

Progression Meeting `MathPhys' programmes

Your options
Module choices



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(Programme Director FG31, FGH1, F344)

Programme structure/Options catalogues: in general

- Fixed year 1&2 (otherwise no guaranteed foundations, progression and accreditation issues...)
- Then: wide choices in year three (and especially in year four)
- Assume you have all seen the `Standard Catalogue(s)', but note:
- Not everything is set in stone, still...
- Things to keep in check: total of 120 credits, balance of workload (-> projects)
- Level M (code starting with 4 or higher) modules
- Projects? Project(s)!
- Consider your future
 - integrated master can directly lead to PhD studies, BSc to a MSc
 - different strategies, depending on your plans and interests:
 - A: align module choices with plans for further study, research or job
 - B: get insight in many fields (as long as you can :-)
- Non standard module choices are possible!
 - ➔ Explore, discuss with module lecturer(s) and other students, check with me
- Plan ahead: pathways, pre-requisites, ask if unsure

Programme structure/Options catalogues: links

- For MATHs modules and more:

<https://www.liverpool.ac.uk/maths-current-students/programmes-and-modules/>

- for pre-requisites:

<https://www.liverpool.ac.uk/maths-current-students/programmes-and-modules/module-details/module-prerequisites/>

- For modules with PHYS code:

<https://www.liverpool.ac.uk/study/undergraduate/courses/physics-bsc-hons/module-details/>

<https://www.liverpool.ac.uk/study/undergraduate/courses/physics-mphys/module-details/>

and links for other more specialised programmes in Physics from the same web-pages.

Detailed published lists for different programmes:

Fixed Year 1+2

then

FG31:

Year 3:

- One QM
- One Project in Maths or Physics, but
- also one of PHYS 378/9

YEAR 1

Required Modules				
Module Code		Title	Credits	Semester
PHYS	156	Practical Skills for Mathematical Physics	15	1st & 2nd Semester
MATH	101	Calculus 1	15	First Semester
MATH	103	Introduction to Linear Algebra	15	First Semester
PHYS	102	The Material Universe	15	First Semester
MATH	102	Calculus II	15	Second Semester
MATH	122	Dynamic Modelling	15	Second Semester
PHYS	103	Wave Phenomena	15	Second Semester
PHYS	104	Foundations of Modern Physics	15	Second Semester

YEAR 2

Required Modules				
Module Code		Title	Credits	Semester
MATH	225	Vector Calculus With Applications in Fluid Mechanics	15	First Semester
MATH	243	Complex Functions	15	First Semester
PHYS	201	Electromagnetism	15	First Semester
PHYS	202	Condensed Matter Physics	15	First Semester
MATH	224	Introduction To The Methods Of Applied Mathematics	15	Second Semester
MATH	228	Classical Mechanics	15	Second Semester
PHYS	203	Quantum & Atomic Physics	15	Second Semester
PHYS	204	Nuclear & Particle Physics	15	Second Semester

YEAR 3

Choose 1 Module				
Module Code		Title	Credits	Semester
PHYS	378	Advanced Practical Physics	15	First Semester
PHYS	379*	Physics Project	15	Second Semester
Choose 4 Modules				
MATH	323	Further Methods Of Applied Mathematics	15	First Semester
MATH	324	Cartesian Tensors and Mathematical Models of Solids and Viscous Fluids	15	First Semester
MATH	325*	Quantum Mechanics	15	First Semester
MATH	322	Chaos and Dynamical Systems	15	Second Semester
MATH	326	Relativity	15	Second Semester
MATH	334*	Mathematical Physics Project	15	Second Semester
Choose 45 Credits				
PHYS	363	Condensed Matter Physics	7.5	First Semester
PHYS	375	Nuclear Physics	7.5	First Semester
PHYS	387	Materials Physics	7.5	First Semester
PHYS	389	Semiconductor Applications	7.5	First Semester
PHYS	393	Statistical and Low Temperature Physics	15	First Semester
PHYS	361*	Quantum Mechanics and Atomic Physics	15	First Semester
PHYS	246	Accelerators & Radioisotopes in Medicine	15	Second Semester
PHYS	370	Advanced Electromagnetism	15	Second Semester
PHYS	374	Relativity and Cosmology	15	Second Semester
PHYS	377	Introduction to Particle Physics	7.5	Second Semester
PHYS	381	Surface Physics	7.5	Second Semester
PHYS	382	Physics of Life	7.5	Second Semester
PHYS	388	Physics of Energy Sources	15	Second Semester
Either MATH334 or PHYS379 must be taken and Either MATH325 or PHYS361 must be taken				

FGH1/F344:

Year 3:

- One QM
- + Relativity

YEAR 3		Choose 3 Modules			
MATH	325	Quantum Mechanics		15	First Semester
Or					
PHYS	361	Quantum Mechanics & Atomic Physics		15	First Semester
And					
MATH	326	Relativity		15	Second Semester
And					
MATH	432	Mathematical Physics Project		15	Second Semester
Or					
PHYS	488	Modelling Physical Phenomena (Project)		15	Second Semester
Choose 45 credits of optional FHEQ Level 6 modules from the list below					
Choose 30 credits of optional FHEQ Level 7 modules from the list below					

FGH1: + MATH 323

Year 4:

- One Y3 Project in Maths or in Physics
- PHYS 480
- Full year project MATH 420 in Y4 (normally in TP)

YEAR 4		Required Modules			
Module Code		Title	Credits	Semester	
PHYS	480	Advanced Quantum Physics	15	First Semester	
MATH	420	Mathematical Physics Project	30	1st & 2nd Semester	
Choose 45 credits of optional FHEQ Level 6 modules from the list below					
Choose 30 credits of optional FHEQ Level 7 modules from the list below					

OPTIONAL - FHEQ Level 6 modules Modules					
Module Code		Title	Credits	Semester	
MATH	323	Further Methods of Applied Maths	15	First Semester	
MATH	324	Cartesian Tensors and Mathematical Models of Solids and Viscous Fluids	15	First Semester	
PHYS	363	Condensed Matter Physics	7.5	First Semester	
PHYS	375	Nuclear Physics	7.5	First Semester	
PHYS	378	Advanced Practical Physics	15	First Semester	
PHYS	387	Materials Physics	7.5	First Semester	
PHYS	389	Semiconductor Applications	7.5	First Semester	
PHYS	393	Statistical and Low Temperature Physics	15	First Semester	
MATH	331	Mathematical Economics	15	Second Semester	
MATH	322	Chaos and Dynamical Systems	15	Second Semester	
MATH	332	Population Dynamics	15	Second Semester	
PHYS	370	Advanced Electromagnetism	15	Second Semester	

Note: year 3 and 4 projects are sometimes 'aligned', but you may want to do very different things instead.

FGH1/
F344:

PHYS	374	Relativity and Cosmology	15	Second Semester
PHYS	377	Introduction to Particle Physics	7.5	Second Semester
PHYS	381	Surface Physics	7.5	Second Semester
PHYS	382	Physics of Life	7.5	Second Semester
PHYS	388	Physics of Energy Sources	15	Second Semester

Year 3/4
options

OPTIONAL - FHEQ Level 7 modules Modules				
Module Code	Title		Credits	Semester
MATH	421	Linear Differential Operators in Mathematical Physics	15	First Semester
MATH	425	Quantum Field Theory (only in Year 4)	15	First Semester
PHYS	481	Accelerator Physics	7.5	First Semester
PHYS	491	Research Skills	7.5	First Semester
PHYS	499	Nanoscale Physics and Technology	15	First Semester
PHYS	497	Magnetic Structure and Function	7.5	First Semester
MATH	423	Intro to String Theory	15	Second Semester
MATH	426	Mathematical Biology	15	Second Semester
MATH	427	Waves, Mathematical Modelling	15	Second Semester
PHYS	490	Advanced Nuclear Physics	7.5	Second Semester
PHYS	493	Advanced Particle Physics	7.5	Second Semester

Not listed, but
natural choices,
are, e.g.,

- + PHYS 470 'Classical Mechanics' 15 credits, sem 1 Lagrange and Hamilton, relevant for accelerators
- + PHYS 392 'Statistics in Data Analysis' 15 credits, sem 1
- + MATH 340 'Riemann Surfaces' 15 credits, sem 2 'follow-up' from 'Complex Functions' MATH243
- + MATH 431 'Introduction to Modern Particle Theory' 15 credits, sem 2
MATH431 alternates with String Theory, hence only taught every 2nd year, need to plan ahead!
- + MATH 424 'Analytical and Computational Methods for Appl. Maths' 15 cr., sem 1 PDEs

These are the standard options, but you may find other modules which we can allow, like modules from Pure or Applied Maths, Statistics/Finance, Physics (, Chemistry).

Other 'exotic' choices are not excluded but less straightforward (pre-requisites, time-tabling).

TP `specials' and other options

- You can tailor your programme, especially the integrated master versions, towards various specialisations, where Liverpool is doing world-leading research;
- from TP, via Applied Mathematics, to a more experimental orientation like particle, nuclear, solid state physics or accelerator science.
- Typical TP modules, leading into our main research areas, are:
QM, Relativity, [Quantum Field Theory](#), [Particle Theory](#), [String Theory](#),
but also [Linear Differential Operators](#) and [Waves, Mathematical Modelling](#).

Your Questions

- This was just a short, general introduction, to bring up common questions
- You have already made a lot of experiences and we are eager to get your feedback
- Contact me if you want to discuss or
ask right now!

Thank you.