

BACHELOR OF SCIENCE (PHYSICS) SESSION 2010/2011

1. UNIVERSITY COURSES (21 CREDITS)

COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDIT
GXEX1401	Information Skills		1
GXEX1411 [@]	Ethnic Relations		2
GXEX1412	Basic Entrepreneurship Culture		2
GXEX1414	Islamic and Asian Civilization (TITAS)		2
SXEX1102	Statistics		3
SXEX1411	Introduction to Science and Technology Studies		3
GTEE1101/2/3/4	English Language (choose 2 courses)		6
____XX	Co-curricular		2

[@]For international students, this course is replaced with GXEX1413 Introduction To Malaysia (2 credits)

2. PROGRAMME CORE COURSES (91 CREDITS)

(1) COMPULSORY COURSES (73 CREDITS)

- LEVEL 1 (18 Credits)

COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDIT
SMES1102	Basic Mathematical Methods	STPM Mathematics /Equivalent	3
SMES1103	Beginning Mathematical Methods	SMES1102	3
SMES1201	Vibrations and Waves	STPM Physics/Equivalent & STPM Mathematics /Equivalent	2
SMES1202	Thermal Physics	STPM Physics/Equivalent & STPM Mathematics /Equivalent	2
SMES1203	Modern Physics	STPM Physics/Equivalent & STPM Mathematics /Equivalent	2
SMES1204	Basic Electronics	STPM Physics/Equivalent & STPM Mathematics /Equivalent	2
SMES1205*	Experimental Methods	STPM Physics/Equivalent & STPM Mathematics /Equivalent	2
SMES1271*	Practical Physics	STPM Physics/Equivalent & STPM Mathematics /Equivalent	2

* Courses to be taken concurrently.

- LEVEL 2 (36 Credits)

COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDIT
SMES2104	Electronics	SMES1204	3
SMES2105	Numerical and Computational Methods	SMES1103	3
SMES2171	Fundamental Physics Practical	SMES1205 & SMES1271	2
SMES2173	Electronics Practical	SMES1204 & SMES1271	2
SMES2174	Applied Physics Practical	SMES1271 & SMES2209	4
SMES2201	Quantum Mechanics	SMES1103 & SMES1201 & SMES1203	3
SMES2203	Mathematical Methods	SMES1103	3
SMES2204	Mechanics	SMES1103 & SMES1201 & SMES1203	3
SMES2205	Statistical Physics	SMES1103 & SMES1202	3
SMES2206	Electricity and Magnetism	SMES1103 & SMES1201	3
SMES2207	Electromagnetism	SMES2206	3
SMES2208	Optics	SMES1103 & SMES1201	2
SMES2209	Instrumentation	SMES1204 & SMES1205	2

- LEVEL 3 (19 Credits)

COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDIT
SMES3171	Microprocessor and Microcomputer Practical	SMES2173	2
SMES3201	Nuclear Physics	SMES2201	3
SMES3202	Physics of Atoms and Molecules	SMES2201	3
SMES3203	Solid State Physics	SMES2201 & SMES2205	3
SMES4181	Project (Note: begins in Semester I; 4 credit hours in Semester I and 4 credit hours in Semester II)	SMES2201 & SMES2205 & SMES2171 & SMES2174 & SMES3171	8

(2) ELECTIVE COURSES (18 CREDITS)

COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDIT
SMES2103	Modern Optics	SMES2208	3
SMES2404	Atmospheric Physics	SMES1103 & SMES1202	3
SMES2405	Gas Discharge Physics	SMES1103 & SMES1202 & SMES1203	3
SMES2406	Radiation Physics	SMES1103 & SMES1203	3
SMES2407	Astrophysics and Cosmology	SMES1103 & SMES1202 & SMES1203	3
SMES2408	Polymer Physics	SMES1103 & SMES1203	3
SMES2409	Biophysics	SMES1103 & SMES1202 & SMES1203	3
SMES3102	Microprocessor	SMES2173	3
SMES3103	Computational Techniques	SMES2105	3
SMES3111	Advanced Quantum Mechanics	SMES2201	3
SMES3112	Advanced Electromagnetism Theory	SMES2207	3
SMES3122	Digital Electronics	SMES2104	3
SMES3303	Advanced Mathematical Methods	SMES2203	3
SMES3306	Plasma Physics	SMES2405	3

SMES3307	Elementary Particle Physics	SMES2201	3
SMES3311	Classical Mechanics and General Relativity	SMES2204	3
SMES3323	Plasma Technology	SMES2405	3
SMES3341	Complex and Nonlinear Systems	SMES2205	3
SMES3391	Industrial Training	SMES2201 & SMES2205 & SMES2171 & SMES2174 & SMES3171	3
SMES3404	Laser Physics	SMES2103 & SMES3202	3
SMES4301	Advanced Solid State Physics	SMES3203	3
SMES4321	Semiconductor Devices	SMES3203	3
SMES4322	Optoelectronics	SMES3404	3
SMES4323	Materials Science	SMES1103 & SMES1201	3
SMES4325	Photonics	SMES2103 & SMES3202	3
3. NON CORE COURSES (10 CREDITS)			
* Courses Offered by Other Institute/Department of Specialization (Please refer to the Non Core Courses from other Institute/Department within the Faculty of Science)			

PROGRAMME GOALS

1. To produce graduates with vast knowledge and sound understanding in physics along with practical, analytical and mathematical skills for a physicists.
2. To produce graduates with oral and written communication skills and ability to work effectively in various disciplines as a team.
3. To produce graduates with high commitment towards ethical practice and appreciation towards environmental, social and safety factors in carrying out their work.
4. To produce graduates with independent learning and problem solving skills which can be used in diversified careers.

PROGRAMME LEARNING OUTCOMES

At the end of the Degree of Bachelor of Science (Physics) programme, graduates are able to:

1. Demonstrate proficiency in the basic knowledge in the major fields of physics (classical mechanics, electricity and magnetism, quantum mechanics, statistical mechanics and thermodynamics) and the field of applied physics (e.g. solid state physics, optics, nuclear physics, atomic physics, etc.).
2. Demonstrate practical skills in physics such as designing, setting up experiments, collecting and analyzing data, identifying sources of error, interpreting experimental results and connecting results to related physics concepts or other scientific theories).
3. Value the need for sustainable development in the practice of physics for the needs of society and the environment.
4. Demonstrate capability in seeking creative and practical solutions to meet the requirements and changes dictated by the work environment in a scientific, professional and ethical way.
5. Demonstrate communication, leadership and team work skills particularly in relating scientific and technical information through both written and oral presentations.
6. Apply physics principles to novel situations, both in the classroom and in research settings, through critical thinking, problem solving, mathematical and computer modeling, and laboratory experimentation.
7. Manage effectively the rigor and discipline it takes to be a good scientist with efficient time management and appropriate use of resources.
8. Apply their physics experience and knowledge to explore opportunities in entrepreneurship world.

NON CORE COURSES (For students from other institute/department within Faculty of Science)			
COURSE CODE	COURSE NAME	PRE-REQUISITE	CREDIT
SMES1201	Vibrations and Waves	STPM Physics/Equivalent & STPM Mathematics/Equivalent	2
SMES1202	Thermal Physics	STPM Physics/Equivalent & STPM Mathematics/Equivalent	2
SMES1203	Modern Physics	STPM Physics/Equivalent & STPM Mathematics/Equivalent	2
SMES1204	Basic Electronics	STPM Physics/Equivalent & STPM Mathematics/Equivalent	2
SMES1501 [§]	Fundamentals of Matter	SPM Science/Equivalent	2
SMES1502 [§]	Fundamentals of Particles and Forces	SPM Science/Equivalent	2

[§] Courses SMES1501 and SMES1502 are equivalent to STPM Physics.

PROPOSED LIST OF COURSES FOR EACH SEMESTER (LECTURE PLANNING GUIDE)

COMPONENT	SEMESTER 1		SEMESTER 2		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	GTEE1101/2/3/4 English Language	3	GTEE1101/2/3/4 English Language	3	19
	GXEX1412 Basic Entrepreneurship Culture	2	GXEX1401 Information Skills	1	
	SXEX1411 Introduction to Science and Technology Studies	3	GXEX1414 Islamic and Asian Civilization (TITAS)	2	
			GXEX1411 [@] Ethnic Relations	2	
Compulsory Courses	SMES1102 Basic Mathematical Methods	3	SMES1103 Beginning Mathematical Methods	3	16
	SMES1204 Basic Electronics	2	SMES1201 Vibrations and Waves	2	
	SMES1205 Experimental Methods	2	SMES1203 Modern Physics	2	
	SMES1271 Practical Physics	2			
Total Credits		17		18	35

COMPONENT	SEMESTER 3		SEMESTER 4		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
University Courses	XXXX# Co-curricular*	2			2
Compulsory Courses	SMES1202 Thermal Physics	2	SMES2104 Electronics	3	28
	SMES2201 Quantum Mechanics	3	SMES2174 Applied Physics Practical	4	
	SMES2209 Instrumentation	2	SMES2205 Statistical Physics	3	
	SMES2171 Fundamental Physics Practical	2	SMES2206 Electricity and Magnetism	3	
	SMES2173 Electronics Practical	2	SMES2208 Optics	2	
		SMES3171 Microprocessors and Microcomputers Practical	2		
Non-core Courses	S___XXXX PROGRAMME NON-CORE COURSE [†]	4			4
Total Credits		17		17	34

COMPONENT	SEMESTER 5		SEMESTER 6		TOTAL CREDITS
	COURSE	CREDIT	COURSE	CREDIT	
Compulsory Courses	SMES2204 Mechanics	3	SMES2105 Numerical and Computational Methods	3	26
	SMES3202 Physics of Atoms and Molecules	3	SMES2203 Mathematical Methods	3	
	SMES3203 Solid State Physics	3	SMES2207 Electromagnetism	3	
	SMES4181 Project	4	SMES4181 Project	4	
Elective Courses	SMESXXXX PROGRAMME ELECTIVE COURSE	3	SMESXXXX PROGRAMME ELECTIVE COURSES	3	6
Non-core Courses	S___XXX PROGRAMME NON-CORE COURSE [†]	2	S___XXX PROGRAMME NON-CORE COURSE [†]	2	4
Total Credits		18		18	36

COMPONENT	SEMESTER 7		TOTAL CREDITS	OVERALL TOTAL CREDITS
	COURSE	CREDIT		
University Courses				21
Compulsory Courses	SMES3201 Nuclear Physics	3	3	73
Elective Courses	SMESXXXX PROGRAMME ELECTIVE COURSES	12	12	18
Non-core Courses	S___XXXX PROGRAMME NON-CORE COURSE [†]	2	2	10
Total Credits		17	17	122

[†] Students may choose any course offered by department/institute other than the Physics Department in the Faculty of Science.

*Students may choose any course offered by other faculties (except Faculty of Science) listed by the Section for Co-Curricular Courses, External Faculty Electives and TITAS (SKET).

[@]For international students, this course is replaced with GXEX1413 Introduction To Malaysia