

STRUKTUR KURIKULUM/ CURRICULUM STRUCTURE

Nama Program : **Bachelor Sains Kimia dengan Kepujian/ Bachelor of Science in Chemistry with Honours**

Jumlah Kredit Bergraduat : **120 Jam Kredit/ Credit Hours**

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

Matlamat Program :

1. Melahirkan ahli kimia yang kompeten dalam aspek teori dan praktikal bagi menerajui bidang berasaskan kimia.
2. Melahirkan penyelidik yang berpengetahuan dan berkemahiran penyelidikan bagi tujuan inovasi dan pengajian lanjutan.
3. Melahirkan pegawai dalam bidang berkaitan yang beretika dan berintegriti di sesebuah organisasi.

RINGKASAN HASIL PEMBELAJARAN PROGRAM

Program	Pengetahuan dan kefahaman (C)	Kemahiran praktikal (P)	Kemahiran kognitif (CTPS)	Kemahiran komunikasi (CS)	Kemahiran interpersonal (TS)	Etika dan profesionalisme (EM)	Kemahiran digital dan pendidikan sepanjang hayat (LL)	Kemahiran personal dan keusahawanan (KK)	Kepimpinan, autonomi dan tanggungjawab (LS)	Kemahiran numerasi (NS)
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Bachelor Sains Kimia dengan Kepujian	33	19	23	9	7	9	10	4	4	6

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

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T	PRASYARAT/ PREREQUISITE
LPE2301	Academic Interaction and Presentation	3	3	0	LPE2401 atau/or MUET Band 3 atau/or 4
LPE2501	Academic Writing	3	3	0	LPE2301
MGM3180	Asas Keusahawanan/ Basic Entrepreneurship	3	2	1	Tiada/ None
PRT2009	Pertanian dan Kehidupan/ Agriculture and Life	2	1	1	Tiada/ None
SKP2101*	Kenegaraan Malaysia/ Malaysian Nationhood	3	3	0	Tiada/ None
FEM2401**	Politik Malaysia dan Masyarakat/ Malaysian Politics and Society	2	2	0	Tiada/ None
SKP3112*	Falsafah dan Isu Semasa/ Philosophy and Current Issues	2	2	0	Tiada/ None

SKP3113**	<i>Falsafah dan Isu Semasa Masyarakat Sivil/ Philosophy and Current Issues in Civil Society</i>	3	3	0	Tiada/ None
atau/ or	atau/ or				
SKP3123**	Penghayatan Etika dan Peradaban di Malaysia/ <i>Internalization of Ethics and Civilization in Malaysia</i>	3	3	0	Tiada/ None
SKP3122*	Penghayatan Etika dan Peradaban/ <i>Internalization of Ethics and Civilization</i>	2	2	0	Tiada/ None
LPM2100**	Bahasa Melayu Komunikasi/ <i>Malay Language Communication</i>	2	2	0	Tiada/ None
QKXxxxx	Kokurikulum/ <i>Co-curriculum</i>	1	0	1	Tiada/ None
QKXxxxx	Kokurikulum/ <i>Co-curriculum</i>	1	0	1	Tiada/ None

Nota: *pelajar tempatan/local student **pelajar antarabangsa/international student

2. Kursus Teras/ Core Courses (70 Kredit/ Credits)

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T	PRASYARAT/ PREREQUISITE
CHY3003	Asas Keselamatan Makmal/ <i>Basic Laboratory Safety</i>	2	2	0	Tiada/ None
CHY3101	Kimia Fizik I/ <i>Physical Chemistry I</i>	4	3	1	Tiada/ None
CHY3102	Kimia Fizik II/ <i>Physical Chemistry II</i>	4	3	1	CHY3101
CHY3103	Kimia Polimer/ <i>Polymer Chemistry</i>	4	3	1	CHY3101
CHY4101	Kinetik Kimia/ <i>Chemical Kinetics</i>	3	2	1	CHY3102
CHY4102	Termodinamik Kimia/ <i>Chemical Thermodynamics</i>	3	2	1	CHY3102
CHY3201	Kimia Organik I/ <i>Organic Chemistry I</i>	4	3	1	CHY2001 atau/or setara/ equivalent
CHY3202	Kimia Organik II/ <i>Organic Chemistry II</i>	4	3	1	CHY3201
CHY3203	Sintesis Organik / <i>Organic Synthesis</i>	4	3	1	CHY3202 dan/ and CHY3402
CHY3301	Keberkasaan dan Ikatan Kimia / <i>Periodicity and Chemical Bonding</i>	4	3	1	CHY2001 atau/or setara/ equivalent
CHY3302	Teori Kumpulan dan Struktur Pepejal / <i>Group Theory and Solid Structure</i>	3	2	1	CHY3301
CHY3303	Kimia Koordinatan dan Organologam Logam Peralihan/ <i>Coordination and Organometallic Chemistry of Transition Metals</i>	3	2	1	CHY3302
CHY3401	Kimia Analisis/ <i>Analytical Chemistry</i>	3	2	1	CHY3101 atau/ or CHY3002
CHY3402	Spektroskopi Kimia/ <i>Chemical Spectroscopy</i>	4	3	1	CHY3101 dan/ and CHY3201

CHY4103	Kimia Pengkomputeran/ <i>Computational Chemistry</i>	4	3	1	CHY3102
CHY4903	Latihan Industri/ <i>Industrial Training</i>	8	0	8	Kebenaran Jabatan/ <i>Department Approval</i>
CHY4959	Disertasi Bachelo/ <i>Bachelor Dissertation</i>	6	0	6	Kebenaran Jabatan/ <i>Department Approval</i>
MTS3100	Kalkulus/ <i>Calculus</i>	3	3	0	Tiada/ <i>None</i>

3. Kursus Elektif/ *Elective Courses* (30 Kredit/ *Credits*)

Pelajar dikehendaki mengambil 12 kredit dari kursus yang tersenarai dalam Elektif Bidang Seterusnya pelajar diminta memilih satu pakej kursus dari Elektif Opsyen sebanyak 9 kredit dan akhir sekali, mengambil kursus elektif terbuka sebanyak 9 kredit dari Elektif Umum dengan persetujuan Ketua Jabatan./ *Students are required to take 12 credits of courses listed in Major Electives. The students are asked to choose a package of courses from Optional Electives with a total of 9 credits and lastly, take elective courses for 9 credits from General Electives with the approval of the Head of Department*

i. Elektif Bidang/ *Major Electives* (12 Kredit/ *Credits*)

KOD KURSUS/ <i>COURSE CODE</i>	NAMA KURSUS/ <i>COURSE NAME</i>	Kr	K	A/T	PRASYARAT/ <i>PREREQUISITE</i>
CHY3204	Kimia Hasil Semula Jadi/ <i>Natural Products Chemistry</i>	4	3	1	CHY3202 dan/ <i>and CHY3402</i>
CHY4201	Tajuk Khas Kimia Organik/ <i>Special Topics in Organic Chemistry</i>	3	3	0	CHY3203 atau/ <i>or CHY3204</i>
CHY4301	Kimia Keadaan Pepejal/ <i>Solid State Chemistry</i>	3	3	0	CHY3302 atau/ <i>or CHY3304</i>
CHY4302	Kimia Biotakorganik/ <i>Bioinorganic Chemistry</i>	3	3	0	CHY3303 atau/ <i>or CHY3304</i>
CHY4401	Elektrokimia/ <i>Electrochemistry</i>	3	3	0	CHY3101 dan/ <i>and CHY3401</i>
CHY4402	Teknik Pemisahan/ <i>Separation Techniques</i>	3	3	0	CHY3401
CHY4601	Pemangkinan Heterogen/ <i>Heterogeneous Catalysis</i>	3	2	1	CHY3102
FSA4001	Sistem Pengurusan Kualiti dalam Sains/ <i>Quality Management System in Science</i>	3	3	0	Tiada/ <i>None</i>

ii. Elektif Opsyen/ *Optional Electives* (9 Kredit/ *Credits*)

KOD KURSUS/ <i>COURSE CODE</i>	NAMA KURSUS/ <i>COURSE NAME</i>	Kr	K	A/T	PRASYARAT/ <i>PREREQUISITE</i>
A. Kimia Gunaan / <i>Applied Chemistry</i>					
CHY3205	Kimia Protein/ <i>Protein Chemistry</i>	3	3	0	CHY3202 dan/ <i>and CHY3402</i>

CHY3501	Kimia Perindustrian/ <i>Industrial Chemistry</i>	3	3	0	CHY3202
CHY3506	Oleokimia/ <i>Oleochemistry</i>	3	2	1	CHY3202
CHY3508	Kimia Hijau/ <i>Green Chemistry</i>	3	2	1	CHY3402
CHY3602	Proses Penapisan Petroleum/ <i>Petroleum Refining Processes</i>	3	3	0	CHY3202
CHY4403	Kimia Forensik/ <i>Forensic Chemistry</i>	3	3	0	CHY3402
CHY4501	Keusahawanan Kimia/ <i>Chempreneurship</i>	3	3	0	CHY3501 atau/ or CHY3504
Atau/ Or					
B. Kimia Makanan / <i>Food Chemistry</i>					
FST3110	Biokimia Makanan/ <i>Food Biochemistry</i>	3	3	0	Tiada/ <i>None</i>
FST3114	Kimia dan Analisis Komponen Makro Makanan/ <i>Chemistry and Analysis of Food Macro-Components</i>	4	2	2	FST3110
FST3115	Kimia dan Analisis Komponen Mikro Makanan/ <i>Chemistry and Analysis of Food Micro-Components</i>	3	2	1	FST3114
FST3302	Asas Pemprosesan dan Pengawetan Makanan/ <i>Fundamentals of Food Processing and Preservation</i>	3	3	0	Tiada/ <i>None</i>
Atau/ Or					
C. Kimia Alam Sekitar / <i>Environmental Chemistry</i>					
EMG4205	Perancangan Respons Tumpahan Minyak/ <i>Oil Spill Response Planning</i>	2	2	0	Tiada/ <i>None</i>
ESC3009	Analisis dan Instrumentasi Alam Sekitar/ <i>Instrumentation and Environmental Analysis</i>	3	2	1	Tiada/ <i>None</i>
ESC3012	Teknologi Rawatan Sisa Pepejal/ <i>Solid Waste Treatment Technology</i>	3	3	0	Tiada/ <i>None</i>
ESC3204	Rawatan Air Sisa/ <i>Wastewater Treatment</i>	3	2	1	Tiada/ <i>None</i>
ESC4205	Kimia Marin/ <i>Marine Chemistry</i>	3	2	1	Tiada/ <i>None</i>
ESC4404	Teknologi Rawatan Sisa Berbahaya/ <i>Hazardous Waste Treatment Technology</i>	3	3	0	Tiada/ <i>None</i>
ESC4507	Forensik Alam Sekitar/ <i>Environmental Forensics</i>	3	2	1	Tiada/ <i>None</i>
Atau/ Or					
D. Kimia Pertanian / <i>Agricultural Chemistry</i>					
PRT3403	Kimia dan Biokimia Pertanian/ <i>Agricultural Chemistry and Biochemistry</i>	4	3	1	Tiada/ <i>None</i>
PLP4601	Sains Racun Perosak/ <i>Pesticide Science</i>	3	2	1	Tiada/ <i>None</i>
SST3005	Sains Tanah Asas/ <i>Basic Soil Science</i>	3	2	1	Tiada/ <i>None</i>
SST3802	Pengurusan Sisa Pertanian/ <i>Agricultural Waste Management</i>	3	2	1	Tiada/ <i>None</i>

SST4402	Kimia Tanah/ <i>Soil Chemistry</i>	3	2	1	Tiada/ <i>None</i>
SST4601	Kesuburan Tanah Lanjutan/ <i>Advanced Soil Fertility</i>	3	2	1	Tiada/ <i>None</i>
SST4801	Sains Tanah Persekitaran/ <i>Environmental Soil Science</i>	3	2	1	SST3005

iii. Elektif Umum/ *General Electives* (9 Kredit/ *Credits*)

KOD KURSUS/ <i>COURSE CODE</i>	NAMA KURSUS/ <i>COURSE NAME</i>	Kr	K	A/T	PRASYARAT/ <i>PREREQUISITE</i>
LP_2101	Bahasa Global Asas/ <i>Basic Global Language</i>	3	3	0	Tiada/ <i>None</i>
	Elektif 1/ <i>Elective 1</i>	3			Tiada/ <i>None</i>
	Elektif 2/ <i>Elective 2</i>	3			Tiada/ <i>None</i>

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

SKEMA PENGAJIAN/ STUDY SCHEME**TAHUN 1/ 1ST YEAR****SEMESTER 1/ 1ST SEMESTER**

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
CHY3003	Asas Keselamatan Makmal/ Basic Laboratory Safety/	2	2	0
CHY3101	Kimia Fizik I/ <i>Physical Chemistry I</i>	4	3	1
CHY3301	Keberkasaan dan Ikatan Kimia/ <i>Periodicity and Chemical Bonding</i>	4	3	1
MTS3100	Kalkulus/ <i>Calculus</i>	3	3	0
PRT2009	Pertanian dan Kehidupan/ <i>Agriculture and Life</i>	2	1	1
SKP3112*	Falsafah dan Isu Semasa/ <i>Philosophy and Current Issues</i>	2	2	0
SKP3113**	Falsafah dan Isu Semasa Masyarakat Sivil/ <i>Philosophy and Current Issues in Civil Society</i>	3	3	0
atau/ or	atau/ or			
SKP3123**	Penghayatan Etika dan Peradaban di Malaysia / <i>Internalization of Ethics and Civilization in Malaysia</i>	3	3	0
JUMLAH/ TOTAL		17/18	14/15	3

SEMESTER 2/ 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
CHY3201	Kimia Organik I/ <i>Organic Chemistry I</i>	4	3	1
CHY3401	Kimia Analisis/ <i>Analytical Chemistry</i>	3	2	1
MGM3180	Asas Keusahawanan/ <i>Basic Entrepreneurship</i>	3	2	1
SKP2101*	Kenegaraan Malaysia/ <i>Malaysian Nationhood</i>	3	3	0
FEM2401**	Politik Malaysia dan Masyarakat/ <i>Malaysian Politics and Society</i>	2	2	0
LPE2301	<i>Academic Interaction and Presentation</i>	3	3	0
SKP3122*	Penghayatan Etika dan Peradaban/ <i>Internalization of Ethics and Civilization</i>	2	2	0
LPM2100**	Bahasa Melayu Komunikasi/ <i>Malay Language Communication</i>	2	2	0
JUMLAH/ TOTAL		17/18	14/15	3

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

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
CHY3102	Kimia Fizik II/ <i>Physical Chemistry II</i>	4	3	1
CHY3302	Teori Kumpulan dan Struktur Pepejal/ <i>Group Theory and Solid Structure</i>	3	2	1
LPE2501	<i>Academic Writing</i>	3	3	0
LP_2101	Bahasa Global Asas/ <i>Basic Global Language</i>	3	3	0
QKXxxxx	Ko-kurikulum/ <i>Co-curriculum</i>	1	0	1
	Elektif/ <i>Elective</i>	3		
JUMLAH/ TOTAL		17		

SEMESTER 2/ 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
CHY3103	Kimia Polimer/ <i>Polymer Chemistry</i>	4	3	1
CHY3202	Kimia Organik II/ <i>Organic Chemistry II</i>	4	3	1
CHY3402	Spektroskopi Kimia/ <i>Chemical Spectroscopy</i>	4	3	1
QKXxxxx	Kokurikulum/ <i>Co-curriculum</i>	1	0	1
	Elektif/ <i>Elective</i>	3		
JUMLAH/ TOTAL		16		

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

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
CHY4103	Kimia Pengkomputeran/ <i>Computational Chemistry</i>	4	3	1
CHY3203	Sintesis Organik/ <i>Organic Synthesis</i>	4	3	1
CHY3303	Kimia Koordinatan dan Organologam Logam Peralihan/ <i>Coordination and Organometallic Chemistry of Transition Metals</i>	3	2	1
	Elektif/ <i>Electives</i>	6		
JUMLAH/ TOTAL		17		

SEMESTER 2/ 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
CHY4101	Kinetik Kimia/ <i>Chemical Kinetics</i>	3	2	1
CHY4959A	Disertasi Bacelor/ <i>Bachelor Dissertation</i>	3	0	3
	Elektif/ <i>Electives</i>	9		
JUMLAH/ TOTAL		15		

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

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
CHY4102	Termodinamik Kimia/ <i>Chemical Thermodynamics</i>	3	2	1
CHY4959B	Disertasi Bacelor/ <i>Bachelor Dissertation</i>	3	0	3
	Elektif/ <i>Electives</i>	6		
JUMLAH/ TOTAL		12		

SEMESTER 2/ 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
CHY4903	Latihan Industri/ <i>Industrial Training</i>	8	0	8
JUMLAH/ TOTAL		8	0	8