

English-taught physics courses at TUM

The following courses are taught in English (except two courses) and have been divided according to possible specialization areas, though exchange students can take courses from different categories.

The courses listed here have so far taken place more or less regularly, in one way or the other: names and contents might have slightly changed, the number of credits and/or the semester in which they are taught, very few might take place in a two-year cycle. Our offer is dynamic and may be subjected to changes in the field (e.g. emergence of new topics), availability of the staff (e.g. teaching-free semesters, rotation of teaching duties in Bachelor courses or changes in postdoctoral fellows' teaching obligations) or any major circumstance. I would say that those courses with the course code in **bold** letters are the ones students can rely on more (taught by professors or permanent staff and more fundamental to specialization – in this sense, they are probably more common elsewhere).

Semiconductor Physics and Nanotechnology

Course Code	Course Title	Semester	Number of ECTS credits
PH2155	Semiconductor Physics	WS	10
PH2179	Biosensors and Bioelectronics	WS	5
PH2169	Structured Photonic Nanomaterials	WS	5
PH2170	Nanoelectronics and Nanooptics	SS	10
PH2166	Physics and Chemistry of Functional Interfaces	WS	5
PH2135	Introduction to Nanofabrication and Nanoanalytics	WS	5
PH2172	2D Materials	SS	5
PH2119	Plasmonics: Fundamentals and Applications	SS	5
PH2205	Applied Quantum Mechanics	SS	5
PH2005	DNA Biophysics and DNA Nanotechnology	WS	5

Material Sciences

Course Code	Course Title	Semester	Number of ECTS credits
PH2053	Physics with Neutrons 1	WS	5
PH2054	Physics with Neutrons 2	SS	5
PH2075	Physics with Positrons 1	WS	5
PH2076	Physics with Positrons 2	SS	5
PH2048	Nanostructured Soft Materials 1	WS	5
PH2049	Nanostructured Soft Materials 2	SS	5
PH2046	Polymer Physics 1	WS	5
PH2047	Polymer Physics 2	SS	5
PH2071	Fundamentals of Surface and Nanoscale Science	WS	5
PH2072	Frontiers of Surface and Nanoscale Science	SS	5
PH2097	Application of Methods of Nuclear Physics in Interdisciplinary Research 1	WS	5
PH2098	Application of Methods of Nuclear Physics in Interdisciplinary Research 2	SS	5
PH2140	Nanoscience using Scanning Probe Microscopy	WS	5

Applied Solid State Physics

Course Code	Course Title	Semester	Number of ECTS credits
PH2033	Magnetism	WS	5
PH2155	Semiconductor Physics	WS	10
PH2157	Applied Superconductivity: Josephson Effects, Superconducting Electronics and Superconducting Quantum Circuits	SS	10
PH2034	Spin Electronics	SS	5
PH2031	Superconductivity and Low Temperature Physics 1	WS	5
PH2032	Superconductivity and Low Temperature Physics 2	SS	5

Medical Physics

Course Code	Course Title	Semester	Number of ECTS credits
PH2001	Biomedical Physics 1	WS	5
PH2002	Biomedical Physics 2	SS	5
PH2181	Image Processing in Physics	WS/SS	5
PH2182	Modern X-Ray Physics	WS/SS	5
PH2209	Introduction to NMR and NMR Imaging	SS	10
PH2097	Application of Methods of Nuclear Physics in Interdisciplinary Research 1	WS	5
PH2098	Application of Methods of Nuclear Physics in Interdisciplinary Research 2	SS	5

Energy Physics

Course Code	Course Title	Semester	Number of ECTS credits
PH2160	Renewable Energies	SS	10
PH2068	Fuel Cells in Energy Technology	SS	5
PH2197	Photochemical Energy Conversion Artificial Photosynthesis	WS	5
PH2155	Semiconductor Physics	WS	10
PH2048	Nanostructured Soft Materials 1	WS	5
PH2049	Nanostructured Soft Materials 2	SS	5

Applied Plasma Physics

Course Code	Course Title	Semester	Number of ECTS credits
PH2035	Plasma Physics 1	WS	5
PH2036	Plasma Physics 2	SS	5
PH2196	Fusion Research	SS	5
PH2024	Light Sources and Gas Laser	WS/SS	5
PH2050	Reactor Physics and Applications of Nuclear Technology 1 *	WS	5
PH2051	Reactor Physics and Applications of Nuclear Technology 2 *	SS	5

* Taught in German.

Fundamental Plasma Physics

Course Code	Course Title	Semester	Number of ECTS credits
PH2035	Plasma Physics 1	WS	5
PH2036	Plasma Physics 2	SS	5
PH2196	Fusion Research	SS	5
PH2037	Ideal Plasma Effects – Introduction to Magneto-Hydrodynamics	WS	5
PH2175	Turbulence in Neutral Fluids and Plasmas	WS	5
PH2194	Turbulent Transport in Fusion Plasma	SS	5
PH2XXX	<i>Astrophysical elective course</i> (a number of courses taught by scientific staff of two Max Planck Institutes in Garching)	WS/SS	5

Theoretical Particle Physics

Course Code	Course Title	Semester	Number of ECTS credits
PH1005	Theoretical Particle Physics	WS	10
PH2040	Relativity, Particles, and Fields	SS	10
PH2041	Quantum Field Theory	WS	10
PH2043	General Relativity and Cosmology	WS	10
PH2042	Introduction to QCD	WS or SS	5

Experimental Particle and Astroparticle Physics

Course Code	Course Title	Semester	Number of ECTS credits
PH2044	Testing the Standard Model of Particle Physics 1	WS	5
PH2045	Testing the Standard Model of Particle Physics 2	SS	5
PH2208	Gas Detectors: Theory and Application	SS	5
PH2193	Modern Detectors for Nuclear and Particle Physics	WS	5
PH2081	Particle Physics with Highest Energy Particle Colliders	WS	5
PH2082	Particle Physics with Cosmic and Terrestrial Particle Colliders	SS	5
PH2058	Introduction to Astrophysics	WS	5
PH2073	Astroparticle Physics 1	WS	5
PH2074	Astroparticle Physics 2	SS	5
PH2151	High Energy Neutrino Astronomy	SS	5
PH2097	Application of Methods of Nuclear Physics in Interdisciplinary Research 1	WS	5
PH2098	Application of Methods of Nuclear Physics in Interdisciplinary Research 2	SS	5
PH2190	Ultrarelativistic heavy-ion collisions: The physics of the Quark-Gluon Plasma	WS/SS	5
PH2057	Computational Physics 1	WS	5
PH2090	Computational Physics 2	SS	5

Light Sciences

Course Code	Course Title	Semester	Number of ECTS credits
PH2025	Quantum Optics 1*	WS	5
PH2026	Quantum Optics 2*	SS	5
PH2024	Light Sources and Gas Laser	WS/SS	5
PH2158	Ultrafast Physics 1	WS	5
PH2159	Ultrafast Physics 2	SS	5
PH2215	Quantum Phase Transitions in Condensed Matter and Ultracold Atom Physics	SS	10

* At the moment, taught every two years.