Theoretical Physics MSc

Year of entry: 2019
Duration: full-time: one year, part-time: two years
Study mode: full-time, part-time

www.kcl.ac.uk/study/postgraduate/taught-courses/theoretical-physics-msc.aspx

The Theoretical Physics MSc is an intensive, research-led course in which you will examine basic topics in theoretical and mathematical physics such as general relativity and quantum field theory, before exploring advanced topics such as string theory, supersymmetry and integrable quantum field theory. You will be exposed to a wide range of research techniques and have the opportunity to conduct and write up your own project.

Key benefits

• Located in the heart of London, giving unparalleled access to research facilities.
• You will be studying innovative modules covering modern theories of physics.
• Research-led course taught by staff who are recognised leaders in their field.
• Opportunity to study theoretical and mathematical physics such as general relativity and quantum field theory, and advanced topics such as string theory, supersymmetry and integral quantum field theories.
• Excellent tutorial support, extensive course-specific interactive teaching and regular classroom discussions.

Course details

The Theoretical Physics MSc is a demanding research-informed course that gives you a coherent, comprehensive introduction to the building blocks of modern theoretical physics and the opportunity to explore more advanced topics.

The Theoretical Physics MSc offers you the choice to study either full or part-time and is made up of optional and required modules. You must take modules totalling 180 credits to complete the course, including 60 credits that will come from a research project and dissertation.

If you are studying full-time, you will complete the course in one year, from September to September.

If you are studying part-time, your course will take two years to complete, you will study from the required optional module list in the first year, and a further selection of required and optional modules, including the research module, in your second year.

You will study modules covering Lie groups and Lie algebras, manifolds, advanced quantum mechanics and field theory, and there are opportunities to explore an extensive range of innovative optional modules, allowing you to develop a study pathway that reflects your interests.
Teaching
We use lectures and group tutorials to deliver most of the modules on the course.
You will also be expected to undertake a significant amount of independent study.
You are expected to spend approximately 10 hours work per credit for each module you attend in your degree, e.g. 150 hours work for a 15 credit module. These hours cover every aspect of the module: lectures, tutorials, independent study, coursework and preparation for examinations.

Assessment
The primary method of assessment for this degree is written examination. You may also be assessed by essays, practical examination, oral presentation, reports, class tests and projects. The nature of assessment varies by module.

Regulating body
King’s College London is regulated by the Office for Students.

Course structure
Courses are divided into modules. You will normally take modules totalling 180 credits.

Required module
You are required to take:
• Theoretical Physics Project (60 credits)

Optional modules
You are also required to take at least 75 credits from a range of optional modules, which may typically include:
• Lie Groups & Lie Algebras (15 credits)
• Manifolds (15 credits)
• Foundations of Mathematical Physics (15 credits)
• Advanced Quantum Mechanics (15 credits)
• Quantum Field Theory (15 credits)
• Advanced General Relativity (15 credits)*
• Space-time Geometry & General Relativity (15 credits)*
• String Theory & Branes (15 credits)
• Supersymmetry (15 credits)
• Advanced Quantum Field Theory (15 credits)
• Standard Model Physics & Beyond (15 credits)
• Mathematical Methods for Theoretical Physics (15 credits)

* Both modules cannot be taken together.

Additionally, you will study sufficient modules to bring the total for the year to 180 credits from a wide range of options that may typically include:
• Special Relativity & Electromagnetism (15 credits)
• Topology (15 credits)
• Rings & Modules (15 credits)
• Metric & Banach Spaces (15 credits)
• Probability Theory (15 credits)
• Risk Neutral Valuation (15 credits)
• Financial Markets (15 credits)
• Stochastic Analysis (15 credits)
• Statistics in Finance (15 credits)
• Theory of Complex Networks (15 credits)
• Dynamical Analysis of Complex Systems (15 credits)
• Elements of Statistical Learning (15 credits)
• Galois Theory (15 credits)
• Representation Theory of Finite Groups (15 credits)
• Algebraic Number Theory (15 credits)
• Operator Theory (15 credits)
• Fourier Analysis (15 credits)
• Algebraic Geometry (15 credits)
• Nonlinear Analysis (15 credits)
• Numerical & Computational Methods in Finance (15 credits)
• Interest Rates & Credit Risk (15 credits)
• Recent Topics in Financial Mathematics (15 credits)
• Incomplete Markets (15 credits)
• Econophysics (15 credits)
• Machine Learning (15 credits)
• Equilibrium Analysis of Complex Systems (15 credits)
• Mathematical Biology (15 credits)

Students taking the part time course should aim to take four modules in each year. The project is taken in the second year.

King’s College London reviews the modules offered on a regular basis to provide up-to-date, innovative and relevant programmes of study. Therefore, modules offered may change. We suggest that you keep an eye on the course finder on our website for updates.
Location

The majority of learning for this degree takes place at the King’s College London Strand Campus, with occasional lectures and practical sessions taking place at the Waterloo Campus. Please note that locations are determined by where each module is taught and may vary depending on the optional modules you select.

Career prospects

Many of our graduates go on to start PhD studies in theoretical physics at various universities in the United Kingdom and abroad, including with our group here at King’s, for which the MSc is particularly well tailored.

Our graduates also take up full-time employment in various industries that require good mathematical/computer knowledge. Recent employers of our graduates have included the Algerian Space Agency, FRM Capital Advisors and Lloyds Banking Group.

Fees and funding

Full-time and part-time tuition fees – UK
The UK tuition fees for the 2019–20 academic year are available on the course web page.
Please note that the tuition fees for subsequent years of study may be subject to increases in line with King’s terms and conditions.

Full-time and part-time tuition fees – EU
Students starting their programme in 2019/20 (September 2019) who are eligible to pay EU fees will pay the same rate of tuition fees as UK students. This will apply for the duration of their programme, but may be subject to change by the UK Government for subsequent cohorts from 2020/21.

The UK tuition fees for the 2019–20 academic year are available on the course web page.
Please note that the tuition fees for subsequent years of study may be subject to increases in line with King’s terms and conditions.

Deposit

When you receive an offer for this course you will be required to pay a non-refundable deposit to secure your place. The deposit will be credited towards your total fee payment.

The UK/EU deposit is £500.
The International deposit is £2,000.

For further information, please visit the fees and funding section of our website:
www.kcl.ac.uk/study/postgraduate/fees-and-funding/index.aspx

Additional costs

In addition to your tuition fees, you can also expect to pay for:
• books if you choose to buy your own copies
• library fees and fines
• personal photocopies
• printing course handouts
• society membership fees
• stationery
• travel costs for travel around London and between campuses
• graduation costs.

Disclaimer

Although this PDF was up-to-date at the time it was produced, please make sure you check our website www.kcl.ac.uk/study or contact us directly for the very latest information before you commit yourself to any of our courses.

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