

STRUKTUR KURIKULUM/ CURRICULUM STRUCTURE

Nama Program : **Bachelor Sains Fizik Instrumentasi dengan Kepujian/**
Bachelor of Science in Instrumentation Physics with Honours

Jumlah Kredit Bergraduat : **121 Jam Kredit/ Credit Hours**

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

Matlamat Program :

1. Ahli instrumentasi yang kompeten dalam aspek teori dan praktikal serta berdaya saing bagi menerajui bidang berasaskan fizik instrumentasi
2. Penyelidik yang berpengetahuan dan berkemahiran tinggi bagi tujuan inovasi dan pengajian lanjutan
3. 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 Fizik Instrumentasi dengan Kepujian	36	14	17	12	10	13	14	5	3	6

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

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T	PRASYARAT/ PREREQUISITE
PRT2009	Pertanian dan Kehidupan/ <i>Agriculture and Life</i>	2	1	1	Tiada/ None
SKP2101*	Kenegaraan Malaysia/ <i>Malaysian Nationhood</i>	3	3	0	Tiada/ None
FEM2401**	Politik Malaysia dan Masyarakat/ <i>Malaysian Politics and Society</i>	2	2	0	Tiada/ None
SKP3112*	Falsafah dan Isu Semasa/ <i>Philosophy and Current Issues</i>	2	2	0	Tiada/ None
SKP3113**	Falsafah dan Isu Semasa Masyarakat Sivil/ <i>Philosophy and Current Issues in Civil Society</i>	3	3	0	Tiada/ None
atau/or					

SKP3123**	<i>atau/or</i> 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
LPE2301	<i>Academic Interaction and Presentation</i>	3	3	0	LPE2401/ MUET Band 3/4
LPE2501	<i>Academic Writing</i>	3	3	0	LPE2301
MGM3180	Asas Keusahawanan/ <i>Basic Entrepreneurship</i>	3	2	1	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

8. Kursus Teras/ *Core Courses* (68 Kredit/ *Credits*)

KOD KURSUS/ <i>COURSE CODE</i>	NAMA KURSUS/ <i>COURSE NAME</i>	Kr	K	A/T	PRASYARAT/ <i>PREREQUISITE</i>
PHY3001	Mekanik/ <i>Mechanics</i>	3	3	0	Tiada/ None
PHY3002	Keelektrikan dan Kemagnetan/ <i>Electricity and Magnetism</i>	3	3	0	Tiada/ None
MTS3100	Kalkulus/ <i>Calculus</i>	3	3	0	Tiada/ None
PHY3105	Fizik Moden/ <i>Modern Physics</i>	3	3	0	Tiada/ None
PHY3209	Termodinamik/ <i>Thermodynamics</i>	3	3	0	Tiada/ None
PHY3303	Sensor dan Transduser/ <i>Sensors and Transducers</i>	4	3	1	PHY3306
PHY3304	Prinsip Sistem Pengukuran/ <i>Principle of Measurement System</i>	4	3	1	Tiada/ None
PHY3306	Elektronik/ <i>Electronics</i>	4	3	1	Tiada/ None
PHY3400	Optik/ <i>Optics</i>	3	0	0	Tiada/ None
PHY3401	Keelektromagnetan/ <i>Electromagnetism</i>	3	3	0	Tiada/ None
PHY3600	Kaedah Matematik dalam Fizik I/ <i>Mathematical Methods in Physics I</i>	3	3	0	Tiada/ None
PHY3901	Amali Mekanik dan Fizik Terma/ <i>Mechanics and Thermal Physics Laboratory</i>	1	0	1	Tiada/ None
PHY3902	Amali Keelektromagnetan dan Optik/ <i>Electromagnetism and Optics Laboratory</i>	1	0	1	Tiada/ None
PHY3903	Pendedahan Awal kepada Industri/ <i>Early Exposure to Industry</i>	1	0	1	Tiada/ None
PHY4301	Mikroprosesor dan Mikrokomputer/ <i>Microprocessor and Microcomputer</i>	3	3	0	PHY3306

PHY4302	Rekabentuk Peralatan Elektronik/ <i>Design of Electronic Equipment</i>	4	3	1	PHY3306
PHY4303	Pengantaramukaan Komputer dan Kawalan/ <i>Computer Interfacing and Control</i>	4	3	1	PHY3306
PHY4304	Sistem Mikropengawal dan Rekabentuk/ <i>Microcontroller Systems and Design</i>	4	3	1	PHY3303
PHY4903	Latihan Industri/ <i>Industrial Training</i>	8	0	8	Tiada/ None
PHY4959	Disertasi Bacelor/ <i>Bachelor Dissertation</i>	6	0	6	Tiada/ None

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

Pelajar dikehendaki mengambil: (i) 15 kredit dari kursus yang tersenarai dalam Elektif Bidang, (ii) memilih satu pakej kursus dari Elektif Opsyen sebanyak 9 kredit dan (iii) mengambil kursus Elektif Umum sebanyak 9 kredit dengan persetujuan Ketua Jabatan/ *Students are required to take: (i) 15 credits of courses listed in Major Elective, (ii) choose a package of courses from Optional Elective with a total of 9 credits and (iii) take courses of General Elective with a total of 9 credits with the approval of the Head of Department*

vii. Elektif Bidang/ *Major Elective (15 Kredit/ Credits)*

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T	PRASYARAT/ PREREQUISITE
PHY3201	Fizik Keadaan Pepejal/ <i>Solid State Physics</i>	3	3	0	Tiada/ None
PHY4202	Peranti Semikonduktor/ <i>Semiconductor Devices</i>	3	3	0	Tiada/ None
PHY4207	Teknologi Pemprosesan Bahan/ <i>Materials Processing Technology</i>	3	3	0	Tiada/ None
PHY4305	Instrumentasi Lanjutan/ <i>Advanced Instrumentation</i>	3	3	0	PHY3304
PHY4306	Elektronik Lanjutan/ <i>Advanced Electronics</i>	3	3	0	PHY3306
PHY4307	Sistem Kawalan Instrumentasi/ <i>Instrumentation Control Systems</i>	3	3	0	Tiada/ None
PHY4309	Instrumentasi Pengimejan Perubatan/ <i>Medical Imaging Instrumentation</i>	3	3	0	Tiada/ None

viii. Elektif Opsyen/ *Optional Elective (9 Kredit/ Credits)*

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T	PRASYARAT/ PREREQUISITE
A. Instrumentasi Pengkomputeran/ <i>Computational Instrumentation</i>					
PHY4605	Kaedah Pengkomputeran dalam Fizik/ <i>Computational Method in Physics</i>	3	2	1	PHY3600
PHY4701	Sains Data untuk Ahli Fizik dan Ahli Teknologi/ <i>Data Science for Physicist and Technologist</i>	3	3	0	PHY3600
PHY4702	Rangkaian Neural Buatan/ <i>Artificial Neural Networks</i>	3	3	0	PHY3600
Atau/ Or					

B. Teknologi Pengukuran/ <i>Measurement Technology</i>					
PHY4308	Prinsip dan Instrumentasi Ujian Tanpa Musnah/ <i>Principles and Instrumentation of Non-Destructive Testing</i>	3	3	0	Tiada/ None
EEE4237	Kejuruteraan Pengujian Elektronik dan Kebolehharapan/ <i>Electronic Testing and Reliability Engineering</i>	3	3	0	Tiada/ None
FSA4001	Sistem Pengurusan Kualiti dalam Sains/ <i>Quality Management System in Science</i>	3	3	0	Tiada/ None
Atau/ Or					
C. Optik Gunaan/ <i>Applied Optics</i>					
PHY4405	Optik Lanjutan dan Fizik Laser/ <i>Advanced Optics and Laser Physics</i>	3	3	0	PHY3400
PHY4406	Gentian Optik dan Optoelektronik/ <i>Fiber Optics and Optoelectronics</i>	3	3	0	PHY3400
PHY4407	Teknologi Bahan Fotonik/ <i>Photonics Material Technology</i>	3	3	0	Tiada/ None

ix. Elektif Umum/ *General Elective* (9 Kredit/ credits)

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

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
PHY3002	Keelektrikan dan Kemagnetan/ <i>Electricity and Magnetism</i>	3	3	0
MTS3100	Kalkulus/ <i>Calculus</i>	3	3	0
PHY3400	Optik/ <i>Optics</i>	3	0	0
PHY3902	Amali Keelektromagnetan dan Optik/ <i>Electromagnetism and Optics Laboratory</i>	1	0	1
PRT2009	Pertanian dan Kehidupan/ <i>Agriculture and Life</i>	2	1	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
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	15	2

SEMESTER 2/ 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
PHY3001	Mekanik/ <i>Mechanics</i>	3	3	0
PHY3306	Elektronik/ <i>Electronics</i>	4	3	1
PHY3600	Kaedah Matematik dalam Fizik I/ <i>Mathematical Methods in Physics I</i>	3	3	0
PHY3901	Amali Mekanik dan Fizik Terma/ <i>Mechanics and Thermal Physics Laboratory</i>	1	0	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
LPE2301	<i>Academic Interaction and Presentation</i>	3	3	0

QKXxxxx	Kokurikulum/ <i>Co-Curriculum</i>	1	0	1
JUMLAH/ TOTAL		17	14	3

TAHUN 2/ 2ND YEAR

SEMESTER 1/ 1ST SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
PHY3105	Fizik Moden/ <i>Modern Physics</i>	3	3	0
PHY3304	Prinsip Sistem Pengukuran/ <i>Principle of Measurement System</i>	4	3	1
PHY3401	Keelektromagnetan/ <i>Electromagnetism</i>	3	3	0
PHY4301	Mikroprosesor dan Mikrokomputer/ <i>Microprocessor and Microcomputer</i>	3	3	0
LPE2501	<i>Academic Writing</i>	3	3	0
QKXxxxx	Kokurikulum/ <i>Co-Curriculum</i>	1	0	1
JUMLAH/ TOTAL		17	15	2

SEMESTER 2/ 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
PHY3209	Termodinamik/ <i>Thermodynamics</i>	3	3	0
PHY3303	Sensor dan Transduser/ <i>Sensors and Transducers</i>	4	3	1
PHY4303	Pengantaramukaan Komputer dan Kawalan/ <i>Computer Interfacing and Control</i>	4	3	1
MGM3180	Asas Keusahawanan/ <i>Basic Entrepreneurship</i>	3	2	1
	Elektif Umum (Bahasa Global)/ <i>General Elective (Global Language)</i>	3		
JUMLAH/ TOTAL		17		

TAHUN 3/ 3RD YEAR

SEMESTER 1/ 1ST SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
PHY4304	Sistem Mikropengawal dan Rekabentuk/ <i>Microcontroller Systems and Design</i>	4	3	1
	Elektif Bidang/ <i>Major Elective</i>	9		
	Elektif Umum/ <i>General Elective</i>	3		
JUMLAH/ TOTAL		16		

SEMESTER 2/ 2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
PHY4959A	Disertasi Bacelor/ <i>Bachelor Dissertation</i>	3	0	3
PHY4302	Rekabentuk Peralatan Elektronik/ <i>Design of Electronic Equipment</i>	4	3	1
	Elektif Bidang/ <i>Major Elective</i>	6		
	Elektif Umum/ <i>General Elective</i>	3		
JUMLAH/ TOTAL		16		

TAHUN 4/ 4TH YEAR

SEMESTER 1/ 1ST SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
PHY4959B	Disertasi Bacelor/ <i>Bachelor Dissertation</i>	3	0	3
PHY3903	Pendedahan Awal kepada Industri/ <i>Early Exposure to Industry</i>	1	0	1
	Elektif Opsyen/ <i>Optional Elective</i>	9		
JUMLAH/ TOTAL		13		

SEMESTER 2/2ND SEMESTER

KOD KURSUS/ COURSE CODE	NAMA KURSUS/ COURSE NAME	Kr	K	A/T
PHY4903	Latihan Industri/ <i>Industrial Training</i>	8	0	8
JUMLAH/ TOTAL		8	0	8