UNIVERSITY OF
LIVERPOOL

XJTU Pathways in Physics

July 2009

Introduction

From 2010/11 students from Xi'an Jiaotong University (XJTU) can study Physics at the University of Liverpool (UoL) for one academic year.

A pathway is a set of modules that offers a coherent collection of Physics or Physics-related subjects that can be taken by XJTU students. Each pathway has a different emphasis, so students can choose one that is most closely aligned with their own interests. At present, three pathways are defined

X1 Physics
X2 Astrophysics
X3 Medical Physics

and more pathways are being considered for implementation in 2011/12.

Within each pathway there are a number of core modules and optional modules. Each module is assigned a credit weighting (either 7.5 or 15 credits) and optional modules should be selected such that the sum for all modules adds up to 120 credits for the year. It is recommended that the students' workload is balanced with 60 credits in each semester, but this is not a requirement.

Most modules will be at Level 3, the level appropriate for a student in their third year of an undergraduate degree programme, but modules at Level 1, Level 2 or Level M (Masters level) may also be selected. When selecting optional modules it is the responsibility of the XJTU student to check that they have the necessary background knowledge, as specified by the module prerequisites that UoL students are required to have passed before taking those modules. This is particularly important when selecting modules at Level 3 and Level M.

In all cases, a student's selection of modules must be approved by the Director of Undergraduate Studies prior to the start of the academic year.

This document specifies the structure of each of the pathways and lists all of the core modules and many of the optional modules. Optional modules that are not listed here may also be selected, subject to the approval of the Director of Undergraduate Studies.

For each module the syllabus and assessment methods are defined in the Module Specifications (http://www.liv.ac.uk/~sdb/ModSpecs) and a checklist of modules with their prerequisites is appended to this document for quick reference. Also, a web page has been set up to help students with the process of selecting pathways and modules (http://www.liv.ac.uk/~sdb/XJTU).

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Pathway X1 Physics

This pathway is based on Year 3 of the BSc degree programme F300 Physics.

The pathway comprises

45 credits of core modules
30 credits of optional modules taken in Semester 1
45 credits of optional modules taken in Semester 2

Colour Key

Semester 1
Semester 2
Semester 1 + 2

X1 Pathway Structure

Core	Name	Credits	Level	Semester
PHYS361	Quantum Mechanics and Atomic Physics	15	3	1
PHYS370	Advanced Electromagnetism	15	3	2
PHYS378	Advanced Practical Physics (BSc)	15	3	1
Optional — *Select 30 credits from:*				
PHYS363	Condensed Matter Physics	7.5	3	1
PHYS375	Nuclear Structure	7.5	3	1
PHYS387	Materials Physics	7.5	3	1
PHYS389	Semiconductor Applications	7.5	3	1
PHYS393	Statistical and Low Temperature Physics	15	3	1
PHYS480	Advanced Quantum Physics	15	M	1
PHYS481	Accelerator Physics	7.5	M	1
PHYS497	Magnetic Structure and Function	7.5	M	1
PHYS499	Nanoscale Physics and Technology	7.5	M	1
Optional — *Select 45 credits from:*				
PHYS241	Communicating Science	7.5	2	2
PHYS246	Accelerators & Radioisotopes in Medicine	15	2	2
PHYS247	Programming Techniques	7.5	2	2
PHYS251	Introduction to Stellar Astrophysics	15	2	2
PHYS374	Relativity and Cosmology	15	3	2
PHYS377	Particle Physics	7.5	3	2
PHYS381	Surface Physics	7.5	3	2
PHYS382	Physics of Life	7.5	3	2
PHYS388	Physics of Energy Sources	15	3	2
PHYS488	Modelling Physical Phenomena (Project)	15	M	2
PHYS489	Condensed Matter Theory	7.5	M	2
PHYS490	Advanced Nuclear Physics	7.5	M	2
PHYS493	Advanced Particle Physics	7.5	M	2
Total Credits		**120**		

Pathway X2 Astrophysics

This pathway is based on Year 3 of the BSc degree programme F3F5 Physics with Astronomy.

The pathway comprises

75 credits of core modules
22.5 credits of optional modules taken in Semester 1
22.5 credits of optional modules taken in Semester 2

Colour Key

Semester 1
Semester 2
Semester 1 + 2

X2 Pathway Structure

Core	Name	Credits	Level	Semester
PHYS361	Quantum Mechanics and Atomic Physics	15	3	1
PHYS362	Advanced Observational Astronomy	15	3	2
PHYS373	Galaxies	15	3	1
PHYS374	Relativity and Cosmology	15	3	2
PHYS375	Nuclear Structure	7.5	3	1
PHYS377	Particle Physics	7.5	3	2
Optional — *Select 22.5 credits from:*				
PHYS363	Condensed Matter Physics	7.5	3	1
PHYS378	Advanced Practical Physics (BSc)	15	3	1
PHYS383	Further Stellar Astrophysics	15	3	1
PHYS387	Materials Physics	7.5	3	1
PHYS389	Semiconductor Applications	7.5	3	1
PHYS393	Statistical and Low Temperature Physics	15	3	1
PHYS480	Advanced Quantum Physics	15	M	1
PHYS481	Accelerator Physics	7.5	M	1
PHYS495	The Interstellar Medium	15	M	1
PHYS497	Magnetic Structure and Function	7.5	M	1
PHYS499	Nanoscale Physics and Technology	7.5	M	1
Optional — *Select 22.5 credits from:*				
PHYS241	Communicating Science	7.5	2	2
PHYS246	Accelerators & Radioisotopes in Medicine	15	2	2
PHYS247	Programming Techniques (Astrophysics)	7.5	2	2
PHYS370	Advanced Electromagnetism	15	3	2
PHYS381	Surface Physics	7.5	3	2
PHYS382	Physics of Life	7.5	3	2
PHYS388	Physics of Energy Sources	15	3	2
PHYS488	Modelling Physical Phenomena (Project)	15	M	2
PHYS489	Condensed Matter Theory	7.5	M	2
PHYS490	Advanced Nuclear Physics	7.5	M	2
PHYS493	Advanced Particle Physics	7.5	M	2
PHYS494	Computational Astrophysics	15	M	2
Total Credits		**120**		

Pathway X3 Medical Physics

This pathway is based on Year 3 of the BSc programme F350 Physics with Medical Applications.

The pathway comprises

45 credits of core modules
37.5 credits of optional modules taken in Semester 1
37.5 credits of optional modules taken in Semester 2

Colour Key

Semester 1
Semester 2
Semester 1 + 2

X3 Pathway Structure

Core	Name	Credits	Level	Semester
PHYS378	Advanced Practical Physics (BSc)	15	3	1
PHYS384	Radiation Therapy Applications	15	3	2
CLIN330	Medical Imaging I	7.5	3	1
CLIN331	Medical Imaging II	7.5	3	2
Optional — *Select 37.5 credits from:*				
PHYS361	Quantum Mechanics and Atomic Physics	15	3	1
PHYS363	Condensed Matter Physics	7.5	3	1
PHYS375	Nuclear Structure	7.5	3	1
PHYS387	Materials Physics	7.5	3	1
PHYS389	Semiconductor Applications	7.5	3	1
PHYS393	Statistical and Low Temperature Physics	15	3	1
PHYS480	Advanced Quantum Physics	15	M	1
PHYS481	Accelerator Physics	7.5	M	1
PHYS497	Magnetic Structure and Function	7.5	M	1
PHYS499	Nanoscale Physics and Technology	7.5	M	1
Optional — *Select 37.5 credits from:*				
PHYS241	Communicating Science	7.5	2	2
PHYS246	Accelerators & Radioisotopes in Medicine	15	2	2
PHYS247	Programming Techniques (Medical Physics)	7.5	2	2
PHYS251	Introduction to Stellar Astrophysics	15	2	2
PHYS370	Advanced Electromagnetism	15	3	2
PHYS374	Relativity and Cosmology	15	3	2
PHYS377	Particle Physics	7.5	3	2
PHYS381	Surface Physics	7.5	3	2
PHYS382	Physics of Life	7.5	3	2
PHYS388	Physics of Energy Sources	15	3	2
PHYS488	Modelling Physical Phenomena (Project)	15	M	2
PHYS489	Condensed Matter Theory	7.5	M	2
PHYS490	Advanced Nuclear Physics	7.5	M	2
PHYS493	Advanced Particle Physics	7.5	M	2
Total Credits		**120**		

	Physics Modules 2009/10		Prerequisite(s)
	PHYS111	Practical Techniques in Physics	—
	PHYS113	Computing Techniques in Physics	—
	PHYS121	Mechanics	—
	PHYS122	Introduction To Quantum Physics	—
	PHYS123	Electricity and Magnetism	—
	PHYS124	Thermal Physics	—
	PHYS125	Introduction To Relativity	—
	PHYS126	Waves and Optics	—
	PHYS132	Physics of Materials	—
	PHYS134	Astronomy Fundamentals	—
	PHYS136	Introduction To Medical Physics	—
	PHYS137	Visual Optics I	—
	PHYS237	Visual Optics II	PHYS137
	PHYS241	Communicating Science	—
	PHYS243	The Physics Toolbox	—
	PHYS246	Accelerators and Radioisotopes in Medicine	PHYS122 or PHYS136
	PHYS247	Programming Tech in Physics, Astro & Med	—
	PHYS248	Principles of Electronics	PHYS123
	PHYS251	Introduction To Stellar Astrophysics	PHYS122 + PHYS134
	PHYS252	Astronomical Techniques	PHYS111 + PHYS134
	PHYS253	Thermodynamics	PHYS124
	PHYS254	Electromagnetism	PHYS123
	PHYS255	Quantum and Atomic Physics	PHYS122
	PHYS256	Nuclei, Molecules and Solids	PHYS255
	PHYS258	Waves and Related Phenomena	PHYS126
	PHYS259	Practical Physics	PHYS111
	PHYS360	Physics For New Technology Project	PHYS111
	PHYS361	Quantum Mechanics and Atomic Physics	PHYS255
	PHYS362	Advanced Observational Astronomy	PHYS251 + PHYS252
	PHYS363	Condensed Matter Physics	—
	PHYS370	Advanced Electromagnetism	PHYS254 + PHYS258
	PHYS373	Galaxies	PHYS251
	PHYS374	Relativity and Cosmology	—
	PHYS375	Nuclear Physics	PHYS256
	PHYS377	Introduction To Particle Physics	PHYS361
	PHYS378	Advanced Practical Physics (BSc)	PHYS111
	PHYS379	Project (BSc)	—
	PHYS381	Surface Physics	—
	PHYS382	Physics of Life	—
	PHYS383	Further Stellar Astrophysics	PHYS251
	PHYS384	Radiation Therapy Applications	PHYS122 or PHYS136
	PHYS386	Medical Physics Project	—
	PHYS387	Materials Physics	PHYS132
	PHYS388	Physics of Energy Sources	PHYS122
	PHYS389	Semiconductor Applications	PHYS132
	PHYS393	Statistical and Low Temperature Physics	PHYS253 + PHYS255
	PHYS394	Practical Astronomy	PHYS251 + PHYS252
	PHYS478	Advanced Practical Physics (MPhys)	PHYS111
	PHYS480	Advanced Quantum Physics	PHYS361
	PHYS481	Accelerator Physics	PHYS370
	PHYS488	Modelling Physical Phenomena	—
	PHYS489	Condensed Matter Theory	PHYS361 + PHYS363
	PHYS490	Advanced Nuclear Physics	PHYS375
	PHYS491	Research Skills	—
	PHYS493	Advanced Particle Physics	—
	PHYS494	Computational Astrophysics	—
	PHYS495	The Interstellar Medium	PHYS373 + PHYS383
	PHYS496	Communication of Astrophysical Ideas	PHYS373 + PHYS383
	PHYS497	Magnetic Structure and Function	PHYS363
	PHYS498	Project (MPhys)	—
	PHYS499	Nanoscale Physics and Technology	—