalam pembiakan dan pembakaan haiwan ruminan. Permanian

beradas, pemprosesan air mani dan pengesanan kebuntingan turut diberi keutamaan semasa latihan. Selain itu para pelajar juga akan menimba pengalaman dalam agrostologi di mana mereka akan terlibat dalam penanaman dan penjagaan rumput untuk pemakanan haiwan diladang tersebut. Kepentingan pengeluaran produk nilai tambah untuk menjana pendapatan dalam bidang perladangan juga dititikberatkan.

## **Latihan Industri II (Poultry, Swine, Aquaculture Internship)**

Tumpuan latihan adalah produksi dan kaedah dalam pengurusan haiwan bukan ruminan. Pelajar akan didedahkan kepada industri atau ladang ternakan untuk mempelajari perkara yang berkaitan dengan produksi dan pendekatan yang digunakan dalam mengurus ladang. Di antara aktiviti yang akan dijalankan termasuklah pengurusan dan perumahan poltri. Pemakanan poltri dan juga teknik pengurusan hasil haiwanakan dilakukan oleh para pelajar. Aspek biosekuriti yang diaplikasikan di ladang akan didedahkan bagi mengawal dan membendung penyakit yang melibatkan unggas. Selain itu, para pelajar akan mempelajari cara pemasaran produk yang telah dihasilkan. Kepentingan produk nilai tambah untuk menjana pendapatan dalam bidang perladangan juga dititikberatkan.

## **Latihan Industri III**

Tumpuan latihan adalah produksi dan kaedah dalam pengurusan haiwan samaada ruminan, bukan ruminan, khinzir, ekuin ataupun akuakultur. Pelajar akan didedahkan kepada industri atau ladang ternakan untuk mempelajari perkara yang berkaitan dengan produksi dan pendekatan yang digunakan dalam mengurus ladang.

## **Peranan dan Tanggungjawab**

### **1. Peranan dan Tanggungjawab Pelajar**

- 1.1. Mengesah penerimaan tawaran LI dengan sesebuah organisasi dalam tempoh yang dipersetujui dan tidak menukar tawaran tersebut dengan organisasi lain tanpa kebenaran fakulti.
- 1.2. Melapor diri di organisasi berkenaan pada tarikh yang ditetapkan.
- 1.3. Memastikan nama baik universiti terpelihara dengan menunjukkan sikap dan tingkahlaku yang baik.
- 1.4. Melaporkan aktiviti harian dalam buku log dan mendapat pengesahan penyelia di organisasi.
- 1.5. Menghantar laporan/ melakukan pembentangan pada masa yang dipersetujui.

### **2. Peranan dan tanggungjawab Penyelia LI di Fakulti**

- 2.1. Menilai kesesuaian tempat latihan sebelum LI dijalankan.
- 2.2. Memastikan pelajar menjalani LI dalam tempoh yang ditetapkan.
- 2.3. Menyelia, menilai dan memantau prestasi pelajar di tempat LI sekurang-kurangnya sekali dalam tempoh LI.
- 2.4. Mendapatkan maklumbalas dari penyelia pelajar di tempat LI.
- 2.5. Melapor kepada fakulti sekiranya timbul sebarang masalah dengan pelajar.
- 2.6. Menilai laporan/ pembentangan pelajar

### **3. Peranan dan Tanggungjawab Penyelia di Penempatan LI**

- 3.1. Membimbing dan merangka pelan latihan pelajar yang menjalani LI.
- 3.2. Memantau dan menilai prestasi pelajar di penempatan LI.
- 3.3. Melapor kepada fakulti sekiranya timbul sebarang masalah dengan pelajar.
- 3.4. Menempatkan pelajar di jabatan/ unit/ seksyen yang sesuai.

## **Penilaian**

Penilaian keseluruhan latihan industri pelajar adalah gabungan penilaian oleh Penyelia Industri (40%), Penyelia Akademik (25%), laporan akhir latihan industri (20%) serta pembentangan (15%).

## **Imbuhan / Elaun**

Universiti tidak menetapkan sebarang bayaran kepada pelajar yang menjalani LI. Pihak industri/ majikan boleh mempertimbangkan pemberian imbuhan/ elaun kepada pelajar.

## **Takaful / Insurans**

Semua pelajar yang mengikuti LI akan mendapat perlindungan takaful/ insurans termasuk aspek keselamatan semasa menjalani LI. Kos takaful/ insurans akan dimasukkan dalam yuran pengajian.

## **Cuti**

Pelajar tidak dibenarkan mengambil cuti sewaktu menjalani LI kecuali dengan kelulusan organisasi yang berkaitan. Pelajar yang tidak dapat menghadiri LI lebih 10% daripada jumlah hari LI yang ditetapkan kerana kecemasan atau cuti sakit disifatkan sebagai tidak memenuhi syarat dan perlu mengulang program LI sepenuhnya.



# Program Pengajian

## **Sarjana Muda Sains (Kepujian) Sains Akuatik**

### **Pendahuluan**

Sarjana Muda Sains (Kepujian) Sains Akuatik adalah persediaan terbaik untuk kerjaya dalam bidang sains akuatik. Program ini adalah ijazah sains gunaan yang menggabungkan asas-asas sains dengan bidang-bidang sains akuatik dan diperlengkapi dengan kerja amali yang luas. Dasar penawaran Program Sarjana Muda Sains (Kepujian) Sains Akuatik adalah selaras dengan sasaran Dasar Agromakanan Negara (DAN), 2011-2020 bagi mendokong usaha Kerajaan dalam menjamin bekalan makanan yang mencukupi dan selamat kepada rakyat serta meningkatkan sumbangan kepada pendapatan negara dan usahawan tani. Pada tahun pertama pengajian, pelajar didedahkan dengan sistem sains akuatik melalui pelbagai kursus asas seperti biokimia, genetik, mikrobiologi, kimia analitikal, iktiologi, oseanografi, dan limnologi. Pada tahun pengajian yang kedua dan ketiga, kursus-kursus yang diajar merangkumi biostatistik, hidrologi, prinsip akuakultur, renang dan keselamatan air, biologi kerang-kerangan, kaedah penyelidikan dan penulisan saintifik, kejuruteraan akuatik, pencemaran akuatik, pengembangan pertanian, makanan dan pemakanan ikan, penguluran ikan, pengurusan hatceri dan ladang, akuakultur bersepadu, akuaponik, anatomi mikro, ekonomi pertanian, pemprosesan dan pengawetan ikan serta teknologi bioflok. Pada tahun keempat pengajian, pelajar akan melaksanakan projek penyelidikan, mendedah kepada isu-isu semasa dalam sains akuatik, entomologi akuatik, kesihatan dan penyakit ikan, pengurusan perikanan secara pendekatan ekosistem, polisi dan akta, algalogi, komunikasi dalam pertanian, pengurusan sungai dan mitigasi banjir, rangkaian nilai perikanan serta toksikologi akuatik.

### **Peluang Kerjaya**

Program ini merupakan satu pelantar perolehan ilmu serta pembangunan kapasiti dan sekaligus mampu melahirkan sumber tenaga yang mahir dalam bidang sains akuatik. Graduan pengajian ini akan mempunyai peluang kerjaya profesional dalam bidang sains akuatik, perniagaantani (pakar runding dan perkhidmatan nasihat), kesihatan dan kebajikan haiwan akuatik, pemasaran, pengurusan keusahawanan bandar dan luar bandar, industri akuakultur, sains perikanan dan penyelidikan.

### **Jangkamasa**

Ijazah ini mengambil masa selama empat (4) tahun dengan keperluan bergraduat ialah 120 kredit.

## Syarat kemasukan

| STPM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MATRIKULASI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | DIPLOMA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1.Mendapat sekurang-kurangnya <b>PNGK 2.50</b> pada peringkat <b>STPM</b></p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C</b> pada peringkat <b>STPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Biology/Chemistry/ Mathematics (M) / Mathematics (T)</li> <li>• Physic / Ekonomi / Perakaunan / Geografi</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat sekurang-kurangnya kepujian <b>Gred B</b> dalam mata pelajaran <b>Mathematics</b> pada peringkat <b>SPM</b></p> <p><b>DAN</b></p> <p>4.Mendapat sekurang-kurangnya <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Biology / Chemistry / Physics</li> <li>• Mana-mana <b>TIGA(3)</b> mata pelajaran lain</li> </ul> <p><b>DAN</b></p> <p>5.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>6. Tiada kecacatan anggota serta pertuturan dan buta warna</p> | <p>1.Mendapat sekurang-kurangnya <b>PNGK 2.50</b> pada peringkat <b>Matrikulasi / Asasi</b></p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C</b> pada peringkat <b>Matrikulasi / Asasi</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Biology /Chemistry / Sains Pertanian</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat sekurang-kurangnya kepujian <b>Gred B</b> dalam mata pelajaran <b>Mathematics</b> pada peringkat <b>SPM</b></p> <p><b>DAN</b></p> <p>4.Mendapat sekurang-kurangnya <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Biology / Chemistry / Physics</li> <li>• Mana-mana <b>TIGA(3)</b> mata pelajaran lain</li> </ul> <p><b>DAN</b></p> <p>5.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>6. Tiada kecacatan anggota serta pertuturan dan buta warna</p> | <p>1.Mendapat sekurang-kurangnya <b>PNGK 2.50</b> pada peringkat <b>Diploma</b> dalam bidang berkaitan</p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Mathematics</li> <li>• Biology / Chemistry / Physics</li> <li>• Mana-mana <b>TIGA(3)</b> mata pelajaran lain</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>4. Tiada kecacatan anggota serta pertuturan dan buta warna</p> |

## Struktur Pengajaran

| Semester             | Kursus Universiti | Kursus Teras | Kursus Elektif | Jumlah Kredit |
|----------------------|-------------------|--------------|----------------|---------------|
| 1                    | 4                 | 12           | -              | 16            |
| 2                    | 6                 | 9            | -              | 15            |
| 3                    | 3                 | 12           | -              | 15            |
| 4                    | 7                 | 6            | -              | 13            |
| 5                    | -                 | 6            | 9              | 18            |
| 6                    | -                 | 3            | 11             | 14            |
| 7                    | -                 | 6            | 7              | 16            |
| 8                    | -                 | 4            | 9              | 13            |
| <b>Jumlah Kredit</b> | <b>20</b>         | <b>64</b>    | <b>36</b>      | <b>120</b>    |

## Semester Satu (Tahun 1)

| Kod           | Nama Kursus                                                                 | Jam Kredit |
|---------------|-----------------------------------------------------------------------------|------------|
| MPU 31022     | Islamic Civilization and Asian Civilization<br>Tamadun Islam & Tamadun Asia | 2 (U)      |
| MPU 32012     | English for Communication I<br>Inggeris untuk Komunikasi I                  | 2 (U)      |
| ASQ 10103     | Fundamental Biochemistry<br>Asas Biokimia                                   | 3 (S)      |
| ASQ 10203     | Fundamental Genetic<br>Asas Genetik                                         | 3 (S)      |
| ASQ 10303     | Ichthyology<br>Iktiologi                                                    | 3 (S)      |
| ASQ 10403     | Oceanography<br>Oseanografi                                                 | 3 (S)      |
| <b>Jumlah</b> |                                                                             | <b>16</b>  |

### Semester Dua (Tahun 1)

| Kod       | Nama Kursus                                                                                                             | Jam Kredit |
|-----------|-------------------------------------------------------------------------------------------------------------------------|------------|
| MPU 31012 | Ethnic Relations<br>Hubungan Etnik                                                                                      | 2 (U)      |
| MPU 33022 | English for Communication II<br>Inggeris untuk Komunikasi II                                                            | 2 (U)      |
| MPU 33032 | Revelation and Society (Islamic Students)<br>Ilmu Wahyu dan Kemasyarakatan (Pelajar Islam)                              | 2 (U)      |
| MPU 33042 | Comparative Religion II (Non Muslim Student)<br>Perbandingan Agama II (Pelajar Bukan Islam)                             |            |
| MPU 33050 | Talaqqi Qu'ran (Pelajar Islam)                                                                                          | 0 (A)      |
| MPU 33060 | Protocol and Management of Official Function (Non Muslim)<br>Protokol dan Pengurusan Majlis Rasmi (Pelajar Bukan Islam) |            |
| ASQ 10503 | Fundamental Microbiology<br>Asas Mikrobiologi                                                                           | 3 (S)      |
| ASQ 10603 | Analytical Chemistry<br>Kimia Analitikal                                                                                | 3 (S)      |
| ASQ 10703 | Limnology<br>Limnologi                                                                                                  | 3 (S)      |
| Jumlah    |                                                                                                                         | 19         |

### Semester Tiga (Tahun 2)

| Kod       | Nama Kursus                                             | Jam Kredit |
|-----------|---------------------------------------------------------|------------|
| KKK xxx   | Co-curriculum<br>Ko-Kurikulum                           | 3 (U)      |
| ASQ 20804 | Biostatistics<br>Biostatistik                           | 4 (S)      |
| ASQ 20903 | Hydrology<br>Hidrologi                                  | 3 (S)      |
| ASQ 21003 | Principle of Aquaculture<br>Prinsip Akuakultur          | 3 (S)      |
| ASQ 21102 | Swimming and Water Safety<br>Renang dan Keselamatan Air | 2 (S)      |
| Jumlah    |                                                         | 15         |

### Semester Empat (Tahun 2)

| Kod       | Nama Kursus                                                                            | Jam Kredit |
|-----------|----------------------------------------------------------------------------------------|------------|
| MPU xxxx  | Foreign Language<br>Bahasa Asing                                                       | 2 (U)      |
| MPU 33012 | Science of Revelation and Science (Muslim)<br>Ilmu Wahyu dan Sains                     | 2 (U)      |
| MPU 33022 | Moral and Ethics II (Non-muslim)<br>Moral dan Etika II                                 |            |
| ABT 22403 | Agricultural Entrepreneurship<br>Keusahawanan Tani                                     | 3 (S)      |
| ASQ 21203 | Biology of Shellfishes<br>Biologi Kerang-kerangan                                      | 3 (S)      |
| ASQ 21203 | Research Methods and Scientific Writing<br>Kaedah Penyelidikan dan Penulisan Saintifik | 3 (S)      |
| Jumlah    |                                                                                        | 13         |

### Semester Lima (Tahun 3)

| Kod       | Nama Kursus                                                   | Jam Kredit |
|-----------|---------------------------------------------------------------|------------|
| ASQ 20143 | Industrial Training I<br>Latihan Industri I                   | 3 (S)      |
| ASQ 31503 | Aquatic Engineering<br>Kejuruteraan Akuatik                   | 3 (S)      |
| ASQ 31603 | Aquatic Pollution<br>Pencemaran Akuatik                       | 3 (S)      |
| ASQ 35003 | Fish Feeds and Feeding<br>Makanan dan Pemakanan Ikan          | 3 (E)      |
| ASQ 35103 | Fish Culture<br>Pengulturan Ikan                              | 3 (E)      |
| ASQ 35203 | Hatchery and Farm Management<br>Pengurusan Hatceri dan Ladang | 3 (E)      |
| Jumlah    |                                                               | 18         |

### Semester Enam (Tahun 3)

| Kod       | Nama Kursus                                                         | Jam Kredit |
|-----------|---------------------------------------------------------------------|------------|
| ASQ 31603 | Agricultural Extension<br>Pengembangan Pertanian                    | 3 (S)      |
| ASQ 35302 | Integrated Akuakultur<br>Akuakultur Bersepadu                       | 2 (E*)     |
| ASQ 35402 | Aquaponic<br>Akuaponik                                              | 2 (E*)     |
| ASQ 35502 | Micro Anatomy<br>Anatomi Mikro                                      | 2 (E*)     |
| ASQ 35603 | Agricultural Economic<br>Ekonomi Pertanian                          | 3 (E*)     |
| ASQ 35703 | Fish Preservation and Processing<br>Pemprosesan dan Pengawetan Ikan | 3 (E*)     |
| ASQ 35802 | Biofloc Technology<br>Teknologi Bioflok                             | 2 (E*)     |
| Jumlah    |                                                                     | 14         |

(E\*) pilihan pelajar

### Semester Tujuh (Tahun 4)

| Kod       | Nama Kursus                                                                                    | Jam Kredit |
|-----------|------------------------------------------------------------------------------------------------|------------|
| ASQ 20143 | Industrial Training II<br>Latihan Industri II                                                  | 3 (S)      |
| ASQ 41802 | Current Issues in Aquatic Science<br>Isu-isu Semasa dalam Sains Akuatik                        | 2 (S)      |
| ASQ 41904 | Research Project I<br>Projek Penyelidikan I                                                    | 4 (S)      |
| ASQ 45902 | Aquatic Entomology<br>Entomologi Akuatik                                                       | 2 (E*)     |
| ASQ 46002 | Fish Health and Diseases<br>Kesihatan dan Penyakit Ikan                                        | 2 (E*)     |
| ASQ 46102 | Ecosystem Approach to Fisheries Management<br>Pengurusan Perikanan secara Pendekatan Ekosistem | 2 (E*)     |
| ASQ 46203 | Policy and Act<br>Polisi dan Akta                                                              | 3 (E*)     |
| Jumlah    |                                                                                                | 16         |

(E\*) pilihan pelajar

### Semester Lapan (Tahun 4)

| Kod       | Nama Kursus                                                                       | Jam Kredit |
|-----------|-----------------------------------------------------------------------------------|------------|
| ASQ 42004 | Research Project II<br>Projek Penyelidikan II                                     | 4 (S)      |
| ASQ 46303 | Algology<br>Algalogi                                                              | 3 (E*)     |
| ASQ 46402 | Agricultural Communication<br>Komunikasi dalam Pertanian                          | 2 (E*)     |
| ASQ 46502 | Riverine Management and Flood Mitigation<br>Pengurusan Sungai dan Mitigasi Banjir | 2 (E*)     |
| ASQ 46602 | Fisheries Value Chain<br>Rantaian Nilai Perikanan                                 | 2 (E*)     |
| ASQ 46702 | Aquatic Toxicology<br>Toksikologi Akuatik                                         | 2 (E*)     |
| Jumlah    |                                                                                   | 13         |

(E\*) pilihan pelajar

**Nota:** A - Kursus Audit S - Kursus Teras E\* - Kursus Elektif pilihan U - Kursus Umum

# Sinopsis Kursus

## Sarjana Muda Sains (Kepujian) Sains Akuatik

### Semester Satu (Tahun 1)

| KodKursus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Nama Kursus                                             | Jam Kredit |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------------|
| ASQ 10103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Biokimia Asas</b><br><b>Fundamental Biochemistry</b> | <b>3</b>   |
| <p>This course discusses the major components and characteristics of biochemical processes occurring in living system. The topics discussed include: physico-chemical properties and functions of carbohydrates, proteins, lipids and nucleic acids; enzymology including enzyme kinetics, mechanism of reaction and factors that influence enzyme activity; bioenergetics, integration and control of metabolism of carbohydrates, proteins, lipids and nucleic acids; role of nucleic acids in genetics and reproduction; biochemical nature of membranes, hormones and their functions. Students are expected to enhance their understanding and application skill in biochemical calculations as foundations for advance biochemistry.</p> |                                                         |            |
| ASQ 10203                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Genetik Asas</b><br><b>Fundamental Genetics</b>      | <b>3</b>   |
| <p>This course discusses various aspects of fundamental genetics especially those related to genes, molecules, cells, organisms and population status. It develops the basis of understanding to how life can exist at all levels of complexity, ranging from the molecular to the population level. This course also covers Mendelian and Non-Mendelian principles, inheritance, and related probability methods. Variation in chromosome structure and number are also discussed in relation to plant breeding. Genetic variation deals with the natural diversity that can be observed among members of the same species as well as among different species are also discussed.</p>                                                         |                                                         |            |
| ASQ 10303                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Iktiologi</b><br><b>Ichthyology</b>                  | <b>3</b>   |
| <p>This course introduces students to a branch of zoology that studies on fish. Students will learn the taxonomy, diversity, organizational structure, survival and various relationships in life cycle of fish, method of determining the age, growth, feeding habits, breeding and other features that are important to fish. This course will include discussions of Ichthyology application in aquaculture. Most of the practical will be conducted in the laboratory, and some training will involve field work. Through series of exercises and sharing, students will understand the specialized topics in Ichthyology and sustainable management of fishery resources.</p>                                                             |                                                         |            |



|                  |                                     |          |
|------------------|-------------------------------------|----------|
| <b>ASQ 10403</b> | <b>Oceanografi<br/>Oceanography</b> | <b>3</b> |
|------------------|-------------------------------------|----------|

This course provides the underlying concepts of oceanography that relates to marine science. Topics include origin of ocean, history of marine science, earth structure and plate tectonics, ocean basins, ocean sediments, water, atmospheric circulation, ocean circulation, waves, tides, coasts, pelagic communities, benthic communities, uses and abuses of the ocean. Students will be expected to demonstrate knowledge in oceanography and its application. Assessments will be by assignments, quiz, field visit, laboratory reports, mid-term exam and final exam. The goal of this course is to produce graduates who knowledgeable in oceanography and its application in marine science.

## **Semester Tiga (Tahun 2)**

|                  |                                                       |          |
|------------------|-------------------------------------------------------|----------|
| <b>ASQ 10503</b> | <b>Mikrobiologi Asas<br/>Fundamental Microbiology</b> | <b>3</b> |
|------------------|-------------------------------------------------------|----------|

The purposes of this course are intended to provide student with an overview, appreciation as well as adequate knowledge of animal microbiology, especially in relation to infectious disease. The focus of this course will therefore be on the core information relevant to understanding the diagnosis, pathogenesis, prevention and treatment of bacterial, viral and fungi infection towards animal. Thus, will provide the student with a foundation in animal microbiology from which further in depth microbiology and disease related research and training is possible. This programme also had a strong practical emphasis, providing students with the basic laboratory skills required for a career in their applied or research microbiology.

|                  |                                                |          |
|------------------|------------------------------------------------|----------|
| <b>ASQ 10603</b> | <b>Kimia Analitik<br/>Analytical Chemistry</b> | <b>3</b> |
|------------------|------------------------------------------------|----------|

This course covers the basic learning in analytical chemistry and understanding of water element, application in conservation and utilization of aquatic resources. Topics include basic units of concentration, oxidation, alkalinity, acidity and chemical integration. Initial discussions cover water quality, which including dissolved gases, nutrients and other substances. The course also emphasizes analytical chemistry in waste from aquaculture. The synopsis course also includes pollution, methods of measurement and control of pollution that is needed in generating activities of aquatic resources. Students are also required to analyse aquatic matters that maximize the benefits of analytical chemistry.

|                  |                                |          |
|------------------|--------------------------------|----------|
| <b>ASQ 10703</b> | <b>Limnologi<br/>Limnology</b> | <b>3</b> |
|------------------|--------------------------------|----------|

To study freshwater science as a division of ecology or environmental science. It covers the biological, chemical, physical, geological, and other attributes of all inland waters (running and standing waters, fresh and saline, natural or man-made).

## Semester Tiga (Tahun 2)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                 |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|----------|
| <b>ASQ 20804</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Biostatistik<br/>Biostatistics</b>                           | <b>4</b> |
| <p>The course will introduce the fundamental concepts of statistics and a variety of descriptive and inferential statistical techniques to prepare the students for performing statistical analyses. The topics include fundamental probability theory, T-Test, Chi-square Test, Analysis of Variance, Correlation, Regression and Non-Parametric Analyses. This course focuses on the applied rather than the theoretical aspects of statistics.</p>                                                                                                                                                                                                                                                                                                                                              |                                                                 |          |
| <b>ASQ 20903</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Hidrologi<br/>Hydrology</b>                                  | <b>3</b> |
| <p>This course provides the underlying concepts of hydrology which is relevant to many other disciplines namely environmental, meteorology, agronomy, geology, climatology, oceanography, glaciology and other earth sciences. Topics include water aloft, precipitation, evaporation, water on land surface, overland and stream flow, water beneath the ground, infiltration and unsaturated flows, streamflow, catchment, elements and water circulation on Earth. Students will be expected to demonstrate knowledge in basic hydrology and its application. Assessments will be by assignments, quiz, field visit, laboratory reports, mid-term exam and final exam. The goal of this course is to produce graduates who knowledgeable on hydrology and its application on earth science.</p> |                                                                 |          |
| <b>ASQ 21003</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Prinsip Akuakultur<br/>Principles of Aquaculture</b>         | <b>3</b> |
| <p>This course will cover the knowledge of the development of aquaculture; good aquaculture practices; the biology of common cultured species and economics of aquaculture. Students will be exposed to the basic system of aquafarm construction and the management of aquafarm.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                 |          |
| <b>ASQ 21102</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Renang dan Keselamatan Air<br/>Swimming and Water Safety</b> | <b>2</b> |
| <p>This course provides knowledge swimming techniques and water safety applications when in aquatic environment. Topics include Introduction to swimming and water safety, breathing, floating, flutter kick technique, diving, front crawl, frog style, breaststroke, backstroke, freestyle, butterfly, CPR, survival swimming and rescue. Assessments will be by assignments and practical tests. Students will be expected to be able to swim for survival and demonstrate CPR and rescue measures during emergency.</p>                                                                                                                                                                                                                                                                        |                                                                 |          |

## Semester Empat (Tahun 2)

|                  |                                                           |          |
|------------------|-----------------------------------------------------------|----------|
| <b>ASQ 21203</b> | <b>Biologi Kerang-kerangan<br/>Biology of Shellfishes</b> | <b>3</b> |
|------------------|-----------------------------------------------------------|----------|

This course covers various aspects learning of shellfish including oysters, snails, lobsters and crabs. The course introduces the biological functions of shellfish, including feed and nutrition, growth, reproduction, genetics and biology. At the end of the course, students can comprehend and recognize the various species of shellfish through the practical sampling, identification of taxa, population biology, preservation and ecology.

|                  |                                                                                                |          |
|------------------|------------------------------------------------------------------------------------------------|----------|
| <b>ASQ 21303</b> | <b>Kaedah Penyelidikan dan Penulisan Saintifik<br/>Research Methods And Scientific Writing</b> | <b>3</b> |
|------------------|------------------------------------------------------------------------------------------------|----------|

This course was introduced to assist students in research methodology and scientific writing. Topics include the principles and measures of aquatic science research using experimental design and statistical analysis. The design takes into account the type of structure and style, and the steps in scientific literature starting from title selection, problems descriptions, hypotheses, literature review, research design, data collection, analysis, results, discussion, recommendations and conclusions. Trial design will include Completely Randomized, Randomized Complete Block, Latin Square and Split Plot Designs. Design and analysis of Factorial Experiments will be taught. Statistic comparison of mean test and measurement concepts will be repeated. Emphasis is also given to the documents organization, drafting a clear scientific report and comprehensive scientific literature.

## Semester Lima (Tahun 3)

|                  |                                                     |          |
|------------------|-----------------------------------------------------|----------|
| <b>ASQ 21403</b> | <b>Latihan Industri I<br/>Industrial Training I</b> | <b>3</b> |
|------------------|-----------------------------------------------------|----------|

This course exposes students to reality of the working environment in the field of aquatic science namely environment sector, fisheries sector, development sector, entrepreneurship sector, research sector and governance sector. Students will be expected to practice the theoretical knowledges that they obtained in their studies. Students are also allowed to choose their industrial training organisation, whether at local or foreign countries. Students are expected to do oral presentation of their industrial training outputs and submit log book and a comprehensive report after training.

|                  |                                                     |          |
|------------------|-----------------------------------------------------|----------|
| <b>ASQ 31503</b> | <b>Kejuruteraan Akuatik<br/>Aquatic Engineering</b> | <b>3</b> |
|------------------|-----------------------------------------------------|----------|

This course provides an overview of the design and construction process as well as introduction to water management planning. Topics include general water supply design, well, chemical handling and storage, coagulation, flocculation and lime-soda softening, sedimentation, filtration, disinfection, drinking water plant and integration, general wastewater, sanitary sewer design collection and design, wastewater microbiology, general water treatment, wastewater plant residual and clean water management. Students will be expected to demonstrate knowledge in basic hydrology and its application. Assessments will

be by assignments, quiz, field visit, laboratory reports, mid-term exam and final exam. The goal of this course is to produce graduates who knowledgeable on planning, design, construction, monitoring and supervision of water.

**ASQ 31603      Pencemaran Akuatik      3**  
**Aquatic Pollution**

This course provides knowledge about the physical, biological and chemical changes that harmful to aquatic resources. Topics include the factors that influence the production, eutrophication, pollution, sewage treatment, pathogens, toxicology, industrial pollution, pesticides, thermal pollution, radioactivity of coal plants, waste acids and soil pollution. At the end of the course, students expected to understand the pollution effects and play important role in suppressing the aquatic pollution and regulating the development of aquatic ecosystem.

**ASQ 31703      Pengembangan Pertanian      3**  
**Agricultural Extension**

This course is introduced to expose students to the background and extension definition relating to concepts, objectives and the agricultural extension model. The course also addresses the extension strategies, the image of extension agent, understanding of theories and methods and the planning process. Exposure to how extension can play an effective role in the dissemination of the farm practices information will also be discussed. At the end of the course, the students are expected to know the real role of agriculture extension.

**ASQ 35003      Makanan dan Pemakanan Ikan      3**  
**Fish Feeds and Feeding**

This course provides technical know-how knowledge of fish feeds and feeding which is vital in aquaculture sustainability. Topics include Introduction to fish nutrition, fish dietary requirements, diet determinants, amino acids and protein, lipids, vitamin requirements, minerals, feeds and feeding, nutritional physiology, feed ingredients and formulation, manufacturing of feeds, fish husbandry and feeds, fish health and quality. Students will be expected to identify suitable alternative feed ingredients to suit fish nutritional requirements, formulate and manufacture formulated diets accordingly. Assessments will be by assignments, quiz, field visit, laboratory reports, mid-term exam and final exam. The goal of this course is to produce aquatic animal nutritionists for the aquaculture and fisheries development in Malaysia.

**ASQ 35103      Pengkulturan Ikan      3**  
**Fish Culture**

This course discusses the seed production technique and cultivation of several commercial aquatic organisms in Malaysia and Southeast Asia regions. Selected species including Tilapia (*Oreochromis niloticus*), catfish (*Pangasius hypophthalmus*), African catfish (*Clarias fariatus*) and lobster (*Macrobrachium rosenbergii*). The course covers the environmental requirements, breeding, seed production, growth, health and disease control, nutrition and elements in sustainable management in fish culture.

|                  |                                                                       |          |
|------------------|-----------------------------------------------------------------------|----------|
| <b>ASQ 35203</b> | <b>Pengurusan Hatceri dan Ladang<br/>Hatchery and Farm Management</b> | <b>3</b> |
|------------------|-----------------------------------------------------------------------|----------|

This course discusses the design and location of fish hatchery, including equipment and accessories needed for effective operation. Topics discussed include water supply, water storage and distribution, water recycling and reconditioning facility; hatchery operations and maintenance; management parent fish, breeding and seed production; handling, feeding and larval rearing, growth and harvesting. It also gives a comprehensive understanding of the roles and responsibilities as a manager or entrepreneur in operation and management of aquaculture farms. Pros and cons of various aquaculture systems that practiced currently are also discussed in this course. Students will get to know and understand differences in management system between government and private sector. The synopsis also includes topics in aquaculture systems, planning, productivity, responsibility and ethics for farm manager. It is hope that this course will produce hatchery managers who are good in technical know-how in hatchery operation in future.

### **Semester Enam (Tahun 3)**

|                  |                                                        |          |
|------------------|--------------------------------------------------------|----------|
| <b>ASQ 35302</b> | <b>Akuakultur Bersepadu<br/>Integrated Aquaculture</b> | <b>2</b> |
|------------------|--------------------------------------------------------|----------|

This course provides an understanding on the scope of the integration of aquaculture with farming and agriculture. Detailed description includes the feasibility of aquaculture in the livestock and agriculture for economic growth and balance of the ecosystem. This course will cover topics such as the use of nutrients in integrated systems, ecosystem of ponds, various agroecological farming systems, public health and utilization animal waste. Students are given the opportunity to visit the farm to get information and direct feedback from farmers on the land settlements, farm management and marketing of agricultural products.

|                  |                                |          |
|------------------|--------------------------------|----------|
| <b>ASQ 35402</b> | <b>Akuaponik<br/>Aquaponic</b> | <b>2</b> |
|------------------|--------------------------------|----------|

This course provides comprehensive teaching of the concept, functions and management systems in relation to the circulation of bio-integrated aquaculture with hydroponic vegetable, flower and herb. Topics will emphasize on selection of fish, aquatic animals and plants to aquaponic, components and design of system, nitrification, subsystem hydroponics and aquaculture, history and challenges of aquaponic, advantages and disadvantages of system. In this course, students are required to build a simple aquaponic system. Assessment is based on design and construction of the system, operation and production in a sustainable manner.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                             |          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------|
| <b>ASQ 35502</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Anatomi Mikro<br/>Micro Anatomy</b>                                      | <b>2</b> |
| <p>This course is designed to study the examination of micro anatomical structures such as cells, tissues, organs and organ systems under light and electron microscope. This course will use microscope slides of anatomical structures as teaching aids in discussions of anatomy. Student will be able to study structure of cells or tissue as compared to normal structure, identify abnormal features and to comprehend the mechanisms that underlie the pathology of these microscopic structures.</p>                                                                                                                                                                                                                                                                                                                                |                                                                             |          |
| <b>ASQ 35603</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Ekonomi Pertanian<br/>Agricultural Economics</b>                         | <b>3</b> |
| <p>This course covers demand supply, types of markets, international trade and effects of government policies, including government intervention in markets. Topics include definition of economics, economic problem, demand and supply, elasticity, utility and demand, possibilities, preferences and choices, organizing production, output and cost, perfect competition and oligopoly, measuring GDP and economic growth, national income accounting, money, the price level and inflation and food marketing. Assessments will be by assignments, case studies, mid-term exam and final exam. Students will be expected to be able to explain, analyse and evaluate the problems in the agricultural sector, especially problems in Malaysia.</p>                                                                                     |                                                                             |          |
| <b>ASQ 35703</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Pemprosesan dan Pengawetan Ikan<br/>Fish Processing and Preservation</b> | <b>3</b> |
| <p>This course provides technical know-how knowledge of fish processing and preservation which is important in fish postharvest sector. Topics include Introduction to fish processing and preservation, Harvesting techniques, fish/crustaceans/ molluscs processing, packaging, freezing, handling of fresh fish, cleaning and sanitation, waste treatment, fish meal and oil, regulations, smoked, cured and dried fish and transportation, distribution and food security. Students will be expected to demonstrate knowledge in fish processing and preservation. Assessments will be by assignments, quiz, field visit, laboratory reports, mid-term exam and final exam. The goal of this course is to produce skilled graduates in postharvest development of aquatic products.</p>                                                  |                                                                             |          |
| <b>ASQ 35802</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Teknologi Bioflok<br/>Biofloc Technology</b>                             | <b>2</b> |
| <p>This course is the introduction of using Biofloc Technology in managing poor water quality. The topics cover introduction to biofloc systems, nitrogen syndrome, BFT to control inorganic nitrogen build up, feeding with bioflocs, ex-situ biofloc technology, optimizing microbial activities in ponds, aeration and aerator deployment, pond management, pond construction, biofloc technology for super intensive aquaculture, BFT effects of aquatic animals disease control, biology and biotechnology behind bioflocs, biofloc technology applied to aquatic animal bloodstocks and bioflocs technology and sustainable aquaculture development. At the end of the course, students are able to learn the application of bioflocs as an alternative ecosystem of rich and potent particles suspended in relatively poor water.</p> |                                                                             |          |

## Semester Tujuh (Tahun 4)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                 |          |
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| <b>ASQ 31403</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Latihan Industri II<br/>Industrial Training II</b>                           | <b>3</b> |
| <p>This course exposes students to reality of the working environment in the field of aquatic science namely environment sector, fisheries sector, development sector, entrepreneurship sector, research sector and governance sector. Students will be expected to practice the theoretical knowledges that they obtained in their studies. Students are also allowed to choose their industrial training organisation, whether at local or foreign countries. Students are expected to do oral presentation of their industrial training outputs and submit log book and a comprehensive report after training.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                 |          |
| <b>ASQ 41802</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Isu-isu Semasa dalam Sains Akuatik<br/>Current Issues in Aquatic Science</b> | <b>2</b> |
| <p>This course provides general knowledge of current issues related to aquatic science. Topics include Issues on complex biodiversity in aquatic science, irrigation and water management, climate change adaptation and mitigation measures, carbon capping and trading, invasive species, trans-boundary species, effluents from urbanization and agriculture, aquaculture development, food security. Aquatic community protection, flooding, food safety, aquatic security and legislation-illegal, unregulated and unreported fisheries. Students will be expected to understand context of issues related to aquatic environment, fisheries, economics and governance and their relations to aquatic development. Assessments will be by assignments, case studies, mid-term exam, final exam and presentation/seminar. This course will expose students to real scenarios or crisis in aquatic environment through case studies. Students will be expected to be able to explain, analyse and suggest suitable strategies which can be used to overcome the crisis in aquatic environment.</p> |                                                                                 |          |
| <b>ASQ 41904</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Projek Penyelidikan I<br/>Research Project I</b>                             | <b>4</b> |
| <p>This course involves a practical research project part I for aquatic science programme. Student will undergo planning and preparation of a written research project proposal and a research project oral presentation with the help of coordinator and supervisor(s). Student is expected to present his/her research proposal at the faculty level, revise and implement research based on the proposal.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                 |          |
| <b>ASQ 45902</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Entomology Akuatik<br/>Aquatic Entomologi</b>                                | <b>2</b> |
| <p>This course provides an understanding on the scope of agriculture entomology. This course will cover topics such as Introduction to importance of insect, Insects diversity, External structure of insects and functions, Insects classification, Internal structure of insects: Digestive and excretory systems, Internal structure of insects: Respiratory and circulatory system, Internal structure of insects: Circulatory system, Internal structure of insects: Auditory system, Internal structure of insects: Nervous system, Describe behaviourism of insects and explain sampling method, Reproduction, growth and development of insect, Insect Ecology I, Insect Ecology I and Pests and outbreaks. Students are expected to produce a detailed insect collection and distinguish the taxa and importance.</p>                                                                                                                                                                                                                                                                        |                                                                                 |          |

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| <b>ASQ 46002</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Kesihatan dan Penyakit Ikan<br/>Fish Health and Diseases</b>                                        | <b>2</b> |
| <p>This course discusses the types of non-infectious diseases (environment, food and genetics) and infectious diseases caused by viruses, bacteria, fungi, protozoa, worms and crustacean with detailed descriptions of the symptoms, diagnosis, pathogen life cycle and means infection. Key topics such as immunology and vaccines fish will be studied. Students are expected to apply this knowledge in fish health management of aquaculture practices.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                        |          |
| <b>ASQ 46102</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Pengurusan Perikanan secara Pendekatan Ekosistem<br/>Ecosystem Approach to Fisheries Management</b> | <b>2</b> |
| <p>This course provides knowledge of Ecosystem Approach to Fisheries Management (EAFM) that strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic, and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries (FAO, 2003). Topics include definition of EAFM, steps to implement EAFM, EAFM plan, fishery management unit, prioritization of issues and goals, developing EAFM plan, implementation of EAFM and monitor, evaluate and adaptation of EAFM. Students will be expected to analyse issues in EAFM, form Fisheries Management Unit of any related EAFM projects and plan EAFM projects accordingly. Assessments will be by assignments, mid-term exam, final exam and presentation/seminar. The goal of this course is to train students to be future trainers in EAFM for Malaysia.</p>                                                                                                   |                                                                                                        |          |
| <b>ASQ 46203</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Polisi dan Akta<br/>Policy and Act</b>                                                              | <b>3</b> |
| <p>This course provides knowledge of policy, acts and its application in aquatic and environment management. Topics include Issues pertaining to aquatic environment, Introduction to law and policy, International law/federal law/state law, Ecosystem Approach to Fisheries Management (EAFM), Criminal Law, Fisheries Law, Native Law, Environmental Law, policies in Malaysia and international commitment of Malaysia towards aquatic environment management. Students will be expected to understand context of issues related to aquatic environment, fisheries, economics and governance and their relations to government policies and acts. Assessments will be by assignments, case studies, mid-term exam, final exam and presentation/ seminar. This course will expose students to real scenarios of poor management of aquatic environment through case studies. Students will be expected to be able to explain, analyse and suggest suitable policies and acts which can be use in governing the future management of the declining environment.</p> |                                                                                                        |          |



## Semester Lapan (Tahun 4)

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|----------|
| <b>ASQ 42004</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Projek Penyelidikan II<br/>Research Project II</b>                                     | <b>4</b> |
| <p>This course involves the continuity of practical research project part I for aquatic science programme. Student will undergo implementation of research work followed with preparation of a written thesis. At the end of the semester, students are expected to complete their respective research with the help of coordinator and supervisor(s). Students are expected to defend their thesis at the faculty level, revise content of thesis and submit thesis to their respective faculty as proof of completion.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                           |          |
| <b>ASQ 46303</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Algologi<br/>Algology</b>                                                              | <b>3</b> |
| <p>This course is a study of planktons in waters. The synopsis course covers the learning of phycology, taxonomy, physiology, biochemistry, genetics, hydrobiology and algae culture. Students will be exposed to practical training for better understanding of algology. At the end of the course, students will be able to identify aquatic alga including the development phases.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                           |          |
| <b>ASQ 46402</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Komunikasi Pertanian<br/>Agricultural Communication</b>                                | <b>2</b> |
| <p>This course covers Introduction to theories, definition and models of individuals and mass groups' communications and its role in attitude change and persuasion in the society and agriculture particularly. Topics include Introduction to basic theories on attitude change and persuasion, Diffusion on innovations on extension, The teaching and learning of adults in extension, Extension teaching method, Extension teaching methods: individual and group methods, Extension teaching methods: mass communication, Participatory – Oriented Method of Agricultural Extension Strategic Extension Campaign, Using Extension Strategies and Organizing for Extension Communication and Determining Target Groups/Rural Community Needs. Assessments will be by public speaking, group oral presentation and method demonstration. This source will also familiarize the students with selected variety of social-psychological theories of attitude change and techniques, its characteristics and applications. This course provides an understanding on how to select appropriate communication techniques in relation to the audiences groups and situation.</p> |                                                                                           |          |
| <b>ASQ 46502</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Pengurusan Sungai dan Mitigasi Banjir<br/>Riverine Management and Flood Mitigation</b> | <b>2</b> |
| <p>This course provides students a basic knowledge on riverine management and strategies to mitigate flood. Topics include introduction to riverine ecosystem, perspectives in riverine concepts, hierarchical patch dynamics in riverine landscape, special arrangement of river systems, hydrogeomorphic characters of a riverine ecosystem, ecological implications of riverine ecosystem, ecogeomorphology of altered riverine landscapes, practical applications of riverine ecosystem synthesis and conservation settings, flood risk management, flood hazard modelling, flood forecasting, vulnerability and flood damage, mitigation measures, historical floods, transboundary issues and research.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                           |          |

Students will be expected to demonstrate knowledge in riverine management and action plans for flood mitigation. Assessments will be by assignments, quiz, field visit, laboratory reports, mid-term exam and final exam. The goal of this course is to develop knowledgeable graduates in riverine management, river modelling and able to develop appropriate recommendations for action plans on flood management and flood mitigation in Malaysia.

**ASQ 46602**

**Rantai Nilai Perikanan  
Fisheries Value Chain**

**2**

This course provides a basic framework of development planning by using value chain approach. Topics include competitive and technology strategies, Competitor selection, Inter-relationships among business units, Defensive strategy, Horizontal strategy, complementary products, industries and competitive strategy, strategic decisions, capacity expansion, governance in value chain and Strategic analysis of vertical integration. Students will be expected to analyse industrial scenarios both vertically and horizontally, identify pitfalls, stakeholders, governance, competitors and strategic strategies to overcome the pitfalls that occur in the industry. Assessments will be by assignments, case studies, mid-term exam, final exam and presentation/seminar. The goal of this course is to train students to practice a technical know-how in producing a value chain.

**ASQ 46702**

**Akuatik Toksikologi  
Toxicology Aquatic**

**2**

This course is about the study of harmful effects of chemicals found in aquatic organisms. The topics cover introduction chemistry, biology, symptoms, mechanisms, treatments and detection of toxic materials. This course will be multi-disciplinary as it related to other fields like synthetic chemistry, proteomic, drug metabolism, mechanism of action, bioinformatics, bioanalytical chemistry, biological chemistry and molecular epidemiology. At the end of the course, students are able to learn the relationship dose and the effect of exposure of living organisms.

# **LATIHAN INDUSTRI**

## **Sarjana Muda Sains (Kepujian) Sains Akuatik (ASQ 20143 dan ASQ30143)**

### **Merit**

Pelajar Ijazah Sarjana Muda Sains (Kepujian) Sains Akuatik diwajibkan menjalani latihan industri sebanyak DUA KALI semasa cuti semester antara sesi iaitu, antara Semester Keempat-Kelima dan Semester Keenam-Ketujuh sekurang-kurangnya selama ENAM (6) minggu setiap kali. Kursus-kursus ini bernilai tiga kredit (3) unit dan pelajar akan diberikan gred. Nilai grednya akan diambil kira dalam pengiraan Purata Nilai Gred Semester (PNGS) atau Purata Nilai Gred Kumulatif (PNGK).

### **Pengenalan Kursus**

Latihan industri merupakan satu kursus yang memberi pendedahan kepada dunia kerjaya agar para pelajar diperlengkapi dengan pelbagai amalan kerja serta aspek praktikal dalam bidang sains akuatik. Pendedahan ini dapat menghubungkan apa yang dipelajari secara teori dan praktikal dengan realiti suasana pekerjaan. Bagi pelajar yang beraspirasi untuk menjadi usahawan, mereka berpeluang mendapatkan pengalaman dan jaringan luar.

### **OBJEKTIF KURSUS**

Latihan industri mempunyai objektif kursus seperti berikut:

1. Memberi pendedahan kepada pelajar terhadap suasana kerja agar mereka dapat menyesuaikan diri dengan mudah apabila menyertai sektor pekerjaan kelak;
2. Memberi pelajar pengalaman kerja berpasukan dan mencontohi kepimpinan baik pemimpin di tempat kerja;
3. Membentuk kemahiran insaniah dalam pengurusan sumber manusia daripada peringkat atasan dan bawahan; dan
4. Pengalaman yang ditimba semasa menjalani latihan menjadikan pelajar lebih berdaya saing dipasaran pekerjaan kerana telah dilengkapi dengan pengetahuan kemahiran, sikap dan pengalaman praktikal yang sesuai.

### **Penempatan**

Pelajar digalakkan untuk mencari tempat latihan industri sendiri yang hampir dengan tempat tinggal bagi mengurangkan kos. Penyelaras kursus akan menentukan kesesuaian dan akan membantu menguruskan penempatan latihan industri ini. Pelajar boleh menjalani latihan industri di mana-mana organisasi, syarikat, perusahaan, agensi, institut penyelidikan dan bioteknologi, universiti dan lain-lain dalam sektor kerajaan dan swasta. Penempatan ini akan dapat memberi pendedahan persekitaran kerja dan pelbagai aspek praktikal dalam bidang sains akuatik di Malaysia.

## **Latihan Industri**

Kursus-kursus ini mendedahkan pelajar kepada realiti persekitaran kerja dalam bidang sains akuatik iaitu sektor alam sekitar, perikanan, pembangunan, keusahawanan, penyelidikan dan tadbir urus. Pelajar dijangka untuk mengamalkan ilmu teori yang diperolehi dalam pelajaran. Pelajar juga dibenarkan untuk memilih organisasi latihan industri sama ada di negara tempatan atau asing. Pelajar dijangka membuat persembahan lisan mengenai output latihan perindustrian mereka dan mengemukakan buku log dan laporan komprehensif selepas latihan.

## **Penilaian**

Penilaian keseluruhan latihan industri pelajar adalah gabungan penilaian oleh Penyelia Industri (25%), Penyelia Akademik (25%) dan laporan akhir latihan industri serta pembentangan (50%).

# Program Pengajian

## Sarjana Muda Teknologi Makanan

### Pendahuluan

Teknologi Makanan mengintegrasikan prinsip dan konsep sains kimia, fizik, mikrobiologi dan kejuruteraan untuk digunakan bagi memilih, merekabentuk, memproses, menganalisis, membungkus, menilai dan menyimpan bahan makanan serta produk makanan dan minuman. Dengan kenaikan kos bahan makanan yang dihadapi sekarang ini, bidang teknologi makanan akan menjadi lebih penting bagi memenuhi keperluan makanan dan minuman yang berkhasiat dan selamat untuk pengguna amnya.

Pelajar yang mengikuti program ini didedahkan kepada semua aspek pembelajaran mengenai makanan; sifat kimia bahan makanan sehingga pengilangan produk makanan yang selamat dan berkualiti tinggi. Mereka perlu mengikuti kurikulum saintifik yang padat sebagai persediaan untuk mendapatkan pelbagai peluang pekerjaan atau untuk melanjutkan pelajaran di peringkat pascasiswazah di dalam bidang berkaitan dengan Teknologi Makanan.

### Peluang Kerjaya

Pemprosesan makanan merupakan salah satu industri pembuatan terbesar dan memberi peluang pekerjaan yang amat baik kepada graduan teknologi makanan. Pembangunan dan pemajuan industri ini memerlukan tenaga mahir di dalam bidang yang berkaitan teknologi makanan. Graduan teknologi makanan mempunyai kemahiran yang membolehkan mereka menjadi usahawan makanan atau memegang jawatan penting di kilang memproses makanan, pembekal makanan dan bahan makanan serta di makmal penyelidikan dan perundingan, badan - badan kerajaan, agensi perundangan dan juga agensi penguatkuasaan.

### Jangkamasa

Ijazah ini mengambil masa selama empat (4) tahun dengan keperluan minima bergraduasi ialah 123 kredit.

## Syarat kemasukan

| STPM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MATRIKULASI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | DIPLOMA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1.Mendapat sekurang-kurangnya <b>PNGK 2.50</b> pada peringkat <b>STPM</b></p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C+</b> pada peringkat <b>STPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Biology</li> <li>• Chemistry</li> <li>• Physic / Mathematics (M) / Mathematics (T)</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat sekurang-kurangnya kepujian <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Bahasa Inggeris</li> <li>• Biology</li> <li>• Chemistry</li> <li>• Physics / Mathematics / Additional Mathematics</li> </ul> <p><b>DAN</b></p> <p>4.Mendapat mana-mana <b>SATU (1) Gred C</b> mata pelajaran lain tidak termasuk Bahasa Melayu dan mata pelajaran diatas</p> <p><b>DAN</b></p> <p>5.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>6. Tiada kecacatan anggota serta pertuturan dan buta warna</p> | <p>1.Mendapat sekurang-kurangnya <b>PNGK 2.50</b> pada peringkat <b>Matrikulasi / Asasi</b></p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya <b>Gred C+</b> pada peringkat <b>Matrikulasi / Asasi</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Biology</li> <li>• Chemistry</li> <li>• Mathematics / Physics</li> </ul> <p><b>DAN</b></p> <p>3.Mendapat sekurang-kurangnya kepujian <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut;</p> <ul style="list-style-type: none"> <li>• Bahasa Inggeris</li> <li>• Biology</li> <li>• Chemistry</li> <li>• Physics / Mathematics / Additional Mathematics</li> </ul> <p><b>DAN</b></p> <p>4.Mendapat mana-mana <b>SATU (1) Gred C</b> mata pelajaran lain tidak termasuk Bahasa Melayu dan mata pelajaran diatas</p> <p><b>DAN</b></p> <p>5.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>6. Tiada kecacatan anggota serta pertuturan dan buta warna</p> | <p>1.Mendapat sekurang-kurangnya <b>PNGK 3.50</b> pada peringkat <b>Diploma</b> dalam bidang berkaitan</p> <p><b>DAN</b></p> <p>2.Mendapat sekurang-kurangnya kepujian <b>Gred C</b> pada peringkat <b>SPM</b> dalam mata pelajaran berikut:</p> <ul style="list-style-type: none"> <li>• Bahasa Inggeris</li> <li>• Biology / Chemistry / Mathematics</li> <li>• Physics / Additional Mathematics</li> </ul> <p><b>DAN</b></p> <p>3. Mendapat mana-mana <b>SATU (1) Gred C</b> mata pelajaran lain tidak termasuk Bahasa Melayu dan mata pelajaran diatas</p> <p><b>DAN</b></p> <p>4.Mendapat sekurang-kurangnya <b>Tahap 2 ( Band 2)</b> dalam <b>MUET</b></p> <p><b>DAN</b></p> <p>5. Tiada kecacatan anggota serta pertuturan dan buta warna</p> |

## Struktur Pengajian

| Semester             | Kursus Universiti | Kursus Teras | Kursus Elektif                      | Jumlah Kredit                        |
|----------------------|-------------------|--------------|-------------------------------------|--------------------------------------|
| 1                    | 7                 | 9            | -                                   | 16                                   |
| 2                    | 4                 | 11           | 3                                   | 18                                   |
| 3                    | 2                 | 9            | 6                                   | 17                                   |
| 4                    | 4                 | 10           | 3                                   | 17                                   |
| 5                    | 3                 | 9            | 6                                   | 18                                   |
| 6                    | -                 | 12           | -                                   | 12                                   |
| 7                    | -                 | 6            | 8                                   | 14                                   |
| 8                    | -                 | 5            | 6                                   | 11                                   |
| <b>Jumlah Kredit</b> | <b>20</b>         | <b>71</b>    | <b>32<br/>Keperluan<br/>Minimum</b> | <b>123<br/>Keperluan<br/>Minimum</b> |

## Semester Satu (Tahun 1)

| Kod           | Nama Kursus                                                                                  | Jam Kredit |
|---------------|----------------------------------------------------------------------------------------------|------------|
| KKK xxxx      | Co-curriculum I<br>Ko-kurikulum I                                                            | 3 (U)      |
| MPU 31022     | Islamic Civilization and Asian Civilization<br>Tamadun Islam dan Tamadun Asia                | 2 (U)      |
| MPU 32012     | English for Communication I                                                                  | 2 (U)      |
| FSI 11503     | Introduction to Food Science and Technology<br>Pengenalan Kepada Sains dan Teknologi Makanan | 3 (S)      |
| FSI 10203     | Basic Food Microbiology<br>Mikrobiologi Makanan Asas                                         | 3 (S)      |
| FSI 10103     | Analytical and Organic<br>Kimia Organik dan Analysis                                         | 3 (S)      |
| <b>Jumlah</b> |                                                                                              | <b>16</b>  |

### Semester Dua (Tahun 1)

| Kod                            | Nama Kursus                                                                                                                  | Jam Kredit |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------|
| MPU 33050<br>atau<br>MPU 33060 | Talaqqi Qur'an (Muslim)<br>Protocol and Management of Official Function<br>Protokol dan Pengurusan Majlis Rasmi (Non-muslim) | 0 (U)      |
| MPU 33032<br>atau<br>MPU 33042 | Kursus Ilmu Wahyu & Kemasyarakatan<br>Perbandingan Agama II<br>(pelajar bukan Islam)                                         | 2 (U)      |
| MPU 32022                      | English for Communication II                                                                                                 | 2 (U)      |
| FSI 11603                      | Physical and Inorganic Chemistry<br><i>Kimia Inorganik dan Fizikal</i>                                                       | 3 (S)      |
| FSI 10803                      | Food Microbiology<br>Mikrobiologi Makanan                                                                                    | 3 (S)      |
| FSI 11302                      | General Physics<br>Fizik Am                                                                                                  | 2 (S)      |
| FSI 20303                      | Calculus<br><i>Kalkulus</i>                                                                                                  | 3 (S)      |
| FSI 16103                      | Nutrition and Health<br>Pemakanan dan Kesihatan                                                                              | 3 (E)      |
| <b>Jumlah</b>                  |                                                                                                                              | <b>16</b>  |

### Semester Tiga (Tahun 2)

| Kod                            | Nama Kursus                                                                 | Jam Kredit |
|--------------------------------|-----------------------------------------------------------------------------|------------|
| MPU 33012<br>atau<br>MPU 33022 | Kursus Ilmu Wahyu & Sains<br>Moral dan Etika II (pelajar bukan Islam)       | 2 (U)      |
| FSI 21203                      | Fundamental of Food Process Engineering<br>Asas Kejuruteraan Proses Makanan | 3 (S)      |
| FSI 20403                      | Chemistry of Food Components<br><i>Kimia Komponen Makanan</i>               | 3 (S)      |
| FSI 22203                      | Food Processing Technology I<br><i>Teknologi Pemprosesan Makanan I</i>      | 3 (S)      |
| CSB 28103                      | Introduction to Information Technology<br>Pengantar Teknologi Maklumat      | 3 (E)      |
| ABS 12303                      | Principle of Accounting<br><i>Prinsip Perakaunan</i>                        | 3 (E)      |
| <b>Jumlah</b>                  |                                                                             | <b>17</b>  |



### Semester Empat (Tahun 2)

| Kod       | Nama Kursus                                                             | Jam Kredit |
|-----------|-------------------------------------------------------------------------|------------|
| MPU xxxxx | Foreign Language<br>Bahasa Asing                                        | 2 (A)      |
| MPU 31012 | Ethnic Relationship<br>Hubungan Etnik                                   | 2 (U)      |
| FSI 20503 | Food Biochemistry<br><i>Biokimia Makanan</i>                            | 3 (S)      |
| FSI 20602 | Food Chemical Analysis<br>Analisis Kimia Makanan                        | 2 (S)      |
| FSI 22303 | Food Processing Technology II<br><i>Teknologi Pemrosesan Makanan II</i> | 3 (S)      |
| FSI 35203 | Bakery Products Technology<br>Teknologi Hasilan Bakeri                  | 3 (E)      |
| FSI 22602 | Halal Food<br>Makanan Halal                                             | 2 (S)      |
| Jumlah    |                                                                         | 17         |

### Semester Lima (Tahun 3)

| Kod       | Nama Kursus                                                                      | Jam Kredit |
|-----------|----------------------------------------------------------------------------------|------------|
| ABT 22403 | Agricultural Entrepreneurship<br>Keusahawanan Tani                               | 3 (U)      |
| ABT 20803 | Biostatistic<br><i>Biostatistik</i>                                              | 3 (S)      |
| FSI 31103 | Food Safety and Quality Management<br>Keselamatan dan Pengurusan Kualiti Makanan | 3 (S)      |
| FSI 30903 | Food Packaging<br><i>Pembungkusan Makanan</i>                                    | 3 (S)      |
| FSI 26303 | Sensory Evaluation of Food<br><i>Penilaian Deria Makanan</i>                     | 3 (E)      |
| MSS 11403 | Principle of Marketing and Selling<br><i>Prinsip Pemasaran dan Jualan</i>        | 3 (E)      |
| Jumlah    |                                                                                  | 18         |

### Semester Enam (Tahun 3)

| Kod       | Nama Kursus                             | Jam Kredit |
|-----------|-----------------------------------------|------------|
| FSI 31412 | Industrial Training<br>Latihan Industri | 12 (S)     |
| Jumlah    |                                         | 12         |

### Semester Tujuh (Tahun 4)

| Kod       | Nama Kursus                                                                | Jam Kredit |
|-----------|----------------------------------------------------------------------------|------------|
| FSI 42402 | Research Project I<br><i>Projek Penyelidikan I</i>                         | 2 (S)      |
| FSI 41004 | Food Product Development<br>Pembangunan Produk Makanan                     | 4 (S)      |
| FSI 45503 | Food Process and Plant Design<br><i>Rekabentuk Proses dan Loji Makanan</i> | 3 (E)      |
| FSI 46003 | Meat Technology<br>Teknologi Daging                                        | 3 (E)      |
| FSI 45602 | Forensic Food Science<br><i>Sains Makanan Forensik</i>                     | 2 (E)      |
| Jumlah    |                                                                            | 14         |

### Semester Lapan (Tahun 4)

| Kod       | Nama Kursus                                                           | Jam Kredit |
|-----------|-----------------------------------------------------------------------|------------|
| FSI 42504 | Research Project II<br><i>Projek Penyelidikan II</i>                  | 4 (S)      |
| FSI 42001 | Seminar<br>Seminar                                                    | 1 (S)      |
| FSI 46203 | Oils and Fats Technology<br>Teknologi Hasil Minyak dan Lemak          | 3 (E)      |
| FSI 45803 | Management of Food Plant Operation<br>Pengurusan Operasi Loji Makanan | 3 (E)      |
| Jumlah    |                                                                       | 11         |

**Nota:** U -Kursus Umum S -Kursus Teras E -Kursus Elektif

# Sinopsis Kursus

## Sarjana Muda Teknologi Makanan

### Semester 1 (Tahun 1)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                              |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------|
| <b>Kod Kursus</b><br>FSI 11503                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Nama Kursus</b><br><b>Introduction to Food Science and Technology</b>     | <b>3</b> |
| <p>The course is arranged to introduce basics of food science and technology and to stimulate students' interest in this field. General aspects of up-to-date food science and technology will be covered, including: food industry outlook, food chemistry, nutrition, food processing including food packaging and engineering, food microbiology, food safety, halal food and food biotechnology.</p>                                                                                                                                                                                            |                                                                              |          |
| <b>FSI 10203</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Mikrobiologi Makanan Asas</b><br><b>Basic Food Microbiology</b>           | <b>3</b> |
| <p>This course introduces the basic study of microorganisms and microbiological techniques used in the laboratory. Topics that will be covered are the role of microorganisms in foods, characteristics and classification of microorganisms, the structure and function of prokaryotic and eukaryotic cell, isolation, cultivation and preservation of microorganisms, growth and development, metabolism and biosynthesis, deterioration and control of microorganisms, mutation, genetic engineering, immune and allergic reactions; laboratory safety and basic techniques in microbiology.</p> |                                                                              |          |
| <b>FSI 10103</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Kimia Organik dan Analisis</b><br><b>Analytical and Organic Chemistry</b> | <b>3</b> |
| <p>This course is designed to introduce students to the analytical and organic chemistry. It outlines the reactions, some techniques such as analysis and uses of molecules containing one functional group such as alcohols, aldehydes, ketones, carboxylic acids, amines in both aliphatic and aromatic. The course includes compulsory laboratory experiments, and student will be guided to conduct experiments that cover techniques, methods, observations and data collections.</p>                                                                                                          |                                                                              |          |

### Semester 2 (Tahun 1)

|                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                               |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------|
| <b>FSI 11603</b>                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Kimia Inorganik dan Fizikal</b><br><b>Physical and Inorganic Chemistry</b> | <b>3</b> |
| <p>This course covers the basics of important physical and inorganic chemistry which include : modern atomic theory, periodic relationship, main group element, theory of bonding, properties of gas, liquid and solid, chemical equilibrium, electrochemistry, thermodynamics, kinetic and nuclear chemistry. This course is supported with the laboratory experimental works where students develop safe manipulate skills.</p> |                                                                               |          |

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|----------|
| <b>FSI 10803</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Mikrobiologi Makanan<br/>Food Microbiology</b>       | <b>3</b> |
| <p>This course comprises lectures and laboratory classes. It covers the role and significance of microorganisms in food and water, factors effecting their growth in food, effects of food processing and preservation techniques on the growth and survival of microorganisms, microbial activities as a causal agent for food poisoning and spoilage, foodborne diseases, food fermentation and the use of microorganisms as processing aids and sources of food ingredients and additives, probiotics microorganisms and indicator organisms.</p>                         |                                                         |          |
| <b>FSI 11302</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Fizik Am<br/>General Physics</b>                     | <b>2</b> |
| <p>This course is introduced to expose students to the general physics which provides sufficient information to enhance the knowledge and understanding of the basic concepts in physics. Topics that will be covered include measurement, work and energy, circular motion, fluids, electricity and magnetism and electromagnetic waves. A strong emphasis will be given on the temperature and heat, the transfer of heat and thermodynamics.</p>                                                                                                                          |                                                         |          |
| <b>FSI 20303</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Kalkulus<br/>Calculus</b>                            | <b>3</b> |
| <p>This course includes first and second degree equation, limit, continuity and derivatives and their applications. Elementary integration and their application, differentiation and integration involving exponential and logarithmic functions, elementary ordinary differential equation also will be covered.</p>                                                                                                                                                                                                                                                       |                                                         |          |
| <b>FSI 16103</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Pemakanan Dan Kesihatan<br/>Nutrition And Health</b> | <b>3</b> |
| <p>This course gives an understanding of basic nutritional principle, planning nutritious diet and nutrition for a lifetime. Areas covered include the composition of food, human requirements for nutrients and how the body processes food and nutrients. Other areas studied are food intolerance, food toxicology and physiological changes that occur as a result of excesses or deficiencies of various nutrients including food additives, anti-nutritional factors, toxic components in food and nutritional changes in food during food processing and storage.</p> |                                                         |          |

### **Semester 3 (Tahun 2)**

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------|
| <b>FSI 21203</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Asas Kejuruteraan Proses Makanan<br/>Fundamental Of Food Process Engineering</b> | <b>3</b> |
| <p>This course deals with fundamental aspects of engineering theory and principles in food processing. It provides students an exposure in using food engineering principles for improving the commonly used unit operations in the food processing industry. Topics covered include introduction to food engineering, material and energy balance, fluid flow, energy in food processing, heat and mass transfer, refrigeration, food freezing, material handling, membrane technology and process control. The basic concepts are introduced with discussion of their applications in food processing.</p> |                                                                                     |          |

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------|
| <b>FSI 20403</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Kimia Komponen Makanan<br/>Chemistry Of Food Components</b>                       | <b>3</b> |
| <p>This course covers the chemical, physical properties food macro and micro-components specifically water, carbohydrates including dietary fibre, proteins and enzymes, lipids, vitamins, minerals, pigments, flavours, natural toxicants, contaminants and food additives. Their roles in the food system shall also be covered. The relationship between structure and function(s) of these components in food will be discussed.</p>                                                                                                                                                                                                                                                                                                                                                         |                                                                                      |          |
| <b>FSI 22203</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Teknologi Pemrosesan Makanan I<br/>Food Processing Technology I</b>               | <b>3</b> |
| <p>The basic principles and practices of the major techniques used in food processing are introduced in a series of integrated laboratory exercises and lectures covering preservation method by reducing water activity and utilization of preservatives and antioxidants, and innovative non-thermal methods. The application of basic engineering principles to understand the operation of modern food processing plant facilities to convert raw materials into high quality foods will also be discussed.</p>                                                                                                                                                                                                                                                                              |                                                                                      |          |
| <b>FSI 26803</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Teknologi Konfeksi Koko dan Gula<br/>Cocoa and Sugar Confectionery Technology</b> | <b>3</b> |
| <p>This course provides an overview of the science and technology of chocolate manufacture from cocoa production, through the manufacturing processes, to the nutrition and health aspects of chocolate consumption. It covers cocoa cultivation and production with special attention paid to post-harvest pre-treatments, fermentation and drying processes. The scientific principles behind industrial chocolate manufacture are outlined with detailed explanations of the various stages of chocolate manufacturing including mixing, refining, conching, tempering, moulding, enrobing, cooling and panning . Other topics covered include sugar and related materials, caramel ,toffees and fudge, gum, jellies and pastilles, tablets and lozenges and also marshmallow and nougat.</p> |                                                                                      |          |
| <b>FSI 26703</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Teknologi Fermentasi Makanan<br/>Food Fermentation Technology</b>                 | <b>3</b> |
| <p>The industrial microbiology section examines how micro-organisms are obtained, handled and maintained in industry and discusses the application of genetically modified micro-organisms. Fermentation modes and kinetic models are discussed using batch and continuous growth. Downstream processes of industrial fermentations and the role of micro-organisms in producing substances of industrial importance is discussed.</p>                                                                                                                                                                                                                                                                                                                                                           |                                                                                      |          |
| <b>ABS 12303</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Prinsip Perakaunan<br/>Principles of Accounting</b>                               | <b>3</b> |
| <p>This course will introduce the objectives, concepts, principles, accounting conventions and recording processes. It also focuses on the accounting cycle starting from analyzing and recording business transactions using system notes to prepare financial statements.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                      |          |

## Semester 4 (Tahun 2)

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------|
| <b>FSI 20503</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Biokimia Makanan<br/>Food Biochemistry</b>                            | <b>3</b> |
| <p>This course discusses the main components and biochemical processes in living organisms in relation to safety and quality of food. The chapters include: water, acid-base and buffer, enzyme (enzyme kinetic and control of enzyme activity), main metabolic pathways and their implications on the safety and quality food during processing.</p>                                                                                                                                                                                                                                   |                                                                          |          |
| <b>FSI 20602</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Analisis Kimia Makanan<br/>Food Chemical Analysis</b>                 | <b>2</b> |
| <p>This course covers the fundamental of proximate analysis of food and its relation to the nutritional value, shelf life, characteristics and Food Act. The course also features hands on approach to the principle of methodology and equipment such as thin-layer chromatography, GC, GCMS, HPLC, FTIR and PCR in detecting/measuring food components.</p>                                                                                                                                                                                                                           |                                                                          |          |
| <b>FSI 22303</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Teknologi Pemrosesan Makanan II<br/>Food Processing Technology II</b> | <b>2</b> |
| <p>This course describe the different methods and techniques used for high- and low-temperature food processing with the aid of basic engineering principles. This course also focuses on the operation of modern food processing plant facilities to convert raw materials into high quality foods. Common unit operations will be covered as well as the principles that control their operation are emphasized. This course will give a 'hands on' experience to the students as to how to handle the equipments and to interpret the data obtained from laboratory experiments.</p> |                                                                          |          |
| <b>FSI 35203</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Teknologi Hasilan Bakeri<br/>Bakery Products Technology</b>           | <b>3</b> |
| <p>This course Integrates class discussions and laboratory exercises to introduce the students to the production of both traditional and modern bakery products. Common practical problems that occur during baking, potential solutions and innovations in baking technology will be discussed.</p>                                                                                                                                                                                                                                                                                    |                                                                          |          |
| <b>FSI 22602</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Makanan Halal<br/>Halal Food</b>                                      | <b>2</b> |
| <p>This course consists of lectures, discussions and class assignments. An assignment will require students to simulate the application of halal certification for a food processing plant. The course includes the concept of halal and haram in Islam, sources of halal food, halal slaughtering methods, halal food processing concept, halal food ingredients and additives. The course also covers legislations related to halal certification and halal mark. Current issues in global halal food industry and markets will also be discussed.</p>                                |                                                                          |          |

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|------------------|---------------------------------------------------|----------|
| <b>FSI 35303</b> | <b>Teknologi Minuman<br/>Beverages Technology</b> | <b>3</b> |
|------------------|---------------------------------------------------|----------|

This course covers the study of different types of beverages such as plant based beverages, dairy based beverages, carbonated formulated beverages and etc. Essential ingredients such as stabilizers and sweeteners, and significant aspects of formulations such as fortification technology and methods to extend shelf-life will be covered.

## **Semester 5 (Tahun 3)**

|                  |                     |          |
|------------------|---------------------|----------|
| <b>ABT 20803</b> | <b>Biostatistic</b> | <b>3</b> |
|------------------|---------------------|----------|

The course introduces the fundamental concepts of statistics and a variety of descriptive and inferential statistical techniques to prepare students for performing statistical analyses using a statistical software, then interpreting and finally, reporting the statistical results/outputs. The topics include probability theory, normal distribution, parametric statistical techniques to explore relationship among variables (correlation, regression), and to compare groups (T-Test, ANOVA). Non-normal distributions and its' non-parametric statistical techniques (examples: Chi-Square, Spearman, Mann-Whitney, Kruskal-Wallis, Friedman) are also introduced. This course focuses on the applied aspects of statistics.

|                  |                                                                                          |          |
|------------------|------------------------------------------------------------------------------------------|----------|
| <b>FSI 31103</b> | <b>Keselamatan Dan Pengurusan Kualiti Makanan<br/>Food Safety And Quality Management</b> | <b>3</b> |
|------------------|------------------------------------------------------------------------------------------|----------|

This course examines food safety from the perspectives of the consumer, the food industry and regulatory agencies. It addresses chemical, physical and microbiological hazards. Example of risk management tools will also be discussed. This course will focus on food safety and quality management components and the tools used for quality control such as control charts, acceptance sampling, and auditing inspections, Hazard Analysis Critical Control Points (HACCP), Good Manufacturing Practice (GMP). The principles and practices of food plant sanitation will also be covered. Students are required to carry out a mini project on preparation and implementation of GMP & HACCP in selected food factories.

|                  |                                                |          |
|------------------|------------------------------------------------|----------|
| <b>FSI 30903</b> | <b>Pembungkusan Makanan<br/>Food Packaging</b> | <b>3</b> |
|------------------|------------------------------------------------|----------|

This course covers areas pertaining to food packaging materials, systems, and applications. The course will begin with topics of the properties, fabrication and function of metal, glass, paper and plastic packaging. Packaging technology will include manual, semi-auto and automatic packaging machines, MAP packaging, vacuum packaging, aseptic packaging and retorting. Selected topics for food packaging applications will include packaging of selected products, product shelf life and new trend in food packaging.

|                  |                                                               |          |
|------------------|---------------------------------------------------------------|----------|
| <b>FSI 26303</b> | <b>Penilaian Deria Makanan<br/>Sensory Evaluation Of Food</b> | <b>3</b> |
|------------------|---------------------------------------------------------------|----------|

This course provide sensory evaluation concepts and application, explanation on methods, formats and techniques for obtaining data through sensory evaluation, preparation of sample for sensory evaluation, factors influencing

measurement of sensory evaluation, statistical data analysis and selection and training of sensory panelists.

**FSI 35403      Teknologi Tenusu      3**  
**Dairy Technology**

This course discusses the technology of dairy product including selection and processing of ice cream, yogurt, yogurt drinks, cheese and powdered milk. Topics covered include composition of various products and ingredients used in the manufacturing process of the frozen dairy products. The course includes compulsory laboratory experiment and student will be guided to conduct experiments that cover analysis and evaluation of various types of dairy products.

**FSI 46603      Functional Food      3**  
**Makanan Berfungsi**

This course consist of scientific literature that examines the proposed mechanisms by which functional foods are able to influence the major metabolic systems of the body with a positive result on overall health, followed with the development, and marketing of functional foods and nutraceuticals product. Overall, the topics that will be covered in this course are functional foods chemistry, its mechanism in human body, technologies and processing, safety and marketing.

### **Semester 6 (Tahun 3)**

**FSI 31412      Latihan Industri      3**  
**Industrial Training**

Industrial training is a necessity for all students of Bachelor of Food Technology. This course requires students to undergo practical training in any institution related to the food industry to expose students to real working environment in parts such as production, operation, management, analysis and marketing. Industrial Training goal is to enable students to get experience in the organization or related companies in line with the faculty to produce graduates who have the skills and expertise to meet the current needs of the country.

### **Semester 7 (Tahun 4)**

**FSI 42402      Projek Penyelidikan I      2**  
**Research Project I**

This course is introduced to provide students with the skill necessary to undertake original research project and to being able to communicate their project in both writing and oral skills. This course may expose student's creativity in designing a research. The topic of the Research Project will be determined in consultation with the supervisor.

**FSI 41004      Pembangunan Produk Makanan      4**  
**Food Product Development**

This course covers the theory and practical concepts involve in designing and developing new food products. The three major components of food product development steps which are development and evaluation of product concept, development of a prototype food product including packaging,



evaluation of product attributes, safety, shelf life, and also market evaluation of the prototype products will be covered. Students will be exposed to various techniques to evaluate sensory attributes of food products. At the end of the course, students will be required to work through a food product development proposal using the product development team approach that is prevalent in the food industry.

**FSI 45503      Rekabentuk Proses Dan Loji Makanan      3**  
**Food Process And Plant Design**

This course presents the principles and methodology for food process and plant design to meet the quality standards and requirements set by the local regulatory agencies. In particular, it emphasizes on the key elements of process and site selection, building the process flow diagram (PFD) for food plants, process analysis and process evaluation in generating inherently safe, economic and environmentally friendly processes, material and energy balances, equipment design, equipment selection and material of construction, waste minimization and overall costing.

**FSI 46003      Teknologi Daging      3**  
**Meat Technology**

This course integrates class discussions and laboratory exercises to introduce the students to the biochemical and physical changes that occur during the conversion of muscle to meat; the traditional processing of meat products; major problems that occur in meat products and potential solutions, innovations and recent advances in the technology for meat processing.

**FSI 45602      Sains Makanan Forensik      3**  
**Forensic Food Science**

This course is introduced to expose the students to the various techno-legal issues which frequently confront companies involved in the manufacture and service of food and beverages. A portfolio of case studies will be used to demonstrate the fundamental and practical aspects of the investigative process, compensation claims from consumers who have experienced foodborne illness, food composition and labeling authenticity, including certification for halal, genetic modification using recombinant DNA technology, species homogeneity, sabotage, deliberate adulteration, tampering; protection of intellectual property and patents.

**FSI 45003      Analisis Makanan Lanjutan      3**  
**Advances In Food Analysis**

This course gives an understanding of theory, potentials and applications of advanced analytical techniques employed in food analysis. It focuses on providing students with knowledge of modern techniques used in research and development as well as inspection of food products.

## Semester 8 (Tahun 4)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------|
| <b>FSI 42504</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Projek Penyelidikan II<br/>Research Project II</b>                                          | <b>4</b> |
| This course will require students to conduct scientific research and eventuate in a producing a thesis. This will proceed under guidance of supervisor and provide the appropriate environment for student to learn the skill required for undertaking successful research.                                                                                                                                                                                                                                                                                                     |                                                                                                |          |
| <b>FSI 42001</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Seminar<br/>Seminar</b>                                                                     | <b>1</b> |
| The seminar is organised for the student to present the findings of their research project. All students will present in seminar and summarizing their research results.                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                |          |
| <b>FSI 46203</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Teknologi Hasil Minyak Dan Lemak<br/>Oils And Fats Technology</b>                           | <b>3</b> |
| This course integrates class discussions, laboratory exercises and factory visits to introduce the students to the technology of fat or oil extraction, purification and modification. The technology to produce specialty fats, downstream products and innovations in the technology for palm oil processing will be covered.                                                                                                                                                                                                                                                 |                                                                                                |          |
| <b>FSI 45803</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Pengurusan Operasi Loji Makanan<br/>Management Of Food Plant Operation</b>                  | <b>3</b> |
| This course is designed to acquaint students with a basic understanding of how operations management is applied in a modern food manufacturing plant to improve operational performance. Students will be exposed to many of the areas or expertise required of today's food plant managers, which include organisation structure and management, production planning, human resources, supply and inventory management and working with regulatory agencies such as the Department of Environment, Department of Health and Department of Internal Trade and Consumer Affairs. |                                                                                                |          |
| <b>FSI 45103</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Teknologi Makanan Hasil Akuatik<br/>Aquatic Food Product Technology</b>                     | <b>3</b> |
| This course is intended to increase the knowledge and skills of students through class discussions, laboratory exercises and visits to various aquatic food manufacturing plants. Chilling and freezing of fish and processing of surimi and surimi-based products will be covered in detail. Extraction of polysaccharides such as carrageenan from seaweeds and innovations in the processing of aquatic food products will be covered.                                                                                                                                       |                                                                                                |          |
| <b>FSI 46403</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Lipid Berstruktur dan Minyak Bersifat Istimewa<br/>Structured Lipids and Specialty Oils</b> | <b>3</b> |
| This course discusses the critical topics in the expanding market and production for lipids. It combines novel and traditional methods from technological and biological perspectives to achieve the most effective pathways for production of modified lipids. This course is integrates into three sections which is exploring development, new production methods and successful products and their uses.                                                                                                                                                                    |                                                                                                |          |

**FSI 36503**

**Toksikologi Makanan  
Food Toxicology**

**3**

This course covers various types of toxicants, including the naturally occurring food toxicants and look at specific toxin action in several food products. The chemical identities of the toxicants and their fates in foods and in the human body are discussed, along with historical notes on the discoveries of the toxins and possible use in ancient times.

# Latihan Industri

## Sarjana Muda Teknologi Makanan

(FSI 31412)

### Merit

Pelajar Ijazah Sarjana Muda Teknologi Makanan diwajibkan menjalani Latihan Industri sebanyak SATU KALI pada Semester Keenam. Ia bernilai dua belas kredit (12) unit dan pelajar akan diberikan gred Lulus atau Gagal. Nilai grednya tidak diambil kira dalam pengiraan Purata Nilai Gred Semester (PNGS) dan Purata Nilai Gred Kumulatif (PNGK). Unit kursus ini akan diambil sebagai sebahagian syarat pengajian untuk pengijazahan.

### Pengenalan Kursus

Latihan industri merupakan satu kursus yang memberi pendedahan kepada dunia kerjaya agar para pelajar diperlengkapi dengan pelbagai amalan kerja serta aspek praktikal dalam bidang teknologi makanan. Melalui pendedahan ini diharap pelajar dapat menghubungkaitkan apa yang dipelajari secara teori dengan realiti suasana pekerjaan dan kerja sebenar supaya mereka lebih bersedia dengan suasana kerja di sektor kerajaan dan swasta yang diceburi kelak. Bagi pelajar yang beraspirasi untuk menjadi usahawan, mereka berpeluang mendapatkan pengalaman suasana dan kerja sendiri melalui latihan industri ini tentang bagaimana sesebuah perusahaan swasta beroperasi.

### Objektif Kursus

Latihan industri mempunyai objektif kursus seperti berikut:

1. Memberi pendedahan kepada pelajar terhadap suasana kerja agar mereka dapat menyesuaikan diri dengan mudah apabila menyertai sektor pekerjaan kelak;
2. Memberi pelajar pengalaman kerja berpasukan dan mencontohi kepimpinan baik pemimpin di tempat kerja;
3. Membangunkan kemahiran insaniah dalam pengurusan sumber manusia daripada peringkat atasan dan bawahan; dan
4. Memperlengkapi dengan pengetahuan mengenai proses industri hulu dan hiliran serta industri menengah dan perkhidmatan pembangunan di organisasi sektor kerajaan dan swasta.

### Penempatan

Pelajar digalakkan untuk mencari tempat latihan industri sendiri yang hampir dengan tempat tinggal bagi mengurangkan kos. Penyelaras kursus akan menentukan kesesuaian dan akan membantu menguruskan penempatan latihan industri. Pelajar boleh menjalani latihan industri di mana-mana organisasi, syarikat, perusahaan, agensi, institut penyelidikan, universiti dan lain-lain dalam sektor kerajaan dan swasta. Penempatan ini akan dapat memberi pendedahan persekitaran kerja dan pelbagai aspek praktikal dalam bidang teknologi makanan di Malaysia.

Semasa latihan industri berlangsung, pelajar akan diletakkan di bawah pengawasan seorang pegawai yang berperanan sebagai penyelia di tempat latihan yang bersesuaian. Penyelia ini akan bertanggungjawab merancang latihan yang diberi dan di akhir sesi latihan, beliau bertanggungjawab untuk menilai dan melaporkan prestasi pelajar kepada penyelaras kursus. Penyelaras kursus atau pensyarah yang dilantik akan melawat pelajar sekurang-kurangnya sekali dalam tempoh latihan bagi memastikan latihan industri pelajar berjalan lancar.

Setelah tamat latihan, pelajar dikehendaki mendokumentasikan pengalaman latihan industri mereka mengikut format laporan yang ditetapkan dan menyerahkan laporan lengkap tersebut kepada penyelaras kursus. Para pelajar akan membentangkan laporan latihan industri dalam sesi kolokium pembentangan latihan industri seperti yang ditetapkan.

## **Penilaian**

Penilaian keseluruhan latihan industri pelajar adalah gabungan penilaian oleh Penyelia Industri (25%), Penyelia Akademik (25%) dan laporan akhir latihan industri serta pembentangan (50%).

## Kursus Universiti

### Program Ijazah

| Nama Kursus                                                | Kod Kursus | Jam Kredit |
|------------------------------------------------------------|------------|------------|
| Tamadun Islam Dan Tamadun Asia (Titas)                     | MPU 31022  | 2          |
| Hubungan Etnik                                             | MPU 31012  | 2          |
| Aqidah & Akhlak (Pelajar Islam)                            | UIU 3012   | 2          |
| Moral & Etika II (Pelajar Bukan Islam)                     | MPU 33022  |            |
| Fiqh Islam                                                 | UIU 3022   | 2          |
| Perbandingan Agama II (Pelajar Bukan Islam)                | MPU 33042  |            |
| Talaqqi Qur'an (Pelajar Islam)                             | MPU 33050  | AUDIT      |
| Protokol Dan Pengurusan Majlis Rasmi (Pelajar Bukan Islam) | MPU 33060  |            |
| English For Communication I                                | MPU 32012  | 2          |
| English For Communication II                               | MPU 33022  | 2          |
| Bahasa Asing [Salah satu yang berkenaan sahaja]            | MPU XXXXX  | 2          |
| Bahasa Arab I                                              | UBA 3012   |            |
| Bahasa Arab II                                             | UBA 3022   |            |
| Bahasa Mandarin                                            | UBC 3012   |            |
| Bahasa Perancis                                            | UBF 3012   |            |
| Keusahawanan Tani                                          | ABT 22403  | 3          |
| Kokurikulum                                                | XXX xxx    | 3          |
| Jumlah Jam Kredit                                          |            | 19         |

## Senarai Kursus Kokurikulum (untuk Pelajar Sarjana Muda)

| Kursus Kokurikulum                    | Kod Kursus        | Nama Kursus                                         |
|---------------------------------------|-------------------|-----------------------------------------------------|
| Kebudayaan                            | KKD 10103         | Muzik Kertuk Dan Rebana Ubi                         |
|                                       | KKD 10203         | Taranum                                             |
|                                       | KKD 10303         | Muzik Kompang                                       |
|                                       | KKD 10403         | Seni Tari                                           |
|                                       | KKD 10503         | Teater                                              |
|                                       | KKD 10603         | Kraftangan                                          |
|                                       | KKD 10703         | Penulisan Khat                                      |
|                                       | KKD 10803         | Iqra                                                |
|                                       | KKD 10903         | Muzik Gamelan                                       |
|                                       | KKD 11003         | Alat Muzik Moden                                    |
|                                       | KKD 11103         | Koir                                                |
|                                       | KKD 11203         | Rodat                                               |
|                                       | KKD 11303         | Muzik Ensemble                                      |
| Kemasyarakatan & Sukarelawan          | KKV 10103         | Projek Khidmat Masyarakat                           |
|                                       | KKV 10203         | Pemadam                                             |
|                                       | KKV 10303         | Briged Perdana                                      |
|                                       | KKV 10403         | Budi Penyayang                                      |
|                                       | KKV 10503         | Rakan Cop                                           |
| Keusahawanan & Pembinaan Diri         | KKN 10103         | Asas Keusahawanan                                   |
|                                       | KKN 10203         | Katering                                            |
|                                       | KKN 10303         | Asas Pengucapan Awam                                |
|                                       | KKN 10403         | Asas Kemahiran Pertanian                            |
|                                       | KKN 10503         | Rakan Kaunselor                                     |
|                                       | KKN 10603         | Asas Kewartawanan                                   |
|                                       | KKN 10703         | Fotografi                                           |
| Pasukan Pakaian Seragam Bersenjata    | KKW 10211 – 30261 | Kor -Sukarelawan Polis I -VI (SUKSIS)               |
|                                       | KKW 10311 – 30361 | PALAPES Udara I – VI                                |
|                                       | KKW 10411 – 20461 | Sukarelawan Siswa Siswi Koreksional I – IV (SISKOR) |
|                                       | KKW 10511 – 30561 | PALAPES Darat I -VI                                 |
| Pasukan Pakaian Seragam Tanpa Senjata | KKY 10103         | Pengakap Kelana Siswa I                             |
|                                       | KKY 10311 – 30351 | Kor- Siswa Siswi Pertahanan Awam I – V (SISPA)      |
| Sukan                                 | KKX 10103         | Bola Sepak                                          |
|                                       | KKX 10203         | Sepak Takraw                                        |
|                                       | KKX 10403         | Tenis                                               |
|                                       | KKX 10503         | Memamah                                             |
|                                       | KKX 10603         | Taekwando                                           |
|                                       | KKX 10703         | Tenpin – Boling                                     |
|                                       | KKX 10803         | Ekuestrian                                          |
|                                       | KKX 10903         | Golf                                                |
|                                       | KKX 11103         | Skuasy                                              |
|                                       | KKX 11203         | Asas Pelayaran                                      |
|                                       | KKX 11303         | Kayak                                               |

|           |             |
|-----------|-------------|
| KKX 11603 | Bola Baling |
| KKX 11703 | Sofbol      |
| KKX 11803 | Ragbi       |
| KKX 12003 | Hoki        |
| KKX 12103 | Judo        |
| KKX 12203 | Rowing      |
| KKX 12303 | Karatedo    |



# Sinopsis Kursus Kokurikulum

## Kebudayaan

### **KKD 10203 Taranum**

Kursus ini akan mendedahkan kepada pelajar akan kaedah membaca Al-Quran secara berlagu disamping memperkenalkan jenis – jenis lagu yang digunakan ketika membaca Al-Quran

### **KKD 10303 Muzik Kompang**

Kursus ini memberikan pendedahan kepada pelajar tentang konsep dan permainan asas kompang, konsep bermain kompang dengan betul, mengenalpasti teknik permainan kompang dari segi rentak pukulan dan lagu, mengetahui cara memimpin kumpulan dan bekerjasama dan memahami proses kompang dihasilkan .

### **KKD 10403 Seni Tari**

Kursus ini akan memberikan pendedahan kepada pelajar – pelajar akan menghasilkan persembahan yang berdaya kreatif tarian tradisional dan moden secara perseorangan dan berkumpulan

### **KKD 10503 Teater**

Kursus ini akan mendedahkan pelajar kepada persediaan fizikal dan mental yang menjadi asas kepada lakonan. Persediaan fizikal termasuklah memahami latihan untuk olah tubuh dan vokal (pengucapan). Persediaan mental pula merujuk kepada proses memahami lakonan melalui latihan seperti improvisasi, bahasa badan (body language), pemerhatian dan penghayatan

### **KKD 10903 Muzik Gamelan**

Kursus ini akan memberikan pendedahan kepada pelajar untuk mengenali, membaca nota dan memainkan alat – alat yang terkandung dalam muzik gamelan secara individu atau berkumpulan.

### **KKD 11003 Alat Muzik Moden**

Kursus ini memberikan pendedahan asas kepada pelajar tentang konsep, teknik bermain alat muzik moden seperti alat muzik kugiran dan memerlukan kreativiti kumpulan semasa mengadakan persembahan.

### **KKD 11103 Koir**

Kursus ini akan memberikan pendedahan kepada pelajar asas menyanyi dengan cara mempelajari kaedah suara, teknik, penjiwaan dan persembahan yang betul serta membaca notasi lagu – lagu koir secara individu dan berkumpulan.

**KKD 11203 Rodat**

Matapelajaran ini akan memberikan pendedahan kepada pelajar – pelajar seni budaya Rodat Negeri Terengganu yang melibatkan aspek iaitu lagu religat, tarian dan alat muzik tradisional menghasilkan persembahan yang berdaya kreatif tarian dan Ton Rodat

**KKD 11303 Muzik Ensemble**

Kursus ini memberikan pendedahan asas kepada pelajar tentang konsep dan teknik bermain alat muzik mengikut kreativiti kumpulan semasa mengadakan satu-satu persembahan.

## Kemasyarakatan & Sukarelawan

**KKV 10103 Projek Khidmat Masyarakat**

Dalam kursus ini pelajar akan didedahkan dengan program kemasyarakatan, kebajikan dan kesedaran. Pelajar juga akan diajar mengenai ciri – ciri kepimpinan dalam menguruskan sesebuah program kemasyarakatan. Pelajar akan melakukan kerja – kerja amal pada masyarakat tanpa mengira kaum dan agama.

**KKV 10203 Pemadam**

Subjek ini menerangkan aspek-aspek pengetahuan dan pendidikan asas sejarah dadah, jenis-jenis dadah dan kesan/akibat kepada manusia, penguatkuasaan undang-undang, profil seorang penagih dan bekas penagih, proses pemulihan di pusat serenti, penjara dan pelajar juga dibawa melawat ke pusat serenti dan penjara di dalam negara. Selain dari itu, matapelajaran ini juga memberi peluang kepada pelajar untuk berinteraksi dengan pelatih melalui kaunseling berkelompok dan penganjuran kursus / bengkel dan seminar anti dadah.

## Keusahawanan & Pembinaan Diri

**KKN 10203 Katering**

Kursus ini dibentuk bertujuan untuk mendedahkan pelajar kepada kemahiran dalam bidang katering. Para pelajar akan diberi penerangan dan tunjukajar dalam pelbagai aspek penyediaan makanan, pengurusan dapur, prinsip makanan dan juga perkhidmatan katering.

**KKN 10303 Asas Pengucapan Awam**

Kursus ini menekankan konsep-konsep asas dalam pengucapan awam bagi membina kecekapan berpidato dan berucap di kalangan pelajar. Bakat dan pengetahuan dalam bidang komunikasi umum yang ada pada pelajar akan digilap melalui latihan-latihan amali pengucapan. Pilihan topik adalah bebas dan terpilih serta pelajar akan membuat persembahan berkumpulan dan individu untuk mempertingkatkan kemahiran pengucapan awam masing – masing

**KKN 10503 Rakan Kaunselor**

Rakan Kaunselor merupakan subjek yang menekankan aspek-aspek kemahiran asas kaunseling yang dapat digunakan oleh pelajar matapelajaran ini untuk membantu diri, rakan pelajar, keluarga dan masyarakat sekelilingnya menangani masalah. Selain dari itu matapelajaran ini juga memberi peluang kepada pelajar untuk mempelajari kemahiran mengurus dan memimpin dalam sesebuah organisasi.

**KKN 10603 Asas Kewartawanan**

Memberi pendedahan serta mengenalkan panduan-panduan dalam menghasilkan bahan berita di dalam akhbar menerusi pelbagai isu semasa dalam dan luar negara demi kepentingan umum melalui media cetak dan elektronik di negara ini.

**KKN 10703 Fotografi**

Kursus ini bertujuan memberi pendedahan dan kemahiran fotografi kepada pelajar – pelajar. Aspek-aspek teori dan pratikal serta teknik-teknik pengambilan gambarfoto yang menarik diberi penekanan. Pelajar berpeluang menghayati seni foto dengan mempratikkan kombinasi teknologi kamera fotografi digital dan analog (SLR kamera). Suatu latihan amali dan penggambaran di luar kampus akan diadakan sebagai sebahagian daripada keperluan kursus. Pelajar sendiri akan menentukan tempat, tarikh dan pengurusannya.

## Pasukan Pakaian Seragam Bersenjata

**Kursus Berpakej****1 Jam Kredit Setiap Semester Diambil****KKW Kor -Sukarelawan Polis I -VI (SUKSIS)****10211 –  
30261**

Kursus ini adalah untuk melahirkan seorang Pegawai Sukarelawan Polis Siswa/i (Kor - SUKSIS) yang berpengetahuan tentang undang-undang berkaitan, latihan mingguan, urusan latihan, pentadbiran, daya kepimpinan, disiplin serta ketahanan fizikal/metal yang sesuai di antara pasukan polis dan Universiti.

**KKW PALAPES Udara I – VI****10311 –  
30361**

Kursus ini mendedahkan kepada para pelajar berkenaan dengan etika kerja dan ianya dapat menguruskan segala maklumat serta idea baru melalui asas ketenteraan yang merangkumi latihan-latihan ilmu medan perang (IMP).

**KKW Sukarelawan Siswa Siswi Koreksional I – IV (SISKOR)****10411 –  
20441**

Kursus ini akan memberi ruang kepada pelajar mengetahui dengan lebih terperinci mengenai Jabatan Penjara Malaysia termasuklah objektif , fungsi ,misi,visi, motto dan Lagu Jabatan. Pelajar juga akan diperkenalkan dengan Akta Penjara dan Peraturan Penjara, Asas Kesukarelawanan termasuk peranan dan tugas sukarelawan, Kepimpinan Sukarelawan, Kod Etika SISKOR dan latihan fizikal (Kawad Kaki) / SENTAP.

**KKW  
10511 –  
30561**

**PALAPES Darat I –VI**

Kursus ini mendedahkan kepada para pelajar berkenaan dengan etika kerja dan ianya dapat menguruskan segala maklumat serta idea baru melalui asas ketenteraan yang merangkumi latihan-latihan ilmu medan perang (IMP).

## Pasukan Pakaian Seragam Tanpa Bersenjata

**KKY 10103 Pengakap Kelana Siswa**

Kursus ini memperkenalkan ilmu kepengakapan, sejarah, struktur organisasi, ilmu asas perkhemahan, kawad kaki, istiadat pengakap, kerja tali menali, mengagak serta ilmu perkhemahan. Kursus ini juga menekankan kepimpinan Manikayu yang akan melayakkan mereka menjadi pemimpin.

**KKY 10311 Kor- Siswa Siswi Pertahanan Awam I – V (SISPA)  
– 30351**

Kursus ini akan memberi ruang kepada pelajar mempelajari ilmu kemahiran pertahanan awam dan melahirkan lebih ramai pegawai Pertahanan Awam yang berkaliber serta mampu menghadapi cabaran global. Pegawai Pertahanan awam akan diberi pengetahuan tentang pengetahuan asas pertahanan awam, asas pertolongan cemas, kemahiran asas melawan kebakaran, kemahiran asas menyelamat dan etika moral.

## Sukan

**KKX 10103 Bola Sepak**

Kursus ini akan memberikan pendedahan awal kepada para pelajar tentang sejarah permainan bola sepak, peraturan asas, kelengkapan permainan dan peralatan, aspek-aspek kecergasan dan latihan yang sesuai, aktiviti regangan dan teknik – teknik kemahiran asas dalam permainan bola sepak

**KKX 10203 Sepak Takraw**

Kursus ini memperkenalkan kepada pelajar-pelajar bagaimana bermain Sepak Takraw dengan betul, asas-asas kepada kemahiran bermain Sepak Takraw, Undang-undang permainan Sepak Takraw, serta melibatkan pelajar dengan latihan bermain dan menganjur mengendalikn suatu pertandingan kecil dan juga menyertainya.

**KKX 10403 Tenis**

Kursus ini memperkenalkan pelajar kepada pengetahuan-pengetahuan asas dan kemahiran-kemahiran asas permainan tenis dan ia juga memperlihatkan pelajar kepada seni pergerakan dan teknik sesuatu pergerakan atau kemahiran yang dilakukan serta teknik boleh menganjurkan pertandingan / kursus.

**KKX 10503 Memanah**

Kursus ini menekankan kepada pelajar tentang undang-undang dan peraturan permainan sukan memanah, pelajar juga diberikan tumpuan tentang kemahiran-kemahiran asas sukan memanah khususnya dari segi teknik yang betul serta pendedahan penganjuran kejohanan mini.

**KKX 10603 Taekwondo**

Kursus ini memberi pendedahan terhadap pengurusan fizikal secara saintifik dalam sukan taekwon-do. Pembentukan sahsiah dan jati diri yang seimbang serta memcetuskan semangat daya juang tinggi dalam menghadapi dan mengharungi cabaran kehidupan harian.

**KKX 10703 Tenpin – Bowling**

Kursus ini akan memberikan pendedahan kepada pelajar – pelajar akan strategi permainan, pengetahuan dalam peralatan serta pengurusan, pemarkahan pertandingan tenpin bowling.

**KKX 10803 Ekuestrian**

Kursus ini memperkenalkan kepada pelajar sukan berkuda, sejarah serta perkembangannya, pelajar juga akan dibawa menerokai alam kehidupan kuda dan bagaimana menjalin persahabatan dengan haiwan ini serta pelajar dapat mempelajari dan mengenalpasti peralatan-peralatan menunggang, ilmu mengenai kesihatan kuda dan teknik-teknik asas menunggang kuda.

**KKX 10903 Golf**

Kursus ini mendedahkan peraturan sukan golf, latihan kecergasan, asas pengadilan, teknik permainan dan penganjuran sukan golf.

**KKX 11103 Skuasy**

Kursus ini memperkenalkan kepada pelajar-pelajar akan kemahiran asas, undang-undang permainan, teknik dan strategi permainan skuasy. Selain itu pelajar didedahkan kepada contoh – contoh kecederaan di dalam sukan ini yang boleh dielakkan .

**KKX 11203 Asas Pelayaran**

Kursus ini memperkenalkan pelajar kepada pengetahuan-pengetahuan asas dan kemahiran-kemahiran asas pelayaran dan ia juga memperlihatkan pelajar kepada sejarah pelayaran, mengetahui jenis dan bahagian kapal layar. Pelajar juga harus melayarkan kapal layar.

**KKX 11303 Kayak**

Kursus ini menawarkan pendedahan asas kepada kemahiran berkayak, teknik-teknik kayuhan yang betul, peraturan dan kod keselamatan semasa berkayak atau semasa menjalankan aktiviti di air.

**KKX 11603 Bola Baling**

Kursus ini akan memberikan pendedahan kepada pelajar – pelajar akan berkebolehan membuat hantaran, rejaman dan tangkapan yang baik bola baling, mengaplikasikan peraturan dalam permainan ini serta berkemahiran dalam penyediaan padang dan alatan permainan ini.

**KKX 11703 Sofbol**

Kursus ini mengajar peraturan sukan sofbol, latihan kecergasan, asas pengadil, teknik permainan dan penganjuran sukan sofbol.

**KKX 11803 Ragbi**

Kursus ini memberikan pendedahan kepada pelajar tentang konsep dan permainan asas ragbi, mengetahui cara memimpin kumpulan dan berkerjasama dalam satu kumpulan serta menggalakkan aktiviti yang diceburi sebagai satu gaya hidup sihat.

**KKX 12003 Hoki**

Kursus ini memperkenalkan kepada pelajar tentang peraturan, teknik dan amalan permainan hoki yang betul. Kemahiran bermain hoki juga didedahkan dengan penglibatan aktif pelajar secara berkumpulan melalui praktikal dan penganjuran pertandingan.

**KKX 12103 Judo**

Kursus ini memperkenalkan kepada pelajar tentang peraturan, amalan dan teknik Judo yang betul. Kemahiran kursus ini juga didedahkan dengan penglibatan aktif pelajar melalui praktikal dan penganjuran pertandingan. Kursus ini juga dapat mencungkil bakat-bakat baru dan menarik minat untuk mewakili universiti dalam sukan Judo.

**KKX 12203 Rowing**

Kursus ini memperkenalkan kepada pelajar tentang peraturan, teknik dan amalan asas Rowing yang betul. Kemahiran asas rowing juga didedahkan dengan penglibatan aktif pelajar secara berkumpulan melalui praktikal dan penganjuran program.

**KKX 12303 Karatedo**

Kursus ini memperkenalkan kepada pelajar tentang peraturan, amalan dan teknik Karatedo yang betul. Kemahiran kursus ini juga didedahkan dengan penglibatan aktif pelajar melalui praktikal dan penganjuran pertandingan. Kursus ini juga dapat mencungkil bakat-bakat baru dan menarik minat untuk mewakili universiti dalam sukan Karatedo.

## Skema Pemarkahan

Gred rasmi Universiti serta markah dan maksudnya adalah seperti berikut:

| MARKAH      | GRED | NILAI GRED | PRESTASI           |
|-------------|------|------------|--------------------|
| 80 – 100    | A    | 4.00       | Cemerlang          |
| 75 – 79     | A-   | 3.67       |                    |
| 70 – 74     | B+   | 3.33       | Kepujian/Baik      |
| 65 – 69     | B    | 3.00       |                    |
| 60 – 64     | B-   | 2.67       | Sederhana          |
| 55 – 59     | C+   | 2.33       |                    |
| 50 – 54     | C    | 2.00       |                    |
| 47 – 49     | C-   | 1.67       | Pencapaian minimum |
| 44 – 46     | D+   | 1.33       |                    |
| 40 – 43     | D    | 1.00       |                    |
| 39 ke bawah | F    | 0.00       | Gagal              |

## Penganugerahan Ijazah Sarjana Muda

Penganugerahan ijazah tersebut adalah berdasarkan Purata Nilai Gred Kumulatif (PNGK) terakhir yang diperolehi. Untuk melayakkan seseorang pelajar dianugerahkan ijazah kepujian ini, pelajar hendaklah mencapai PNGK terakhir tidak kurang daripada 2.00. Tahap pencapaian penganugerahan ijazah adalah seperti berikut:

| PNGK        | Kesetaraan Kelas           |
|-------------|----------------------------|
| 3.67 - 4.00 | Kepujian (Kelas satu)      |
| 3.00 - 3.66 | Kepujian (Kelas dua atas)  |
| 2.33 - 2.99 | Kepujian (Kelas dua bawah) |
| 2.00 - 2.32 | Kepujian                   |

## **Kelab Pelajar**

### **Agribiosis**

Persatuan Pelajar Sarjana Muda Bioteknologi Pertanian  
Universiti Sultan Zainal Abidin (UniSZA)

### **Alpha**

Persatuan Pelajar Sarjana Muda Produksi dan Kesihatan Haiwan  
Universiti Sultan Zainal Abidin (UniSZA)

### **FOSSAC**

Persatuan Pelajar Sarjana Muda Teknologi Makanan  
Universiti Sultan Zainal Abidin (UniSZA)



# **Jawatankuasa Buku Panduan Prasiswazah**

## **Penasihat**

Prof Madya Dr Kamarul 'Ain Mustafa

## **Pengerusi**

Prof Madya Dr Nalini Arumugam

## **Ahli Jawatankuasa**

Prof Madya Dr Connie Fay Komilus

Prof Madya Dr John Tang Yew Huat

Dr Noor Afiza Badaluddin

Dr Nguang Siew Ing

Dr Zalilawati Mat Rashid

Salmah Mohamed

Tajul Afif Abdullah

Khairil Mahmud

Fadlina Ismail

Tuan Syaripah Najihah Tuan Mohd Razali