

FAKULTI PENGAJIAN ALAM SEKITAR

Maklumat Am

Fakulti Pengajian Alam Sekitar, Universiti Putra Malaysia (UPM), ditubuhkan pada 1 September 2004, hasil daripada penaikan taraf Jabatan Sains Alam, Fakulti Sains dan Pengajian Alam Sekitar. Penubuhan Fakulti ini adalah selari dengan hasrat kerajaan untuk menangani pelbagai isu alam sekitar semasa dan akan datang serta mencapai matlamat pembangunan mampan negara.

Fakulti Pengajian Alam Sekitar mempunyai dua jabatan iaitu Jabatan Sains Alam Sekitar dan Jabatan Pengurusan Alam Sekitar. Ketika ini, fakulti menawarkan dua (2) di peringkat pra siswazah iaitu program pengajian Bachelor Sains dan Teknologi Alam Sekitar (BSTAS) dan Bachelor Pengurusan Alam Sekitar (BPAS). Manakala, di peringkat siswazah, fakulti menawarkan program Master alam sekitar (MEnv), Master Sains (MS) dan Doktor Falsafah (PhD). Fakulti Pengajian Alam Sekitar merupakan satu-satunya badan akademik di Malaysia yang menawarkan ijazah di peringkat bachelor, master dan doktor falsafah dalam bidang alam sekitar.

Fakulti mempunyai 31 orang pegawai akademik termasuk 5 Tutor yang terdiri dari pelbagai disiplin. Selain daripada peranan pegawai akademik di dalam pengajaran, mereka juga terlibat dalam pelbagai projek penyelidikan iaitu samada kerjasama dengan beberapa fakulti di UPM, lain-lain agensi tempatan dan luar negara. Di antara agensi-agensi tersebut ialah Kementerian Sumber Asli dan Alam Sekitar, Kementerian Pertanian dan Industri Asas Tani, Kementerian Perumahan dan Kerajaan Tempatan, Kementerian Kesihatan, Kementerian Pelajaran, Japanese International Cooperation Agency (JICA), Asia Forum for Parliamentarians on Population and Development (AFPPD), European Union, United Nation Education Programme dan lain-lain. Fakulti juga mempunyai unit perkhidmatan profesional dan jaringan industri, Profesional Environment Services (PES) yang berperanan menyediakan khidmat perundingan, penyelidikan dan latihan khususnya yang berkaitan dengan berkaitan dengan projek Penilaian Kesan Alam Sekitar (EIA), penilaian kesan sosial (SIA), pelan pengurusan alam sekitar (EMP) dan lain-lain.

Menyedari peningkatan isu dan masalah alam sekitar khususnya di dalam penyelidikan, Fakulti juga telah menubuhkan Pusat Kecemerlangan Forensik Alam Sekitar (iForensic) pada September 2008. Tujuan utama penubuhan unit ini adalah untuk menyediakan dan melaksanakan penyiasatan forensik alam sekitar secara pantas terhadap sesuatu isu alam sekitar di Malaysia. Di samping mempunyai kemudahan peralatan makmal yang berteknologi terkini, ia juga mampu menghasilkan hasil kajian yang berkualiti melalui penglibatan kepakaran sedia ada.

FACULTY OF ENVIRONMENTAL STUDIES

General Information

The Faculty of Environmental Studies, Universiti Putra Malaysia (UPM) was established on the 1st September, 2004 when the Department of Environmental Science from the Faculty of Science and Environmental Studies was upgraded to Faculty level. The establishment of this faculty is in line with the government's aim in addressing the current and future environmental issues and in achieving the national sustainable development goals.

The Faculty of Environmental Studies has two departments, namely the Department of Environmental Sciences and Department of Environmental Management. Currently, the program offered by the faculty includes Bachelor in Environmental Science and Technology (BEST), Bachelor of Environmental Management (BEM), Master of Environment (MEnv), Master of Science (MS) and Doctor of Philosophy (PhD). The Faculty of Environmental Studies, Universiti Putra Malaysia, is the only academic body in Malaysia which offers Bachelor, Masters and Doctorate level degrees in the field of environmental science and management.

These faculties have 31 academic staffs and 5 tutors who come from various disciplines. Apart from teaching, the academic staffs are also involved in varied research projects, whether in collaboration with other faculties in UPM as well as other agencies, both local and foreign. The agencies involved includes the Ministry of Natural Resources Environment, Ministry of Agriculture and Agro-based Industry, Ministry of Housing and Local Government, Ministry of Health, Ministry of Higher Education, Ministry of Education, Japanese International Cooperation Agency (JICA), Asian Forum for Parliamentarians on Population Development (AFPPD), the European Union and the United Nations Education Program among others. Besides that, the faculty consultancy services unit, i.e. the Professional Environment Services (PES) unit, provides consultancy services to public and private organizations that is related to Environmental Impact Assessment (EIA), Social Impact Assessment (SIA) and Environmental Management Plans (EMP), short courses and other consultancy services.

Realizing the increasing issues and problems of the environment, specifically in the research, the faculty have founded a Centre for Environmental Forensic Excellence (iForensic) on September 2008. The main purpose of having this centre is to plan and execute environmental forensic investigation in dealing with any particular environmental issue in Malaysia. Other than having the latest technology of equipments laboratory, this centre also produce a quality result through the expertise that the faculty have.

Pengurusan Fakulti / Faculty Management

Dekan/ Dean

Prof. Madya Dr. Ramdzani Abdullah

Timbalan Dekan (Akademik dan Hal Ehwal Pelajar)

Deputy Dean (Academic and Student Affairs)

Prof. Madya Dr Ahmad Makmom Hj. Abdullah

Timbalan Dekan (Siswazah, Penyelidikan dan Pembangunan)

Deputy Dean (Graduate, Research and Development)

Prof. Dr. Mohamad Pauzi Zakaria

Ketua Jabatan Sains Alam Sekitar

Head Department of Environmental Sciences

Prof. Madya Dr. Puziah Abdul Latif

Ketua Jabatan Pengurusan Alam Sekitar

Head Department of Environmental Management

Prof. Madya Dr. Mohd Rusli Yacob

Ketua Penolong Pendaftar

Chief Assistant Registrar

En. Mohd Hussin Abdul Rahim

Program Prasiswazah yang ditawarkan

Bachelor / Bachelor

1. Bachelor Sains Dan Teknologi Alam Sekitar/ *Bachelor of Environmental Science and Technology*
2. Bachelor Pengurusan Alam Sekitar/ *Bachelor of Environmental Management*

STRUKTUR KURIKULUM / CURRICULUM STRUCTURE

Nama Program : **Bachelor Pengurusan Alam Sekitar/ *Bachelor of Environmental Management***

Jumlah Kredit Bergraduat : **133 Jam Kredit / *Credit Hours***

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

1. Kursus Universiti/ University Courses (24 Kredit / Credits)

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A/T
BBI2423	<i>Academic Interaction and Presentation</i>	3	2	1
BBI2424	<i>Academic Writing</i>	3	2	1
PRT2008	<i>Pertanian dan Manusia/ Agriculture and Human</i>	2	2	0
ECN3100	<i>Prinsip Ekonomi/ Principles Of Economics</i>	3	3	0
EMG3001	<i>Manusia dan Alam Sekitar/ Man And Environment</i>	3	3	0
MGM3101	<i>Prinsip Pengurusan/ Principles Of Management</i>	3	3	0
SKP2203	<i>Tamadun Islam Tamadun Asia/ Islamic Civilization and Asian Civilization</i>	2	2	0
SKP2204	<i>Hubungan Etnik/ Ethnic Relations</i>	2	2	0
SKP2101	<i>Kenegaraan Malaysia/ Malaysian Nationhood</i>	3	3	0

2. Kursus Teras/ Core Courses (76 Kredit / 76 Credits)

i. Kursus Fakulti Lain / Courses from others faculties (10 Kredit / Credits)

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
ACT2112	<i>Perakaunan Pengenalan/ Introductory Accounting</i>	4	3	1
MGM3211	<i>Prinsip Pemasaran/ Principles Of Marketing</i>	3	3	0
MGM3180	<i>Asas Keusahawanan/ Basic Entrepreneurship</i>	3	2	1

ii. Kursus Dari Fakulti Pengajian Alam Sekitar/ Faculty of Environmental Studies (66 Kredit / Credits)

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
EMG3003	<i>Sistem Maklumat Alam Sekitar/ Environmental Information Systems</i>	3	2	1
EMG3004	<i>Sains Biologi Untuk Pengurusan Alam Sekitar/ Biological Sciences for Environmental Management</i>	3	3	0
EMG3005	<i>Sains Fizikal Untuk Pengurusan Alam Sekitar/ Physical Sciences for Environmental Management</i>	3	3	0
EMG3006	<i>Amali Sains dan Geografi untuk Pengurusan Alam Sekitar/ Science and Geography Practicals for Environmental Management</i>	3	0	3

EMG3007	Kaedah Kuantitatif Untuk Pengurusan Alam Sekitar/ <i>Quantitative Methods for Environmental Management</i>	3	1	2
EMG3103	Pengurusan Kualiti Air dan Udara/ <i>Air and Water Quality Management</i>	3	3	0
EMG3104	Prinsip Pengurusan Sisa Pepejal/ <i>Principles of Solid Waste Management</i>	3	3	0
EMG3202	Penilaian Kesan Alam Sekitar/ <i>Environmental Impact Assessment</i>	2	2	0
EMG3203	Pengenalan Perancangan Alam Sekitar/ <i>Introduction to Environmental Planning</i>	3	3	0
EMG3204	Studio Perancangan Alam Sekitar II/ <i>Environmental Planning Studio I</i>	3	0	3
EMG3302	Ekonomi dan Pengurusan Alam Sekitar/ <i>Environmental Economics and Management</i>	3	3	0
EMG3303	Pengurusan dan Operasi Projek/ <i>Project Management and Operation</i>	3	3	0
EMG3501	Prinsip Undang-undang Alam Sekitar/ <i>Principles of Environmental Law</i>	3	3	0
EMP4901	Latihan Industri/ <i>Industrial Training</i>	12	0	12
EMG4999	Projek Ilmiah Tahun Akhir/ <i>Final Year Project</i>	6	0	6
EMG4103	Pengurusan Sumber Asli/ <i>Natural Resource Management</i>	3	3	0
EMG4204	Studio Perancangan Alam Sekitar II/ <i>Environmental Planning Studio II</i>	3	1	2
EMG4801	Kerja Lapangan Pengurusan Alam Sekitar/ <i>Environmental Management Fieldwork</i>	2	0	2
EMG4991	Seminar Pengurusan Alam Sekitar/ <i>Environmental Management Seminar</i>	2	1	1

3. Kursus Elektif/ *Elective Courses* (33 Kredit / *Credits*)

i. Kursus Elektif Ekonomi dan Pengurusan/ *Economics and Management Elective Courses* (sekurangnyanya 6 kredit / *at least 6 credits*)

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A/T
ACT3211	Pengurusan Kewangan/ <i>Financial Management</i>	3	3	0
ECN3101	Mikroekonomi I/ <i>Microeconomics I</i>	3	3	0
MGM3113	Gelagat Organisasi/ <i>Organizational Behavior</i>	3	3	0
MGM3123	Pengurusan Sumber Manusia/ <i>Human Resource Management</i>	3	3	0
MGM4183	Keusahawanan/ <i>Entrepreneurship</i>	3	3	0

ii. Kursus Elektif Pengurusan Alam Sekitar/ *Environmental Management Elective Courses* (sekurangnyanya 24 kredit / *at least 24 credits*)

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A/T
EMG3205	Geografi Fizikal/ <i>Physical Geography</i>	3	3	0

EMG3401	Masyarakat, Etika dan Alam Sekitar/ <i>Society, Ethics and the Environment</i>	3	3	0
EMG3402	Kaedah Penyelidikan Kualitatif untuk Alam Sekitar/ <i>Qualitative Research Methods for the Environment</i>	4	3	1
EMG4001	Statistik untuk Perancangan dan Pengurusan Alam Sekitar/ <i>Statistics for Environmental Planning and Management</i>	3	2	1
EMG4101	Pengurusan Zon Pinggir Laut/ <i>Coastal Zone Management</i>	3	3	0
EMG4102	Sistem Pengurusan Kualiti Alam Sekitar/ <i>Environmental Quality Management Systems</i>	3	3	0
EMG4104	Pengurusan Sumber Persisir Pantai/ <i>Coastal Resources Management</i>	3	3	0
EMG4105	Pengurusan Projek Dalam Sekitaran Terkawal/ <i>Management of Projects in Controlled Environments</i>	3	2	1
EMG4106	Perubahan Alam Sekitar dan Isu Semasa/ <i>Environmental Change and Current Issues</i>	2	2	0
EMG4202	Perancangan Pengangkutan/ <i>Transport Planning</i>	3	3	0
EMG4203	Perancangan dan Pengurusan Alam Sekitar Gunaan/ <i>Applied Environmental Planning and Management</i>	3	2	1
EMG4205	Perancangan Respons Tumpahan Minyak/ <i>Oil Spill Response Planning</i>	2	2	0
EMG4401	Geografi Kemanusiaan/ <i>Human Geography</i>	3	3	0
EMG4402	Gender dan Pengurusan Bersepadu Sumber Asli/ <i>Gender and Integrated Natural Resources Management</i>	3	2	1
EMG4501	Polisi dan Pentadbiran Alam Sekitar/ <i>Policy and Environmental Administration</i>	3	3	0
EMG4502	Undang-undang Alam Sekitar dan Perancangan/ <i>Environmental Law and Planning</i>	3	3	0
EMG4503	Undang-undang Pengurusan Sisa/ <i>Waste Management Laws</i>	4	4	0

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

Nota/Notes :

1. Pelajar diwajibkan memilih **2 kredit** daripada **kursus kokurikulum** yang ditawarkan oleh universiti/ It is *compulsory for students to take 2 credits of co-curriculum courses offered by the university*
2. Pelajar perlu melengkapkan pakej keperluan bahasa inggeris seperti jadual di bawah :
(Butiran lanjut mengenai CEL dan LAX sila rujuk di muka surat belakang buku panduan ini)
Students need to complete the english package as the table below: For more details on CEL and LAX please refer to the back/last page of this book.

MUET Band	Graduation Requirements for 4-year programmes
1 & 2	3 BBI + 3 CEL + 24 LAX points
3 & 4	2 BBI + 2 CEL + 36 LAX points
5 & 6	3 CEL + 36 LAX points

SKEMA PENGAJIAN/ STUDY SCHEME

TAHUN 1 / 1st YEAR

SEMESTER 1 / 1st SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A/T
BBI2423	<i>Academic Interaction and Presentation</i>	3	2	1
MGM3101	Prinsip Pengurusan/ <i>Principles Of Management</i>	3	3	0
EMG3001	Manusia dan Alam Sekitar/ <i>Man And Environment</i>	3	3	0
EMG3004	Sains Biologi Untuk Pengurusan Alam Sekitar/ <i>Biological Sciences for Environmental Management</i>	3	3	0
EMG3005	Sains Fizikal Untuk Pengurusan Alam Sekitar/ <i>Physical Sciences for Environmental Management</i>	3	3	0
EMG3007	Kaedah Kuantitatif Untuk Pengurusan Alam Sekitar/ <i>Quantitative Methods for Environmental Management</i>	3	1	2
JUMLAH/ TOTAL		18	15	3

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A/T
PRT2008	Pertanian dan Manusia/ <i>Agriculture and Human</i>	2	2	0
BBI2424	<i>Academic Writing</i>	3	2	1
SKP2101	Kenegaraan Malaysia/ <i>Malaysian Nationhood</i>	3	3	0
MGM3211	Prinsip Pemasaran/ <i>Principles Of Marketing</i>	3	3	0
ECN3100	Prinsip Ekonomi/ <i>Principles Of Economics</i>	3	3	0
EMG3006	Amali Sains dan Geografi untuk Pengurusan Alam Sekitar/ <i>Science and Geography Practicals for Environmental Management</i>	3	0	3
	Ko-kurikulum/ <i>Co-curriculum</i>	1	0	1
JUMLAH/ TOTAL		18	13	5

TAHUN 2 / 2ND YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A/T
SKP2203	Tamadun Islam Tamadun Asia/ <i>Islamic Civilization and Asian Civilization</i>	2	2	0
ACT2112	Perakaunan Pengenalan/ <i>Introductory Accounting</i>	4	3	1
EMG3003	Sistem Maklumat Alam Sekitar/ <i>Environmental Information Systems</i>	3	2	1
EMG3103	Pengurusan Kualiti Air dan Udara/ <i>Air and Water Quality Management</i>	3	3	0
EMG3203	Pengenalan Perancangan Alam Sekitar/ <i>Introduction to Environmental Planning</i>	3	2	1
EMG3104	Prinsip Pengurusan Sisa Pepejal/ <i>Principles of Solid Waste Management</i>	3	3	0
JUMLAH/ TOTAL		18	16	2

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
SKP2204	Hubungan Etnik/ <i>Ethnic Relations</i>	2	2	0
EMG3204	Studio Perancangan Alam Sekitar I/ <i>Environmental Planning Studio I</i>	3	0	3
EMG3302	Ekonomi dan Pengurusan Alam Sekitar/ <i>Environmental Economics and Management</i>	3	3	0
EMG3501	Prinsip Undang-undang Alam Sekitar/ <i>Principles of Environmental Law</i>	3	3	0
EMG3303	Pengurusan dan Operasi Projek/ <i>Project Management and Operation</i>	3	3	0
EMG4991	Seminar Pengurusan Alam Sekitar/ <i>Environmental Management Seminar</i>	2	1	1
	Elektif/ <i>Elective</i>	2	0	0
	JUMLAH/ TOTAL	18	12	4

TAHUN 3 / 3RD YEAR

SEMESTER 1 / 1ST YEAR

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
EMG3202	Penilaian Kesan Alam Sekitar/ <i>Environmental Impact Assessment</i>	2	2	0
EMG4103	Pengurusan Sumber Asli/ <i>Natural Resource Management</i>	3	3	0
EMG4204	Studio Perancangan Alam Sekitar II/ <i>Environmental Planning Studio II</i>	3	1	2
EMG4801	Kerja Lapangan Pengurusan Alam Sekitar/ <i>Environmental Management Fieldwork</i>	2	0	2
	Elektif/ <i>Elective</i>	7	0	0
	Ko-kurikulum/ <i>Co-curriculum</i>	1	0	1
	JUMLAH/ TOTAL	18	6	5

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
EMP4901	Latihan Industri/ <i>Industrial Training</i>	12	0	12
	JUMLAH/ TOTAL	12	0	12

TAHUN 4 / 4TH YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
EMG4999A	Projek Ilmiah Tahun Akhir/ <i>Final Year Project</i>	3	0	3
MGM3180	Asas Keusahawanan/ <i>Basic Entrepreneurship</i>	3	2	1
	Elektif/ <i>Elective</i>	12	0	0
	JUMLAH/ TOTAL	18	2	4

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
EMG4999B	Projek Ilmiah Tahun Akhir/ <i>Final Year Project</i>	3	0	3
	Elektif/ <i>Elective</i>	12	0	0
JUMLAH/ TOTAL		15	12	3

Nota : Pelajar diwajibkan memilih 2 kredit daripada kursus ko-kurikulum yang ditawarkan oleh universiti/ *Students are required to take 2 credits of co-curriculum courses offered by the university*

STRUKTUR KURIKULUM / CURRICULUM STRUCTURES

Nama Program : **Bachelor Sains Dan Teknologi Alam Sekitar/ *Bachelor of Environmental Science and Technology***

Jumlah Kredit Bergraduat : **131 Jam Kredit / *Credit Hours***

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

1. Kursus Universiti/ *University Courses* (20 Kredit / *Credits*)

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
BBI2423	<i>Academic Interaction and Presentation</i>	3	2	1
BBI2424	<i>Academic Writing</i>	3	2	1
EMG3001	Manusia dan Alam Sekitar/ <i>Man And Environment</i>	3	3	0
PRT2008	Pertanian dan Manusia/ <i>Agriculture and Human</i>	2	2	0
SKP2101	Kenegaraan Malaysia/ <i>Malaysian Nationhood</i>	3	3	0
SKP2203	Tamadun Islam Tamadun Asia/ <i>Islamic Civilization and Asian Civilization</i>	2	2	0
SKP2204	Hubungan Etnik/ <i>Ethnic Relations</i>	2	2	0
	Ko-kurikulum/ <i>Co-curriculum</i>	2	0	2

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

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
ECN3100	Prinsip Ekonomi/ <i>Principles Of Economics</i>	3	3	0
EMG3202	Penilaian Kesan Alam Sekitar/ <i>Environmental Impact Assessment</i>	2	2	0
EMG3401	Masyarakat, Etika dan Alam Sekitar/ <i>Society, Ethics and the Environment</i>	3	3	0
EMG3502	Undang-undang Kawalan Pencemaran Alam Sekitar/ <i>Law Of Environmental Pollution Control</i>	3	3	0
ESC3001	Teknik Pengukuran Alam Sekitar/ <i>Environmental Measurement Techniques</i>	3	2	1
ESC3002	Prinsip Kimia Dalam Alam Sekitar/ <i>Chemical Principles In The Environment</i>	4	3	1
ESC3010	Sains Tanah dan Air/ <i>Soil And Water Sciences</i>	3	2	1
ESC3011	Pengenalan Sains Atmosfera/ <i>Introduction To Atmospheric Sciences</i>	3	2	1
ESC3006	Prinsip Fizik Alam Sekitar/ <i>Principles Of Environmental Physics</i>	4	3	1
ESC3007	Prinsip Biologi Alam Sekitar/ <i>Principles Of Environmental Biology</i>	4	3	1
ESC3012	Teknologi Rawatan Sisa Pepejal/ <i>Solid Waste Treatment Technology</i>	3	3	0
ESC3009	Analisis dan Instrumentasi Alam Sekitar/ <i>Instrumentation And Environmental Analysis</i>	3	2	1
ESC3101	Prinsip Kesihatan Alam Sekitar/ <i>Principles Of Environmental Health</i>	3	2	1
ESC3203	Hidrologi Alam Sekitar/ <i>Environmental Hydrology</i>	3	2	1

ESC3204	Rawatan Air Sisa/ <i>Wastewater Treatment</i>	3	2	1
ESC3501	Sistem Maklumat Geografi Alam Sekitar/ <i>Environmental Geographic Information Systems</i>	3	2	1
ESC4514	Keusahawanan Dalam Alam Sekitar/ <i>Entrepreneurship In Environment</i>	3	2	1
ESC4901	Latihan Industri/ <i>Industrial Training</i>	12	0	12
ESC4999	Projek Ilmiah Tahun Akhir/ <i>Final Year Project</i>	6	0	6
MTH3003	Statistik bagi Sains Gunaan/ <i>Statistics For Applied Sciences</i>	4	3	1
MTH3100	Kalkulus/ <i>Calculus</i>	3	3	0

3. Kursus Elektif/ *Elective Courses* (33 kredit/ credits)

- i. Sains Alam Sekitar/ *environmental sciences* (Pilih 12 jam kredit / *Choose 12 credit hours*)

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
ESC4101	Penilaian Risiko dan Kesihatan Alam Sekitar/ <i>Environmental Health Risk Assessment</i>	3	3	0
ESC4201	Pengurusan Kualiti Air Sungai/ <i>River Water Quality Management</i>	3	3	0
ESC4202	Hidrogeologi/ <i>Hydrogeology</i>	3	2	1
ESC4204	Analisis Lembangan/ <i>Watershed Analysis</i>	3	3	0
ESC4205	Kimia Marin/ <i>Marine Chemistry</i>	3	2	1
ESC4301	Pemencilan Karbon dan Perubahan Iklim Carbon <i>Sequestration And Climate Changes</i>	3	2	1
ESC4406	Geofizik Alam Sekitar/ <i>Environmental Geophysics</i>	3	3	0
ESC4502	Respons Kecemasan Alam Sekitar/ <i>Environmental Emergency Response</i>	3	3	0
ESC4503	Biologi Pencemaran/ <i>Pollution Biology</i>	3	2	1
ESC4505	Ekologi Industri/ <i>Industrial Ecology</i>	3	3	0
ESC4507	Forensik Alam Sekitar/ <i>Environmental Forensics</i>	3	2	1
ESC4508	Biodiversiti dan Pemuliharaan/ <i>Biodiversity And Conservation</i>	3	3	0
ESC4509	Ekologi Sumber Asli/ <i>Ecology Of Natural Resources</i>	3	.3	0
ESC4510	Biofizik Alam Sekitar/ <i>Environmental Biophysics</i>	3	2	1
ESC4512	Kimia Alam Sekitar Lanjutan/ <i>Advance Environmental Chemistry</i>	3	2	1

- ii. Teknologi Alam Sekitar/ *Environmental Technology* (Pilih 15 jam kredit / *Choose 15 credit hours*)

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
ESC3205	Rawatan Air Minum/ <i>Drinking Water Treatment</i>	3	3	0
ESC3507	Envirometriks/ <i>Envirometrics</i>	3	2	1
ESC4102	Penilaian Pendedahan Pencemaran/ <i>Pollution Exposure Assessment</i>	3	2	1

ESC4303	Teknologi Pengawalan Pencemaran Udara/ <i>Air Pollution Control Technology</i>	3	3	0
ESC4401	Teknik Penyiasatan Subpermukaan/ <i>Subsurface Investigation Technique</i>	3	3	0
ESC4404	Teknologi Rawatan Sisa Berbahaya/ <i>Hazardous Waste Treatment Technology</i>	3	3	0
ESC4504	Pemodelan Sistem Alam Sekitar/ <i>Environmental Modeling</i>	3	2	1
ESC4506	Teknologi Pintar untuk Alam Sekitar/ <i>Intelligent Technology For Environment</i>	3	3	0
ESC4511	Penderiaan Jauh Alam Sekitar/ <i>Environmental Remote Sensing</i>	3	2	1
ESC4513	Bioremediasi Alam Sekitar/ <i>Environmental Bioremediation</i>	3	2	1
ESC4603	Sistem Tenaga dan Alam Sekitar/ <i>Energy System And Environment</i>	3	3	0

- iii. Pengurusan dan Pentadbiran Alam Sekitar/ *Management and Administration Environmental* (Pilih 6 jam kredit / *Choose 6 credit hours*).

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
EMG3302	Ekonomi dan Pengurusan Alam Sekitar/ <i>Environmental Economics and Management</i>	3	3	0
EMG4202	Perancangan Pengangkutan/ <i>Transport Planning</i>	3	3	0
EMG4501	Polisi dan Pentadbiran Alam Sekitar/ <i>Policy and Environmental Administration</i>	3	3	0

Nota/ Notes : Kr = Jam Kredit/ Credit Hour, K = Kredit/ Credit, A = Amali/ Laboratory, T = Tutorial

Nota Penting/Notes :

1. Pelajar diwajibkan memilih **2 kredit** daripada **kursus kokurikulum** yang ditawarkan oleh universiti/ It is *compulsory for students to take 2 credits of co-curriculum courses offered by the university*
2. Pelajar perlu melengkapkan pakej keperluan bahasa inggeris seperti jadual di bawah : (Butiran lanjut mengenai CEL dan LAX sila rujuk di muka surat belakang buku panduan ini)
Students need to complete the english package as the table below : For more details on CEL and LAX please refer to the back/last page of this book.

MUET Band	Graduation Requirements for 4-year programmes
1 & 2	3 BBI + 3 CEL + 24 LAX points
3 & 4	2 BBI + 2 CEL + 36 LAX points
5 & 6	3 CEL + 36 LAX points

SKEMA PENGAJIAN/ STUDY SCHEME

TAHUN 1 / 1ST YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
EMG3001	Manusia dan Alam Sekitar/ <i>Man And Environment</i>	3	3	0
ESC3006	Prinsip Fizik Alam Sekitar/ <i>Principles Of Environmental Physics</i>	4	3	1
ESC3101	Prinsip Kesihatan Alam Sekitar/ <i>Principles Of Environmental Health</i>	3	2	1
PRT2008	Pertanian dan Manusia/ <i>Agriculture and Human</i>	2	2	0
SKP2203	Tamadun Islam Tamadun Asia/ <i>Islamic Civilization and Asian Civilization</i>	2	2	0
SKP2204	Hubungan Etnik/ <i>Ethnic Relations</i>	2	2	0
JUMLAH/ TOTAL		16	14	2

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
ESC3001	Teknik Pengukuran Alam Sekitar/ <i>Environmental Measurement Techniques</i>	3	2	1
BBI2423	<i>Academic Interaction and Presentation</i>	3	2	1
ESC3002	Prinsip Kimia Dalam Alam Sekitar/ <i>Chemical Principles In The Environment</i>	4	3	1
ESC3007	Prinsip Biologi Alam Sekitar/ <i>Principles Of Environmental Biology</i>	4	3	1
SKP2101	Kenegaraan Malaysia/ <i>Malaysian Nationhood</i>	3	3	0
	Ko-kurikulum/ <i>Co-curriculum</i>	1	0	1
JUMLAH/ TOTAL		18	13	5

TAHUN 2 / 2ND YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
BBI2424	<i>Academic Writing</i>	3	2	1
EMG3401	Masyarakat, Etika dan Alam Sekitar/ <i>Society, Ethics and the Environment</i>	3	3	0
ESC3010	Sains Tanah dan Air/ <i>Soil And Water Sciences</i>	3	2	1
ESC3011	Pengenalan Sains Atmosfera/ <i>Introduction To Atmospheric Sciences</i>	3	2	1
MTH3100	Kalkulus/ <i>Culculus</i>	3	3	0
	Elektif/ <i>Elective</i>	3	3	0
JUMLAH/ TOTAL		18	15	3

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
ECN3100	Prinsip Ekonomi/ <i>Principles Of Economics</i>	3	3	0
ESC3012	Teknologi Rawatan Sisa Pepejal/ <i>Solid Waste Treatment Technology</i>	3	3	0
ESC3009	Analisis dan Instrumentasi Alam Sekitar/ <i>Instrumentation And Environmental Analysis</i>	3	2	1
MTH3003	Statistik bagi Sains Gunaan/ <i>Statistics For Applied Sciences</i>	4	3	1
	Ko-kurikulum/ <i>Co-curriculum</i>	1	0	1
	Elektif/ <i>Elective</i>	3	3	0
JUMLAH/ TOTAL		17	14	3

TAHUN 3 / 3RD YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
ESC3203	Hidrologi Alam Sekitar/ <i>Environmental Hydrology</i>	3	2	1
ESC3204	Rawatan Air Sisa/ <i>Wastewater Treatment</i>	3	2	1
ESC3501	Sistem Maklumat Geografi Alam Sekitar/ <i>Environmental Geographic Information Systems</i>	3	2	1
	Elektif/ <i>Elective</i>	9	9	0
JUMLAH/ TOTAL		18	15	3

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
EMG3502	Undang-undang Kawalan Pencemaran Alam Sekitar/ <i>Law Of Environmental Pollution Contro</i>	3	3	0
ESC4999A	Projek Ilmiah Tahun Akhir/ <i>Final Year Project</i>	3	0	3
ESC4514	Keusahawanan Dalam Alam Sekitar/ <i>Entrepreneurship In Environment</i>	3	2	1
	Elektif/ <i>Elective</i>	9	8	1
JUMLAH/ TOTAL		18	13	5

TAHUN 4 / 4TH YEAR

SEMESTER 1 / 1ST SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
ESC4999B	Projek Ilmiah Tahun Akhir/ <i>Final Year Project</i>	3	0	3
EMG3202	Penilaian Kesan Alam Sekitar/ <i>Environmental Impact Assessment</i>	2	2	0
	Elektif/ <i>Elective</i>	9	8	1
JUMLAH/ TOTAL		14	10	4

SEMESTER 2 / 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/COURSE NAME	Kr	K	A
ESC4901	Latihan Industri/ <i>Industrial Training</i>	12	0	12
JUMLAH/ TOTAL		12	0	12

Nota : Pelajar diwajibkan memilih 2 kredit daripada kursus ko-kurikulum yang ditawarkan oleh universiti/ *Students are required to take 2 credits of co-curriculum courses offered by the university*

SINOPSIS KURSUS / COURSE SYNOPSIS

Jabatan Pengurusan Alam Sekitar/ Department of Environmental Management

EMG3001 Manusia dan Alam Sekitar/ *Man And Environment* 3(3+0)

Prasyarat : Tiada

Kursus ini merangkumi prinsip dan konsep berkenaan bumi dan sistem cakerawala, proses fizikal, kimia dan biologi yang menyokong sistem sokongan kehidupan di bumi ekologi dan ekosistem. Kesan aktiviti manusia ke atas alam sekitar, pencemaran dan pengurusannya juga dibincangkan.

This course covers principles and concepts about the earth and the solar system, physical, chemical, and biological processes that shape the earth's life support system, ecology and ecosystems. Impacts of human activities on the environment, pollution and its management are discussed

EMG3003 Sistem Maklumat Alam Sekitar/ *Environmental Information Systems* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi pengenalan sumber maklumat alam sekitar, kaedah pengumpulan dan pengurusan pangkalan data, mencari dan membentangkan maklumat. Teknik pemerhatian jarak jauh, kajian sosial dan jaringan pengawasan juga diaplikasikan. Pengurusan pangkalan data melalui penggunaan program komputer diperkenalkan.

This course covers identification of sources of environmental information, methods of collecting, abstracting and presenting information, and database management. Remote sensing techniques, social studies and monitoring networks are applied. Database management using computers and programs are also introduced.

EMG3004 Sains Biologi Untuk Pengurusan Alam Sekitar/ *Biological Sciences for Environmental Management* 3 (3 + 0)

Prasyarat : Tiada

Kursus ini merangkumi aplikasi konsep asas biologi dalam pengajian alam sekitar. Kitaran biogeokimia dan pengaliran bahan kimia melalui litosfera, atmosfera, hidrosfera, biosfera serta kesannya ke atas sistem biologi dan manusia juga dibincangkan.

This course covers the application of basic biological concepts in the study of the environment. Biogeochemical cycles and chemical material transport through the lithosphere, atmosphere, hydrosphere, biosphere as well as their effects on biological systems and humans are discussed.

EMG3005 Sains Fizikal Untuk Pengurusan Alam Sekitar/ *Physical Sciences for Environmental Management* 3 (3 + 0)

Prasyarat : Tiada

Kursus ini merangkumi prinsip fizik dan kimia serta aplikasinya terhadap fenomena alam sekitar. Proses fizikal yang mempengaruhi alam sekitar, kesan aktiviti manusia dan parameter fisiko-kimia yang mencemarkan alam sekitar juga diperkenalkan.

This course covers physical and chemical principles and their application to environmental phenomena. Physical processes that influence the environment, effects of human activities and physico-chemical parameters that pollute the environment are introduced.

EMG3006 Amali Sains dan Geografi untuk Pengurusan Alam Sekitar/ 3 (0 + 3)
Science and Geography Practicals for Environmental Management

Prasyarat : EMG3004 dan EMG3005

Kursus ini merangkumi kaedah pengukuran bahan alam sekitar dalam makmal dan lapangan, keselamatan makmal, alatan pengukuran dan piawaian rujukan bahan.

This course covers methods for the measurement of environmental materials in the laboratory and field, laboratory safety, measuring instruments and standard reference materials.

EMG3007 Kaedah Kuantitatif Untuk Pengurusan Alam Sekitar/ 3 (1+2)
Quantitative Methods for Environmental Management

Prasyarat : Tiada

Kursus ini merangkumi kaedah matematik dan statistik bagi menganalisis data untuk pengurusan alam sekitar. Tumpuan diberikan kepada asas aljabar dan persamaan, fungsi eksponen, trigonometri, geometri dan pengenalan kalkulus. Kaedah statistik termasuk kebarangkalian, statistik tak berparameter, regresi dan korelasi akan diuraikan.

This course covers mathematical and statistical methods used in the analysis of data for environmental management. Basic algebra and equations, exponential, trigonometry, geometry and introductory calculus are emphasised. Topics in statistic include probability, non-parametric statistics, regression and correlation are explained.

EMG3103 Pengurusan Kualiti Air dan Udara/ Air and Water Quality 3 (3+0)
Management

Prasyarat : Tiada

Kursus ini merangkumi konsep asas mengenai pencemaran air dan udara. Tumpuan diberikan kepada teknologi dan sistem pengurusan yang digunakan untuk mengawal pencemaran air dan udara.

This course covers the basic concepts of water and air pollution. Technologies and management systems used to control water and air pollution are emphasized.

EMG3104 Prinsip Pengurusan Sisa Pepejal/ Principles of Solid 3 (3+0)
Waste Management

Prasyarat : Tiada

Kursus ini merangkumi aspek perancangan, pengurusan, teknologi, ekonomi dan perundangan untuk enam elemen asas di dalam pengurusan sisa pepejal. Tumpuan juga diberikan terhadap pengubalan sistem kitar semula sisa, pembangunan tapak pelupusan serta lain-lain teknologi untuk pengolakan sisa pepejal. Penyediaan laporan teknikal juga akan dibincangkan.

This course covers the planning, management, technological, economic and legal aspects of six functional elements in solid waste management. Emphasis will be given towards recycling systems, development of waste disposal sites and other technologies for waste treatment. The preparation of technical reports will also be discussed.

EMG3202 Penilaian Kesan Alam Sekitar/ Environmental Impact 2(2+0)
Assessment

Prasyarat : EMG3001

Kursus ini merangkumi penggunaan Penilaian Kesan Alam Sekitar (EIA) dalam perancangan sesuatu projek pembangunan. Kaedah EIA yang sering digunakan dalam sesuatu penilaian juga dibincangkan.

This course covers the use of the Environmental Impact Assessment (EIA) method in planning of developmental projects. EIA methodologies that are commonly used are discussed.

EMG3203	Pengenalan Perancangan Alam Sekitar/ <i>Introduction to Environmental Planning</i>	3 (3 + 0)
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Prasyarat : Tiada

Kursus ini merangkumi prinsip asas dan teori asas perancangan serta pelbagai kaedah perancangan terkini. Aspek perancangan fizikal seperti kajian pelan induk, pelan tempatan, pelan strategik dan penggunaan pawaian perancangan diperkenalkan. Hubungkait antara perancangan, pengurusan, pemeliharaan alam sekitar dan Sistem Maklumat Geografi turut diberi perhatian.

This course covers the basic principles and theories of planning as well as various recent planning methods and techniques. Physical planning aspects such as structure plans, local plans, strategic plans and planning standards are introduced. The relationships between planning, management, environmental conservation, rehabilitation and Geographic Information Systems will be emphasized.

EMG3204	Studio Perancangan Alam Sekitar I/ <i>Environmental Planning Studio I</i>	3 (0+3)
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Prasyarat : Tiada

Kursus ini merangkumi konsep asas mengenai perancangan alam sekitar dan kegunaan kerja studio untuk menghasilkan pelan perancangan projek bersifat praktikal. Kegunaan kaedah penderiaan jauh dan perisian GIS turut dibincangkan. Kemahiran ini digunakan semasa menganalisis isu perancangan serta pembentukan penyelesaiannya.

This course covers the basic concepts of environmental planning and the use of studio work in developing practical planning projects. The use of remote sensing methods and GIS software will be discussed. These skills will be applied in the analysis of a planning issue and the development of a solution.

EMG3205	Geografi Fizikal/ <i>Physical Geography</i>	3 (3+0)
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Prasyarat : Tiada

Kursus ini merangkumi isu asas dalam geografi fizikal dan menganalisis implikasi penyelidikan terkini. Interaksi global yang melibatkan sistem atmosfera, lautan, ekosistem, dan geologi diberi tumpuan. Pengaruh proses global dan perubahan alam sekitar ke atas keadaan bentuk muka bumi dan bentuk landskap juga dibincangkan.

This course covers the fundamental issues in physical geography and analyses the implications of recent research. Global interactions involving the atmosphere, oceans, ecosystems, and geologic and earth surface processes will be emphasised. The influence of global processes and environmental changes on the nature of landforms and landscapes will be discussed.

EMG3302	Ekonomi dan Pengurusan Alam Sekitar/ <i>Environmental Economics and Management</i>	3 (3+0)
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Prasyarat : EGN3100

Kursus ini merangkumi pendekatan ekonomi dalam mentafsir masalah alam sekitar dan menilai penyelesaian dasar. Tumpuan diberikan kepada kegagalan pasaran dan kesan luaran, penyelesaian lazim dan ekonomi untuk masalah alam sekitar. Pendekatan analisis risiko, analisis kos-faedah, kajian kes masalah alam sekitar, serta pendekatan untuk mencapai pembangunan mapan diterapkan.

This course covers the economic approach in assessing environmental problems and evaluating policy solutions. Emphasis will be given to market failure and externalities, conventional and economic solutions to environmental problems. Risk analysis approaches, benefit-cost analysis, case studies in environmental problems, and approaches to achieve sustainable development are covered.

EMG3303 Pengurusan dan Operasi Projek/ *Project Management and Operation* 3 (3+0)

Prasyarat : ECN3100

Kursus ini merangkumi teori, teknik dan proses perancangan dan pengurusan projek di peringkat makro dan mikro, elemen pengurusan dan pengawalan kualiti projek. Analisis projek, teknik penilaian projek dan isu kontemporari dalam perancangan dan pembangunan projek turut dibincangkan.

This course covers the theories, techniques and process of project planning and management both at macro and micro levels, elements of management and the control of project management. Project analysis, techniques of project evaluation and contemporary issues on planning and project development will be discussed.

EMG3401 Masyarakat, Etika dan Alam Sekitar/ *Society, Ethics and the Environment* 3(3+0)

Prasyarat : EMG3001

Kursus ini merangkumi pertalian antara masyarakat dan isu alam sekitar masa kini. Peranan ekonomi, etika, undang-undang dan kerajaan dalam membentuk dan menyelesaikan masalah serta penglibatan masyarakat dalam pengurusan sumber dan pengawalan pencemaran diberi penekanan.

This course covers the relationship between the society and present environmental issues. The roles of economy, ethics, law and government in developing and solving environmental problems as well as the involvement of society in resource management and pollution control are emphasised.

EMG3402 Kaedah Penyelidikan Kualitatif untuk Alam Sekitar/ *Qualitative Research Methods for the Environment* 4 (3+1)

Prasyarat : Tiada

Kursus ini merangkumi pendekatan dan kaedah asas penyelidikan kualitatif alam sekitar termasuk kerangka teori dalam penyelidikan kualitatif. Tumpuan juga akan diberikan kepada latihan dalam kaedah umum pengumpulan data seperti temubual, pemerhatian dan analisis dokumen.

This course covers qualitative research methods in the field of the environment including theoretical framework in qualitative research. Emphasis will be given towards training in common data collection methods such as interviewing, observations and document analysis.

EMG3501 Prinsip Undang-undang Alam Sekitar/ *Principles of Environmental Law* 3 (3 + 0)

Prasyarat : Tiada

Kursus ini merangkumi pengenalan kepada system perundangan di Malaysia termasuk pendekatan undang-undang lazim dan statutori dalam usaha meningkatkan kualiti alam sekitar. Tumpuan juga diberikan kepada perjanjian, konvensyen, dan isu-isu alam sekitar di peringkat antarabangsa serta implikasi perundangannya. Kes undang-undang berkaitan isu-isu alam sekitar turut dibincangkan.

This course covers introduction to the legal system in Malaysia including common law and statutory approaches in efforts to improve environmental quality. Agreements, conventions, and issues pertaining to environment at the international level and their legal implications are emphasised. Case laws on environmental issues are discussed.

EMG3502 Undang-undang Kawalan Pencemaran Alam Sekitar/ *Law 3 (3 + 0)*
 Of Environmental Pollution Control

Prasyarat : Tiada

Kursus ini merangkumi pengenalan kepada sistem perundangan di Malaysia, penggunaan undang-undang "tort" dan pendekatan statutori dalam kawalan pencemaran alam sekitar. Perkembangan undang-undang di negara lain berkaitan alam sekitar turut dibincangkan. Isu alam sekitar berkaitan sains dan teknologi seperti kegagalan melaksanakan sesuatu sistem perawatan dan sebagainya samada di peringkat tempatan atau antarabangsa diberi tumpuan utama. Kes undang-undang berkaitan akan dibincangkan.

EMP4901 Latihan Industri/ *Industrial Training* 12 (0+12)

Prasyarat : Pelajar program Bachelo Pengurusan Alam Sekitar tahun akhir

Kursus ini merangkumi keperluan untuk pelajar menjalani latihan amali di agensi awam atau syarikat swasta selama 24 minggu. Semasa menjalani latihan ini, pelajar dapat menimba pengetahuan bagaimana agensi awam atau swasta menguruskan isu yang berkaitan dengan alam sekitar dari berbagai aspek.

This course covers the need for students to undergo practical training at public agencies or private companies for a period of 24 weeks. During the training period, the students will develop knowledge and practical experience on how public agencies or private companies deal with issues related to the environment from different aspects.

EMG4999 Projek Ilmiah Tahun Akhir/ *Final Year Project* 6 (0+6)

Prasyarat : Tiada

Kursus ini merangkumi keperluan untuk pelajar tahun akhir menyiapkan projek penyelidikan selama 2 semester di bawah penyeliaan kakitangan akademik. Setiap pelajar akan menyampaikan penemuannya dalam seminar akademik dan mengemukakan laporan akhir penyelidikan.

This course covers the requirement for final year students to undertake research projects in two semesters under the supervision of academic staff. Each student will present his research findings in an academic seminar and submit final academic report of the research.

EMG4001 Statistik untuk Perancangan dan Pengurusan Alam Sekitar/ 3 (2+1)
 Statistics for Environmental Planning and Management

Prasyarat : EMG3007

Kursus ini merangkumi penggunaan kaedah statistik untuk menganalisis dan interpretasi maklumat dalam perancangan dan pengurusan alam sekitar. Konsep dan aplikasi kaedah statistik akan dibincangkan. Aktiviti makmal ditumpukan kepada teknik memproses data, penyelesaian masalah dan interpretasi maklumat yang berkaitan dengan alam sekitar.

This course covers the application of statistical methods to the analysis and interpretation of information in environmental planning and management. Concepts and application of statistical methods are discussed. Laboratory activities emphasize data processing techniques, problem solving and interpretation of information related to environment.

EMG4101 Pengurusan Zon Pinggir Laut/ *Coastal Zone Management* 3(3+0)

Prasyarat : Tiada

Kursus ini merangkumi pengurusan zon pinggir laut termasuk kawasan estuari, gunatanah dan aktiviti-aktiviti yang terdapat di kawasan tersebut. Penekanan diberikan kepada pengelasan unit kawasan pinggir laut, undang-undang tempatan dan antarabangsa mengenai pengurusan zon pinggir laut. Projek pengurusan zon pinggir laut akan dilaksanakan.

This course covers coastal zone management including estuaries, land use, and activities in the area. Emphasis is given to coastal zone classification, national and international law for coastal zone management. Coastal zone management project will be conducted.

EMG4102 Sistem Pengurusan Kualiti Alam Sekitar/ *Environmental Quality Management Systems* 3 (3+0)

Prasyarat : EMG3001

Kursus ini merangkumi isu berkaitan dengan perdagangan, pembangunan dan alam sekitar serta peranan pengguna, masyarakat, sektor industri dan pihak kerajaan dalam peningkatan kualiti alam sekitar. Piawaian sistem pengurusan alam sekitar, penggunaan dan impak piawaian antarabangsa seperti siri ISO 14000 berkaitan pengurusan alam sekitar akan diperkenalkan.

This course covers the issues related to trade, environment and development and the roles of consumer, community, industry and government in enhancing the environment quality. The environmental management system standards, their application and impacts of international standards such as ISO 14000 series related to environmental management will be introduced.

EMG4103 Pengurusan Sumber Asli/ *Natural Resource Management* 3 (3+0)

Prasyarat : EMG3204 dan EMG3302

Kursus ini merangkumi jenis sumber asli berasaskan tanah, udara dan air. Ciri biogeografi sumber serta prinsip pengurusan yang sesuai akan dibincangkan. Kajian kes dan kaedah ekonomi serta pendekatan lain bagi menilai sumber semulajadi akan diberi tumpuan. Keperluan pelan pengurusan dibincangkan termasuk tenaga manusia dan kemudahan.

This course covers the natural resources on land, air, and water. The biogeographic characteristics of the resources and sustainable management principles will be discussed. Case studies, economic and other approaches to evaluate natural resources will be given focus. The requirements of a management plan will be discussed including human resources and facilities.

EMG4104 Pengurusan Sumber Persisir Pantai/ *Coastal Resources Management* 3 (3+0)

Prasyarat : EMG3203

Kursus ini merangkumi jenis, had keluasan dan kepentingan sumber persisir pantai. Konsep pengurusan dan kaedah untuk pengurusan sumber persisir ditekankan. Isu dan permasalahan berkenaan pembangunan mapan sumber persisir dibincangkan.

This course covers the types, extent and importance of coastal resources. Management concepts and methodologies for coastal resources management are stressed. Issues and problems related to the sustainable development of the resources are discussed.

EMG4105 Pengurusan Projek Dalam Sekitaran Terkawal/ *Management of Projects in Controlled Environments* 3 (2 + 1)

Prasyarat : EMG3204 atau EMG3303

Kursus ini merangkumi penggunaan dan aplikasi amalan terbaik dan pendekatan berasaskan proses untuk pengurusan pelbagai projek berkaitan alam sekitar. Tumpuan turut diberikan kepada kajian kes perniagaan, kumpulan pengurusan projek, kawalan, risiko dan kualiti.

This course covers the use and application of the best practice and process-based approaches for the management of all types of projects related to the environment. The emphasis is on business case studies, project management team, controls, risk and quality.

EMG4106 Perubahan Alam Sekitar dan Isu Semasa/ *Environmental Change and Current Issues* 2 (2+0)

Prasyarat : EMG 3202 atau EMG 3203

Kursus ini merangkumi sejarah perubahan geologi bumi dan membincangkan isu semasa berkaitan kesan perubahan alam sekitar kepada manusia. Kesan manusia ke atas muka bumi dan keadaan dinamik sistem alam sekitar akan dibincangkan bagi skala masa yang berbeza. Isu semasa alam sekitar, kesannya atas kebajikan dan kemakmuran manusia dan pendekatan sistem tadbir urus untuk menyelesaikan isu secepat juga dibincangkan.

This course covers the geological history of changes on the earth and discusses the current issues of environmental change affecting mankind. The impact of mankind on the earth and the dynamic nature of the environmental system is discussed over different time scales. Current environmental issues, their effects on human welfare and prosperity and governance system for resolving global issues are discussed.

EMG4202 Perancangan Pengangkutan/ *Transport Planning* 3(3+0)

Prasyarat : Tiada

Kursus ini merangkumi sistem pengangkutan dan hubungannya dengan guna tanah di kawasan bandar dan desa. Teori aliran trafik dan implikasi pembangunan dan kegunaan tanah bagi kemudahan pengangkutan akan diberi tumpuan. Pengumpulan data, teknik penilaian dan teknik penentuan projek serta perancangan pengangkutan disamping kesannya dibincangkan.

This course covers transport systems and its relationship to land use in urban and rural areas. Traffic flow theory and the implications of development and various land use activities on transport facilities are emphasised. Data collection, evaluation and project appraisal techniques for transport planning and its effects are discussed.

EMG4203 Perancangan dan Pengurusan Alam Sekitar Gunaan/ *Applied Environmental Planning and Management* 3 (2+1)

Prasyarat : EMG3204

Kursus ini merangkumi konsep dan kaedah yang diamalkan dalam perancangan dan pengurusan alam sekitar. Kemahiran analisis untuk memilih pelan alternatif yang sesuai dan langkah-langkah penebatan untuk mengurangkan impak persekitaran akan dibangunkan melalui perbincangan kajian kes.

This course covers the concepts and methods practiced in environmental planning and management. Analytical skills in selecting appropriate alternative plans and mitigation measures to reduce environmental impacts will be developed through discussion of case studies.

EMG4204 Studio Perancangan Alam Sekitar II/ *Environmental Planning Studio II* 3 (1+2)

Prasyarat : EMG3203 dan EMG3204

Kursus ini merangkumi aspek strategik dan kepelbagaian disiplin yang diperlukan dalam perancangan alam sekitar yang luas termasuk Rancangan Fizikal Negara (RFN) bagi pembentukan pembangunan bandar dan desa secara komprehensif atau sebagai kajian pengurusan sumber. Penekanan tertumpu pada input saintifik, teknik penyelidikan, interaksi ekologi, sosial, ekonomi serta aspek budaya. Penggunaan GIS merupakan komponen asas dalam studio.

This course covers the strategic and multi-disciplinary nature of broad scale environmental planning including National Physical Plan (NPP) for a comprehensive urban and rural development or a resource management studies. Emphasis will be given to scientific inputs and research techniques, interaction of ecological, social, economic and cultural aspects. The application of GIS techniques will be an integral component of the studio.

EMG4205 Perancangan Respons Tumpahan Minyak/ Oil Spill 2 (2+0)
Response Planning

Prasyarat : EMG3202

Kursus ini merangkumi strategi dan isu yang terlibat dalam respons kepada insiden tumpahan minyak di laut. Fakta yang mempengaruhi kelakuan dan pergerakan minyak, serta impak terhadap jenis pantai dan ekosistem diuraikan. Komponen pelan kontingensi tumpahan minyak diperkenalkan. Langkah yang terlibat dalam pengurusan tindakan respons tumpahan minyak dan kes tumpahan minyak dibincangkan.

This course covers the strategies and issues involved in response to oil spills at sea. The factors which influence the behaviour and movement of oil, including the impact on different types of shores and ecosystems are explained. The components of an oil spill contingency plan are introduced. The steps which are involved in the management of oil spill response and past oil spill cases are discussed.

EMG4401 Geografi Kemanusiaan/ Human Geography 3 (3+0)

Prasyarat : EMG3205

Kursus ini merangkumi pelbagai pendekatan dari aspek budaya, sosial, politik dan ekonomi terhadap geografi kemanusiaan. Cabaran yang dihadapi oleh masyarakat bagi menangani masalah alam sekitar turut dibincangkan.

The course covers multiple approaches towards human geography from cultural, social, political and economic aspects. Challenges facing society in dealing with environmental problems are discussed.

EMG4402 Gender dan Pengurusan Bersepadu Sumber Asli/ Gender 3 (2+1)
and Integrated Natural Resources Management

Prasyarat : EMG4103

Kursus ini merangkumi isu gender dalam pengurusan sumber asli bersepadu. Pertimbangan aspek gender dalam projek bersepadu pengurusan sumber asli dan kelemahan projek yang tidak peka kepada aspek gender dibincangkan melalui kajian kes. Kaedah petunjuk kesan tindakan juga dibincangkan.

This course covers the issue of gender in integrated natural resource management. Consideration of gender aspects in the integrated natural resource management and weaknesses in projects which are insensitive to gender aspects are discussed through case studies. Indicators of impact methods are also discussed.

EMG4501 Polisi dan Pentadbiran Alam Sekitar/ Policy and 3(3+0)
Environmental Administration

Prasyarat : EMG3001

Kursus ini merangkumi proses pembentukan polisi yang berkaitan dengan alam sekitar. Tumpuan diberikan kepada pentadbiran dan perundangan persekitaran termasuk peranan 'Common Law' di Malaysia. Sistem pentadbiran alam sekitar yang diamalkan oleh beberapa negara lain turut dibincangkan.

This course covers the process of formulating policies related to environmental matters. Administration and laws including 'Common Law' in Malaysia are emphasised. Systems of environmental administration as practiced by other countries are also discussed.

EMG4502 Undang-undang Alam Sekitar dan Perancangan/ 3 (3 + 0)
Environmental Law and Planning

Prasyarat : EMG3501

Kursus ini merangkumi undang-undang berkaitan pengurusan, kawalan pencemaran dan perancangan alam sekitar. Tumpuan juga diberikan kepada penguatkuasaan, perundangan Tort, rejim perundangan alam sekitar peringkat tempatan dan antarabangsa.

This course covers law related to the management, pollution control and planning of the environment. Enforcement, law of Torts, local and international legal regime are also emphasized.

EMG4503 Undang-undang Pengurusan Sisa/ *Waste Management* 4 (4 + 0)
Laws

Prasyarat : EMG 3501 dan EMG4502

Kursus ini merangkumi aspek perundangan pengurusan sisa industri, komersil dan pepejal terkawal. Peranan institusi berkaitan dan sistem pengurusan sisa diberi penekanan. Prosedur tindakan mahkamah turut dibincangkan.

This course covers the legal aspects of industrial, commercial and controlled solid waste management. The roles of related institutions and waste management system are emphasised. Court's action procedures are also discussed.

EMG4801 Kerja Lapangan Pengurusan Alam Sekitar/ *Environmental* 2 (0 + 2)
Management Fieldwork

Prasyarat : EMG3204

Kursus ini merangkumi kaedah penyelidikan berkaitan impak pembangunan ke atas alam sekitar. Kajian lapangan dan persediaan laporan penilaian kesan alam sekitar akan dilaksanakan.

This course covers research methods on the impact of development on the environment through field studies. Preparation of an environmental impact assessment reports will be conducted.

EMG4991 Seminar Pengurusan Alam Sekitar/ *Environmental* 2 (1+1)
Management Seminar

Prasyarat : Pelajar tahun dua Program Bachelo Pengurusan Alam Sekitar

Kursus ini akan melatih pelajar untuk mengguna teknik pembentangan seminar termasuk persembahan, isi, persiapan, alat pandang dengar dan perisian persembahan. Pelajar akan dinilai melalui pembentangan seminar ilmiah dan teknikal.

This course trains students towards the proper use of seminar presentation techniques including presentation, content, preparation, audio visual equipment and seminar presentation software. Student will be evaluated through academic and technical seminars presentation.

Jabatan Sains Alam Sekitar/ Department of Environmental Sciences

ESC3001 Teknik Pengukuran Alam Sekitar/ *Environmental Measurement Techniques* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi prinsip asas dan kaedah yang digunakan di dalam teknik pengukuran parameter fizikal dan sosial di dalam kajian alam sekitar. Teknik pengukuran alam sekitar, persampelan, analisis dan interpretasi data akan dibincang dan dilaksanakan di lapangan. Pelajar dikehendaki menyediakan laporan serta membuat pembentangan hasil kerja lapangan.

This course covers the basic principles and methods used in physical and social parameter measurements in environmental studies. Techniques of environmental measurement, sampling, data analysis and interpretation will be discussed and implemented in the field.

ESC3002 Prinsip Kimia Dalam Alam Sekitar/ *Chemical Principles In The Environment* 4(3+1)

Prasyarat : Tiada

Kursus ini merangkumi konsep kimia dan aplikasinya dalam bidang alam sekitar. Topik yang dibincangkan termasuklah kimia fizik, kimia organik, kimia kinetik, keseimbangan kimia, termokimia, elektrokimia dan tindakbalas kimia. Aplikasi konsep kimia dalam menerangkan interaksi pencemaran dalam alam sekitar, kaedah analisis dan proses rawatan ke atas pencemar akan dibincangkan.

The course covers basic concepts of chemistry and its application in environment field. Topics discussed include physical chemistry, organic chemistry, chemical kinetics, chemical equilibrium, thermochemistry, electrochemistry and chemical reactions. The applications of chemistry concepts in describing interaction of pollutants in the environment, analytical methods and treatment processes of chemical pollutants will be explained.

ESC3006 Prinsip Fizik Alam Sekitar/ *Principles Of Environmental Physics* 4 (3+1)

Prasyarat : Tiada

Kursus ini merangkumi prinsip fizik dan aplikasinya kepada kajian alam sekitar. Topik perbincangan termasuk kinematik, dinamik, bentuk tenaga, momentum keabadian momentum dan tenaga, prinsip keselantaran, hidrostatik dan hidrodinamik asas, hukum gas, keelektrikan dan kemagnetan, sinaran dan pengangkutan bahan. Asas fizik yang digunakan dalam pembentukan model alam sekitar dan pergerakan bahan seperti persamaan Darcy, Navier-Stokes turut dibincangkan. Proses yang mempengaruhi pergerakan air dan udara atas permukaan bumi seperti daya Coriolis, geostrofik, pasang-surut, dan ombak juga diperkenalkan.

This course covers physical principles and its applications in environmental studies. Topics discussed includes kinematics, dynamics, forms of energy, momentum, conservation of momentum and energy, principle of continuity, hydrostatic and fundamental hydrodynamics, gas laws, electricity and magnetism, radiation, and transport of materials. Basic principles of physics used in environmental model's construction and material movements such as Darcy equation and Navier-Stokes equation will also be discussed. The processes influencing water and air movement on earth's surface such as Coriolis force, geostrophic, tides and waves will be introduced.

ESC3007 Prinsip Biologi Alam Sekitar/ *Principles Of Environmental Biology* 4(3+1)

Prasyarat : Tiada

Kursus ini merangkumi topik-topik prinsip asas ekologi, seperti ekosistem, aliran tenaga, kitaran nutrien dan rantai makanan; asas fisiologi tumbuhan terutama fotosintesis; proses biodegradasi, fermentasi, biodeposisi dan bioturbasi serta sistem aerobik dan anaerobik. Tajuk-tajuk seperti sistem enzim MFO, prinsip pemuliharaan semula sumber asli, masalah pencemaran dan eutrofikasi akan dibincangkan. Pelajar juga akan didedahkan kepada kitaran biogeokimia.

This course covers basic principles of ecology such as ecosystem, energy flow, nutrient cycling and food chain; basic plant physiology mainly photosynthesis; biodegradation process, fermentation, biodeposition and bioturbation including aerobic and anaerobic systems. Topics such as MFO enzyme systems, environmental preservation of natural resources, environmental pollution and eutrophication will also be covered.

ESC3009 Analisis dan Instrumentasi Alam Sekitar/ *Instrumentation And Environmental Analysis* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi analisis kimia dalam alam sekitar. Tajuk termasuk analisis pencemar organik, pencemar tak organik dan reaktiviti bahan pencemar dengan partikel. Penyediaan bahan kimia piawai dan kolum akan diperincikan. Instrumentasi terkini yang digunakan dalam kajian alam sekitar akan diterangkan dan diikuti dengan kajian amali serta pembentangan secara berkumpulan.

This course covers chemical analysis in the environment that includes analysis of organic and inorganic pollutants and particle reactivity with pollutants. Preparation of standard chemical and column is detailed out. The most recent instrumentations employed in environmental studies are discussed.

ESC3010 Sains Tanah dan Air/ *Soil And Water Sciences* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi prinsip asas sains dan teknologi kajian tanah dan air. Tajuk termasuk aspek utama geosains, kitaran hidrologi, pengaliran melalui media telus, peranan air dalam kontinum tanah-tumbuhan-atmosfera, kualiti air dan hidraulik.

This course covers the basic scientific and technological principles of soil and water studies which include the main aspects of geoscience, hydrologic cycle, flow through porous media, the role of water in soil-plant-atmosphere continuum, water quality and hydraulic.

ESC3011 Pengenalan Sains Atmosferal/ *Introduction To Atmospheric Sciences* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi komposisi dan struktur atmosfera, pembentukan awan dan fenomena cuaca, proses termodinamik, sinaran suria dan daratan, pergerakan udara dan ramalan cuaca. Tajuk perubahan cuaca termasuk perubahan meteorologi dan pemanasan global akan dibincangkan.

This course covers composition and structure of atmosphere, cloud formation and weather phenomena, thermodynamic processes, solar and terrestrial radiation, air motions, and weather forecasts. Climate change including meteorological changes and global warming are also discussed.

ESC3012 Teknologi Rawatan Sisa Pepejal/ *Solid Waste Treatment Technology* 3 (3+0)

Prasyarat : Tiada

Kursus ini merangkumi elemen sistem pengurusan sisa pepejal termasuk penjaan, pengendalian dan pemprosesan di punca, pengumpulan, pengangkutan, pengurangan sisa dan kitar semula, teknologi penukaran dan pelupusan akhir. Hubungan antara ekonomi, teknologi, kesihatan, alam sekitar, perundangan dan perancangan dalam sistem pengurusan dan pelupusan sisa pepejal akan ditekankan.

This course covers elements of solid waste management system which include generation, on-site handling and processing, collection, transportation, waste minimization and recycling, conversion technologies and final disposal. The relationship between economics, technologies, health, environment, law and planning in solid waste management and disposal are emphasized.

ESC3101 Prinsip Kesihatan Alam Sekitar/ *Principles Of Environmental Health* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi perbincangan pelbagai isu dan masalah persekitaran yang memberi kesan ke atas kesihatan manusia berdasarkan kaedah toksikologi, epidemiologi, mikrobiologi dan kajian kes. Kursus ini meneliti pencemaran di dalam beberapa media alam sekitar, bahan kimia dan racun perosak, pencetus wabak dan penyakit bawaan air dan makanan, impak perubahan cuaca keatas kesihatan manusia, dan penilaian risiko kesihatan persekitaran.

This course covers various environmental issues and problems that affect human health based on toxicology methods, epidemiology, microbiology and case studies. Pollution in different environmental media, chemicals and pesticides, epidemics, food and water borne diseases, the impact of climate on human health, and environmental health risk assessment are discussed.

ESC3203 Hidrologi Alam Sekitar/ *Environmental Hydrology* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi peranan hidrologi dalam perancangan dan pengurusan alam sekitar. Impak eko-hidrologi ke atas pengurusan alam sekitar akan dibincang. Topik perbincangan termasuk masalah banjir, tanah runtuh, hakisan dan pemendapan, pencemaran tidak bertitik dan pencemaran air tanah. Pemodelan hidrologi dan pencemaran air juga dibentangkan.

This course covers the role of hydrology in environmental planning and management as well as the eco-hydrological impacts on environmental management. Also discussed are problems of flood, landslide, erosion and sedimentation, non-point source of pollution, groundwater pollution and hydrologic modelling.

ESC3204 Rawatan Air Sisa/ *Wastewater Treatment* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi proses rawatan air sisa berasaskan kepada keperluan perundangan tempatan, sumber dan ciri air sisa dan peranan operator loji rawatan. Parameter asas kawalan operasi loji dan pengawasan proses ditekankan. Prinsip rawatan enapcemar anaerobik, penggunaan semula efluen dan enapcemar, dan isu kesihatan serta keselamatan juga dibincangkan.

This course discusses several different objectives of wastewater treatment, local regulatory requirements for wastewater discharges, wastewater sources and characteristics and the role of the wastewater treatment plant operator. Basic plant operational control parameters and process monitoring is emphasized. Principles of anaerobic sludge treatment, effluent and sludge reuse and health and safety issues are also explained.

Prasyarat : Tiada

Kursus ini akan membincangkan sumber-sumber bekalan air, punca pencemaran air, kaedah rawatan air minum dan kepentingan pengurusan air untuk menyediakan bekalan air minum yang berterusan. Parameter-parameter penting penentuan kualiti air dan kaedah nyahjangkitan air akan di bincang secara terperinci termasuk kesan kualiti air terhadap kesihatan manusia dan kehidupan akuatik. Penggunaan air untuk berbagai fungsi dalam perkembangan ekonomi juga dibincangkan. Teknik penyampelan air terawat dalam program pemeliharaan kualiti air, kaedah analisis dan proses pengurusan maklumat kualiti air minum akan dibincang dalam rangka program pengawasan kualiti air peringkat daerah dan negeri. Penggunaan peralatan aksesori di rumah seperti alat turas air, alat nyahjangkit air dan alat mineralisasi air juga akan dibincangkan.

This course discusses water supply sources, water pollution, drinking water treatment processes and the importance of water management for the production of potable water supplies on a continuous basis. Important drinking water quality parameters and proper disinfection techniques are discussed as well as the impact of water quality on human health and aquatic populations. The various water uses in economic development, drinking water sampling techniques, analytical procedures and water quality data management are discussed in the context of water surveillance at the district and state level. The use of home accessories such as water filters, water sterilizers and mineral water production units are also discussed.

Prasyarat : Tiada

Kursus ini merangkumi konsep Sistem Maklumat Geografi (GIS) termasuk takrifan GIS, data geografi, kartografi dan struktur data dalam GIS, input dan output serta aplikasi GIS dalam bidang alam sekitar.

This course covers the definition of GIS, geographic data, cartographic and data structure, input and output data as well as application of GIS in the field of environment.

Prasyarat : MTH3003 atau setara

Kursus ini merangkumi kaedah analisis dan interpretasi data alam sekitar dalam langkah tebatan sumber pencemaran. Pendekatan yang digunakan mengambilkira penjimatan kos dan masa dalam penyelidikan. Kajian kes akan digunakan untuk mengesahkan model ramalan berdasarkan analisis masa sebenar. Kursus ini juga akan melibatkan penggunaan kaedah analisis multivariat dan pemodelan untuk menilai kualiti alam sekitar.

This course covers methods in analysis and interpretation of environmental data in mitigating pollution sources. Case studies are used to validate prediction models based on real time analysis. Multivariate analysis and modelling methods to evaluate environmental quality are also discussed.

Prasyarat : ESC3101 atau setara

Kursus ini merangkumi proses penilaian risiko yang digunakan untuk mengukur potensi kesan dan impak buruk ke atas kesihatan manusia dan populasi disebabkan oleh pencemaran di tempat kerja atau alam sekitar. Beberapa contoh sebenar (melalui kajian kes) untuk menaksir impak kesihatan akan digunakan.

This course covers the health risk assessment process to measure the potential adverse effects and impacts on individual and population due to occupational and environmental pollutions.

ESC4102 Penilaian Pendedahan Pencemaran/ *Pollution Exposure* 3 (2+1)
Assessment

Prasyarat : ESC3101 atau setara

Kursus ini merangkumi anatomi dan fisiologi manusia, toksikologi industri, prinsip penilaian persekitaran tempat kerja, kaedah persampelan, pendedahan kebisingan dan kawalan, dan penggunaan garis panduan dan piawaian. Penekanan akan diberikan kepada mengenalpasti, menilai dan mengawal hazard di tempat kerja dan ancaman kepada manusia dan persekitaran.

This course covers anatomy and physiology of the human body, industrial toxicology, principles of evaluating the work environment, sampling methodology, noise exposure and control, and application of guidelines and standards. Emphasizes are given to the identification, evaluation and control of potential workplace hazards and the potential health threats to humans and the environment.

ESC4201 Pengurusan Kualiti Air Sungai/ *River Water Quality* 3 (3+0)
Management

Prasyarat : Tiada

Kursus ini merangkumi sumber pencemaran air, perancangan dan pengurusan kualiti air, penentuan indeks kualiti air dan pengkelasan sungai untuk pengurusan sumber air. Masalah dan penyelesaian kawasan tadahan air setempat dan serantau berkaitan dengan pengurusan kualiti air sungai akan dibincangkan.

This course covers water pollution sources, planning and management of water quality, water quality index determination and river classification for water resource management. Localized and regional watershed problems and solutions in relation to river water quality management are discussed.

ESC4202 Hidrogeologi/ *Hydrogeology* 3(2+1)

Prasyarat : Tiada

Kursus ini merangkumi isu kepentingan sumber air tanah serta proses-proses yang digunakan di dalam mengurus sumber air tanah. Selain dari itu, topik berkaitan pembangunan air tanah , aliran melalui keliangan, perjalanan dan taburan air ke perigi, saliran, prosedur penebusgunaan, pencemaran air tanah dan pemodelan air tanah akan dibincangkan.

This course covers importance issue of groundwater and the processes that were used to manage it. In addition topics related to groundwater development, flow through porous media, water movement and distribution towards groundwater wells, drainage, reclamation procedures, groundwater pollution and ground water modeling will also be discussed.

ESC4204 Analisis Lembangan/ *Watershed Analysis* 3 (3+0)

Prasyarat : ESC3203 atau setara

Kursus ini merangkumi masalah pengurusan alam sekitar dari sudut hidrologi dan geomorfologi yang melibatkan lembangan saliran. Teknik dan kaedah penilaian lembangan saliran menggunakan Sistem Maklumat Geografi (GIS) dan pemodelan lembangan untuk menilai tahap kesihatan lembangan saliran yang meliputi diagnosis penyebab, cadangan pilihan dan polisi untuk memperbaiki sistem lembangan saliran. Kajian kes yang merangkumi aspek hidrologi dan impak pencemaran air dari pelbagai guna tanah akan dibentangkan.

This course covers hydrologic and geomorphic basis of environmental management problems concerning drainage basins. Essential tools and techniques to conduct watershed evaluation using Geographic Information Systems (GIS) and watershed modelling to evaluate the health status of a watershed that will include diagnosing the causes, suggestion on options, and policies on how to improve the watershed system.

ESC4205 Kimia Marin/ *Marine Chemistry* 3 (2+1)

Prasyarat : ESC3002 atau setara

Kursus ini merangkumi proses kimia persekitaran marin. Topik perbincangan termasuk asas biogeokimia oksigen, komposisi garam, spesis kimia terlarut, radioisotop, elemen utama dan surih, logam berat di persisiran pantai dan laut dalam. Kaedah analisis dan pengukuran kimia marin akan dibincangkan.

This course covers the chemical processes of marine environments which include basic biogeochemistry of oxygen, salt composition, dissolved chemical species, radioisotopes, trace and major elements, heavy metals in the coastal and deep-ocean. The analytical and measurement methods of marine chemistry are also discussed.

ESC4301 Pemencilan Karbon dan Perubahan Iklim *Carbon Sequestration And Climate Changes* 3 (2+1)

Prasyarat : ESC3002, ESC3007 atau setara

Kursus ini merangkumi sumber, perubahan dan impak gas rumah hijau, prinsip dan Rangka kerja Bangsa-bangsa Bersatu Konvensyen Ke atas Perubahan Iklim. Penumpuan adalah terhadap perubahan suhu, peningkatan paras laut, perubahan jumlah hujan, kesan perubahan iklim ke atas biodiversiti dan kelestarian sistem sokongan hidup. Konsep pemencilan karbon dalam ekosistem dan perdagangan karbon akan dibincangkan. Model akan digunakan untuk mengira bajet karbon.

This course covers sources, changes and impacts of greenhouse gases, principles and United Nations Framework Convention on Climate Change. The focus is on temperature changes, sea level rises, changes in amount of rainfall, impacts of climate change on biodiversity and sustainability of life support systems. Concept of carbon sequestration in ecosystem and carbon trading are discussed.

ESC4303 Teknologi Pengawalan Pencemaran Udara/ *Air Pollution Control Technology* 3 (3+0)

Prasyarat : ESC 3006 atau setara

Kursus ini merangkumi pelbagai aspek teknologi kawalan pencemaran udara. Topik termasuk kesan pencemaran udara, pengukuran dan pemantauan, meteorologi, peraturan dan kawalan kejuruteraan pencemaran udara. Penekanan akan diberikan kepada pemilihan teknologi bersesuaian.

This course covers various aspects of air pollution control technologies including measurement and monitoring, meteorology, regulatory and engineering control of air pollution.

ESC4401 Teknik Penyiasatan Subpermukaan/ *Subsurface Investigation Technique* 3 (2+1)

Prasyarat : ESC3006 atau setara

Kursus ini merangkumi kaedah penyiasatan dan pengenalpastian struktur, parameter fizikal dan bahan kandungan subpermukaan bumi. Topik termasuk kaedah geofizik untuk peninjauan dan carigali. Aplikasi pelbagai kaedah penilaian akuifer dan program komputer juga digunakan.

This course covers methods to investigate and identify structures, physical parameters and the constituents of the earth subsurface including geophysical methods for surveying and exploration purposes. Application of various aquifer evaluation methods and computer programs are also adopted.

ESC4404 Teknologi Rawatan Sisa Berbahaya/ *Hazardous Waste Treatment Technology* 3 (3+0)

Prasyarat : ESC3002 atau setara

Kursus ini merangkumi ciri fizikal, kimia dan ketoksikan sisa berbahaya yang membentuk asas untuk pengelasan hazard dan penentuan pergerakan, taburan dan juga impak ke atas kesihatan manusia dan alam sekitar. Strategi pengurusan termasuk kaedah pengendalian, penyimpanan dan pengangkutan sisa berbahaya mengikut Akta Kualiti Alam Sekeliling 1974, dan peraturan antarabangsa akan dibincangkan. Teknologi rawatan dan pelupusan ke atas sisa berbahaya akan ditekankan.

This course covers the physical, chemical and toxic properties of hazardous wastes that form the basis for hazard classification and determination of their movement, distribution as well as their impacts on human health and the environment. Treatment and disposal technologies including handling, storage and transportation based on the Environmental Quality Act 1974 and international regulations are discussed.

ESC4406 Geofizik Alam Sekitar/ *Environmental Geophysics* 3 (2+1)

Prasyarat : ESC3006 atau setara

Kursus ini merangkumi struktur dalaman bumi serta kandungannya. Beberapa kaedah geofizik digunakan untuk tujuan peninjauan, carigali dan penilaian tahap pencemaran. Aktiviti antropogenik dan proses semulajadi yang menyumbang kepada pencemaran alam sekitar akan dibincangkan.

This course covers the study of earth's internal structures and content through geophysical methods such as surveying, exploration and pollution assessment. Anthropogenic activities and natural processes contributing to environmental pollution are also discussed.

ESC4502 Respons Kecemasan Alam Sekitar/ *Environmental Emergency Response* 3 (3+0)

Prasyarat : ESC3002 atau setara

Kursus ini merangkumi pengurusan air, makanan, sisa cecair, sisa pepejal, sisa perubatan, perumahan, pusat penjagaan dan perlindungan, vektor, bahan berbahaya dan toksik, dan radiasi selepas bencana. Dokumen Keselamatan Data Bahan (MSDS), Dokumen Keselamatan Bahan Kimia (CSDS) dan prosedur arahan insiden akan juga dibincangkan. Senario respons kecemasan di lapangan akan diperkenalkan.

This course covers management of water, food, liquid waste, solid waste, medical waste, housing and mass care shelters, disease vectors, hazardous and toxic materials, radiation, and biological infection wastes after a disaster including nature of emergencies and disasters and emergency response. Material Safety Data Sheet (MSDS), Chemical Safety Data Sheet (CSDS) documents and incident command procedures are discussed.

ESC4503 Biologi Pencemaran/ *Pollution Biology* 3(2+1)

Prasyarat : Tiada

Kursus ini membincangkan tentang alam semulajadi dan punca-punca pencemaran udara, air dan tanah. Gerakbalas fisiologi dan biokimia dan tumbuhan, haiwan dan organisma lain; mekanisme pertahanan; pengelakan dan ketahanan serta kesan ke atas kesihatan dan kesejahteraan manusia; pengukuran dan pengawasan; petunjuk biologi dan penggunaannya; evolusi; pencemaran; dan sifat ketahanan serta toleransi akan juga disentuh.

This course covers discussion on the natural environment and sources of air, water and soil pollution. The physiological and biochemical responses of plants and animals and other organisms including defense mechanisms, avoidance and resistance, monitoring, biological indicators and their applications, evolution, pollution, practical uses of tolerance and resistance will also be discussed.

ESC4508 Biodiversiti dan Pemuliharaan/ *Biodiversity And Conservation* 3 (3+0)

Prasyarat : ESC3007 atau setara

Kursus ini merangkumi konsep penting biodiversiti dan pemuliharaan. Penekanan diberikan kepada aspek etika, perundangan dan ekonomi yang mempengaruhi sikap kita terhadap pengurusan biodiversiti melalui perbincangan terhadap pemacu utama yang menyebabkan kehilangan biodiversiti serta strategi pemuliharaan yang penting bagi menjamin kelestarian biodiversiti. Kaedah melindungi ekosistem, strategi membaikpulih sebagai alat pemuliharaan.

This course covers concepts in biodiversity and conservation. Emphasis is placed on ethics, laws and economics that influence attitudes towards management of biodiversity through discussions on drivers of biodiversity loss and strategies in conservation to guarantee biodiversity sustainability, methods to protect ecosystem and restoration strategies as conservation tools.

ESC4509 Ekologi Sumber Asli/ *Ecology Of Natural Resources* 3 (3+0)

Prasyarat : ESC3007 atau setara

Kursus ini merangkumi konsep biofizikal dan sosio-ekonomi sumber asli alam sekitar dan juga prinsip ekologi untuk pengekalan, pemeliharaan dan pemuliharaan sumber asli. Ekologi dan sejarah semulajadi pelbagai sumber asli meliputi organisma individu hingga lanskap, dari ekosistem semulajadi hingga ekosistem terurus, dari rimba hingga pertanian dan sistem bandar, dan dari alam sekitar tempatan hingga pemuliharaan antarabangsa. Pemeliharaan semasa, pemuliharaan dan isu pengurusan akan dibincangkan.

This course covers biophysical and socioeconomic concepts of managing natural resources and ecological principles in the preservation, conservation and restoration of resources. The ecology and natural history of diverse natural resources ranging from individual organisms to landscapes, natural to managed ecosystems, wilderness to agricultural and urban systems, and local to international environment are discussed.

ESC4510 Biofizik Alam Sekitar/ *Environmental Biophysics* 3 (2+1)

Prasyarat : ESC3006 atau setara

Kursus ini merangkumi prinsip asas bagi menganalisis pertukaran tenaga dan jisim antara organisma hidup dan alam sekitarnya. Perbincangan termasuk parameter iklim mikro dan interaksi dengan tumbuhan serta kesan keatas alam sekitar. Penggunaan model matematik bagi mengira kadar pemindahan tenaga dan jisim, dan impak perubahan iklim mikro ke atas hasil pertanian.

This course covers principles for analyzing energy and mass changes between living organisms and their environment. Discussions include microclimate parameters and its interaction with vegetation as well as impacts on environment. Application of models to calculate energy and mass transfer rates, and impact of micro climatic changes on agriculture yield are also discussed.

ESC4511 Penderiaan Jauh Alam Sekitar/ *Environmental Remote Sensing* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi konsep penderiaan jauh dan aplikasinya dalam alam sekitar. Tajuk yang dibincangkan termasuklah prinsip penderiaan jauh, teori radiasi, sistem sensor, pencerapan, pembedaan, penyimpanan dan analisis data, penanda spektral bahan semulajadi dan buatan manusia, dan aplikasi prinsip penderiaan jauh dalam alam sekitar.

This course covers concepts of remote sensing and its application in environmental management including the principles of remote sensing, radiation theory, sensor systems, data acquisition, correction and storage, data analysis, and spectral signatures of natural and man-made materials.

ESC4512 Kimia Alam Sekitar Lanjutan/ *Advance Environmental Chemistry* 3 (2+1)

Prasyarat : ESC3002 atau setara

Kursus ini merangkumi proses kimia lanjutan dalam alam sekitar termasuk tabiat partikel, tabiat pemisahan bahan pepejal dan koloid, kimia air bersih dan tercemar, kimia tanah dan pencemaran udara. Pengangkutan mendatar dan menegak bahan pencemar organik akan diperincikan. Biopemantauan bahan kimia organik dan tak organik seperti logam berat, nutrien, racun perosak dan hidrokarbon akan dibincangkan.

This course covers concepts of chemistry concerning the behavior of particles in the environment, partitioning of solids and colloids, and chemistry of natural and polluted water, soil and air. Lateral and vertical transport of organic pollutants are emphasized. Biomonitoring of organic and inorganic chemicals such as heavy metals, nutrients, pesticides and hydrocarbons are discussed.

ESC4513 Bioremediasi Alam Sekitar/ *Environmental Bioremediation* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi pelbagai aspek remediasi tanah menggunakan kaedah biologi untuk penguraian sebatian toksik. Proses bioremediasi, tindakbalas biokimia, dan lintasan metabolik akan dibincangkan. Kaedah rawatan in-situ dan rawatan reaktor akan ditekankan.

This course covers various aspects of soil remediation using biological methods to degrade toxic compounds. The bioremediation process, biochemical reactions and metabolic pathways are emphasized. In-situ and reactor treatment processes are discussed.

ESC4514 Keusahawanan Dalam Alam Sekitar/ *Entrepreneurship In Environment* 3 (2+1)

Prasyarat : Tiada

Kursus ini merangkumi konsep perniagaan dan isu berkaitan keusahawanan alam sekitar. Tumpuan diberikan kepada penyediaan pelan perniagaan dan cadangan perundingan, perancangan organisasi, pemasaran, pengurusan kewangan dan aset. Pengaruh kepada faktor sosio-ekonomik ke atas kejayaan usahawan dan perunding alam sekitar dibincangkan.

This course covers business concepts and issues concerning environmental entrepreneurship. Emphasis is placed on preparation of business plans and consultancy proposals, organizational planning, marketing, and financial and asset management. The influence of socio-economic factors on the success of entrepreneurs and environmental consultant are discussed.

ESC4603 Sistem Tenaga dan Alam Sekitar/ *Energy System And Environment* 3 (3+0)

Prasyarat : ESC3006 atau setara

Kursus ini merangkumi kepelbagaian sumber tenaga, penjanaan tenaga, kesan alam sekitar dan implikasi sosio-ekonomi. Penggunaan teknologi tenaga bersih penjanaan dibincangkan bersama dengan polisi dan strategi kerajaan berhubung dengan tenaga.

This course covers energy sources, energy generation its impacts on the environment, energy conservation, and socioeconomic implications. The utilization of clean energy technology is discussed in light of government policies and strategies on energy.

ESC4901 Latihan Industri/ *Industrial Training*

12 (0+12)

Prasyarat : Telah lulus 7 semester pengajian dalam program Bachelo Sains dan Teknologi Alam Sekitar

Kursus ini menyediakan latihan kerja melalui program kerjasama latihan-pendidikan di antara fakulti dengan organisasi kerajaan dan bukan kerajaan. Pelajar akan menjalankan latihan sekurang-kurangnya satu semester di bawah penyeliaan seorang penasihat di tempat latihan tersebut. Pelajar diwajibkan membenteng secara lisan dan menyediakan laporan bertulis di akhir latihan praktikal. Pelajar akan dilawati sekurang-kurangnya sekali oleh ahli akademik fakulti semasa latihan praktikal dijalankan.

This course covers an industrial training for a period of 24 weeks at various selected government agencies, companies or factories related to environmental science and technology. The training is organized jointly by the coordinator and supervisor or the manager from the related agencies, company or factory.

ESC4999 Projek Ilmiah Tahun Akhir/ *Final Year Project*

6 (0+6)

Prasyarat : Tiada

Kursus ini merangkumi projek penyelidikan berkaitan sains dan teknologi alam sekitar selama dua semester di bawah penyeliaan kakitangan akademik. Pelajar akan mencadangkan topik penyelidikan. Pelajar diwajibkan membuat pembentangan lisan dan menghantar laporan bertulis.

This course covers research projects related to environmental sciences and technology which are carried out over two semesters under the supervision of an academic staff. Students will propose research topics and are required to make oral presentations as well as submission of written reports.

KURSUS TAWARAN FAKULTI LAIN
(*Sila rujuk sinopsis pada fakulti berkenaan*)

1.	FAKULTI BAHASA MODEN DAN KOMUNIKASI		
1.1	BBI2423	<i>Academic Interaction and Presentation</i>	3 (2+1)
1.2	BBI2424	<i>Academic Writing</i>	3 (2+1)
2.	FAKULTI PERTANIAN		
2.1	PRT2008	<i>Pertanian dan Manusia/ Agriculture and Human</i>	2 (2+0)
3.	FAKULTI EKONOMI DAN PENGURUSAN		
3.1	ECN3100	<i>Prinsip Ekonomi/ Principles Of Economics</i>	3 (3+0)
3.2	MGM2111	<i>Pengurusan Organisasi Dan Perniagaan/ Organisation and Business Management</i>	3 (3+0)
3.3	ACT2112	<i>Perakaunan Pengenalan/ Introductory Accounting</i>	4 (3+1)
3.4	MGM3211	<i>Prinsip Pemasaran/ Principles Of Marketing</i>	3 (3+0)
3.5	ACT3211	<i>Pengurusan Kewangan/ Financial Management</i>	3 (3+0)
3.6	ECN3101	<i>Mikroekonomi I/ Microeconomics I</i>	3 (3+0)
3.7	ECN3311	<i>Ekonomi Sumber Asli/ Natural Resource Economics</i>	3 (3+0)
3.8	MGM3113	<i>Gelagat Organisasi/ Organizational Behavior</i>	3 (3+0)
3.9	MGM3123	<i>Pengurusan Sumber Manusia/ Human Resource Management</i>	3 (3+0)
3.10	MGM4183	<i>Keusahawanan/ Entrepreneurship</i>	3 (3+0)
4.	FAKULTI EKOLOGI MANUSIA		
4.1	SKP2101	<i>Kenegaraan Malaysia/ Malaysian Nationhood</i>	3 (3+0)
4.2	SKP2203	<i>Tamadun Islam Tamadun Asia/ Islamic Civilization and Asian Civilization</i>	2 (2+0)
4.3	SKP2204	<i>Hubungan Etnik/ Ethnic Relations</i>	2 (2+0)
5.	FAKULTI SAINS		
5.1	MTH3003	<i>Statistik bagi Sains Gunaan/ Statistics For Applied Sciences</i>	4 (3+1)
5.2	MTH3100	<i>Kalkulus/ Calculus</i>	3 (3+0)

ELEX SCHEME FOR 4 YEARS PROGRAMMES FROM SEPTEMBER 2013

MUET Band	Graduation Requirements for 4-year programmes
1 & 2	3 BBI + 3 CEL + 24 LAX points
3 & 4	2 BBI + 2 CEL + 36 LAX points
5 & 6	3 CEL + 36 LAX points

Sem	4 - Years Programme					
	MUET 1 & 2		MUET3 & 4		MUET 5 & 6	
Sem 1	BBI2422	CEL101	CEL102	LAX	LAX	
Sem 2	LAX	CEL102	BBI2423		CEL103	
Sem 3	BBI2423		BBI2424		LAX	
Sem 4	BBI2424		LAX		Choose ONE : CEL104/105	
Sem 5	LAX		LAX		LAX	
Sem 6	Choose ONE : CEL105/106/107		Choose ONE : CEL105/106/107		LAX	
Sem 7	LAX		LAX		Choose ONE : CEL105/106/107	
Sem 8	LAX <i>or</i>	OPTIONS : CEL104/105/106/107	LAX <i>or</i>	OPTIONS : CEL104/105/106/107	LAX <i>or</i>	OPTIONS : CEL104/105/106/107

Note :

Students who are away on Industrial Training in any semester need not enroll in any course or LAX for that particular semester, but they must enroll in a course LAX in subsequent semesters.

BBI courses

- BBI2422 (Reading for Academic Purpose)
- BBI2423 (Academic Interaction and Presentation)
- BBI2424 (Academic Writing)

CEL courses

- CEL101 (Vocabulary and Grammar for Communication)
- CEL102 (Effective Listening and Speaking)
- CEL103 (Writing Academic Texts)
- CEL104 (Oral Presentation)
- CEL105 (Spoken Communication for the Workplace)
- CEL106 (Communication for Professional Development)
- CEL107 (Written Business Communication)

LAX

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

Pre-requisites for courses

- CEL102 : Level 2 in CEL101 or MUET Band 5-6
- CEL103 : Passed BBI2424 or MUET Band 5 - 6
- BBI2423 : Level 2 in CEL102
- BBI2424 : Passed BBI2423
- CE2104,105,106,107 :Passed BBI2424 or MUET Band 5 – 6