

1st and 3rd Semester Courses

Code	Code Name	Weekly Teaching Hours			
		T	A	C	ECTS
FIZ600	Ph.D. Thesis	0	0	0	30
FIZ601	**Seminar I	0	0	0	15
FIZ603	**Seminar II	0	0	0	15
FIZ605	* Advanced Quantum Mechanics II	3	0	3	7,5
FIZ607	* Advanced Classical Mechanics II	3	0	3	7,5
FIZ609	*Special Functions in Physics II	3	0	3	7,5
FIZ611	*Advanced Statistical Mechanics II	3	0	3	7,5
FIZ613	The Quantum Theory of Solids	3	0	3	7,5
FIZ615	Magnetic Properties of Solids	3	0	3	7,5
FIZ617	Physics of Superconductors	3	0	3	7,5
FIZ619	Radiation Physics	3	0	3	7,5
FIZ621	Theory of Solid State	3	0	3	7,5
FIZ623	History of Science II	3	0	3	7,5
FIZ625	Crystal Growth Techniques	3	0	3	7,5
FIZ627	Introduction to High Energy Physics II	3	0	3	7,5

*Compulsory courses, (Minimum 9 credits must be taken.)

**Two seminars are taken during Ph.D. studies.

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		T	A	C	ECTS
FIZ600	Tez	0	0	0	30
FIZ601	**Seminar I	0	0	0	15
FIZ603	**Seminar II	0	0	0	15
FIZ605	* Advanced Quantum Mechanic II	3	0	3	7,5
	Scattering, spin and angular momentum, identical particles, selected application examples, introduction to relativistic theory,				
FIZ607	* Advanced Classical Mechanics II	3	0	3	7,5
	Special relativity in classical mechanics, Canonical Transformations, Poisson Transformations, Hamilton-Jacobi Theory, Small Oscillations, Continuous Systems and Fields.				
FIZ609	* Special Function in Physics	3	0	3	7,5
	Differential equations in physics, Separation of variables, analytic structure of second order equations, introduction to Sturm-Liouville problem, geometric function, Legendre function, spherical harmonics, Bessel functions, Hermite functions, Laguerre functions, Special solutions found by using Green functions				
FIZ611	*Advanced Statistical Mechanics II	3	0	3	7,5
	Master equation, probability distribution of dynamic systems, ergodic theory, Equilibrium fluctuations and critical events, correlation function, critical powers, quantum liquids, formulas of hydrodynamics and Onsager, Fluctuation and dissipation theorem, Wiener-Khinchin theorem, linear reaction, memory function, symmetry breaking, non-equilibrium phase transition.				
FIZ613	The Quantum Theory of Solids	3	0	3	7,5
	Plasmons, optical photons and wave polarization, Magnons, technics of multi substances and electron's gas, Polarons and electron-phonon interactions. Bloch functions, Brillouin regions and crystal symmetry, electron dynamics in the magnetic fields.				

FIZ615	Magnetic Properties of Solids	3	0	3	7,5
	Langevin Diamagnetism, Paramagnetism, Nuclear diamagnetism, Paramagnetic susceptibility of conducting electrons, ferromagnetic order, Magnons, antiferromagnetic order.				
FIZ617	Physics of Superconductors	3	0	3	7,5
	Type I super conductors (zero resistance, diamagnetism, critical magnetic field, interval state, critical current density, tunnels and GAP energy). Type II super conductors (mixed state, critical current)				
FIZ619	Radiation Physics	3	0	3	7,5
	Interaction of radiation with matter, alpha, beta, gamma, neutron radiation, measurement technics, radiation protection rules, dosimeter.				
FIZ621	Theory of Solid State	3	0	3	7,5
	Thermodynamic stability and statistic at the semiconductors, quantum theory of electrons and existence of energy bands in the solids, Metal semiconductors contact problems, semiconductors.				
FIZ623	Science History II	3	0	3	7,5
	Science at ancient era, Science at the medieval, Renaissance : towards modern science, science at 17-19 century, new paradigms and science at 20th century				
FIZ625	Crystal Growth Techniques	3	0	3	7,5
	Evolution of crystal growth, growth from liquid phase, Silicon and GaAs growth methods, Czochralski and Brigman technics, Epitacsial growth, ultra high vacuum technics and conditions, kinetic theories of gases, chemical vapor phase deposition/epitaxy(CVD), metal organic chemical vapor epitaxy(MOCVD) technics: molecular beam epitaxy (MBE)				
FIZ627	Introduction to High Energy Physics II	3	0	3	7,5
	Gauge field theory, Higgs mechanism and spontaneous symmetry breaking, phenomenology of standard model, Grand unified theories				