Master

Modul / LV-Nr.	Dozent/in	Titel	Typ	Ort	Tag	von	bis	Zeit von	Zeit bis	Inhalt
Advanced Laboratory Course for Master (6+2; 10 LP)										
200550-S12	Martin Weinelt	Advanced Laboratory Course for Master Students/Physikalisches Praktikum für Masterstudierende	Praktikum	FP-R FP-Räume	Mo	16.04.2012	09.07.2012	11:00	17:00	Inhalt: Advanced lab course in experimental physics. Experiments are performed in groups of two (and sometimes three) students. Every student has to participate in a total of eight experiments. The experimental work will be documented in a report. The lab course is accompanied by a seminar series (Mon, 8-11am), where students present the experiments and jointly discuss their results and interpretation. Zielgruppe: Master students of physics in the first or second semester. Der Kurs kann auch von Studierenden des Diplomstudienganges Physik als FP Teil A belegt werden. Zugangsvoraussetzungen sind in diesem Fall (i) ein abgeschlossenes Vordiplom, (ii) Schein in Quantenmechanik und (iii) Schein in Festkörperphysik oder Atom- und Molekülphysik (idealerweise beide Scheine). Literatur: Please consult the handouts and the web page of the lab course.
			Seminar	1.1.16 FB Raum	Mo	16.04.2012	09.07.2012	08:00	11:00	
Advanced Solid State Physics (4+2; 10 LP)										
205000-S12	Wolfgang Kuch	Advanced Solid State Physics	Vorlesung	1.3.14 Hörsaal A	Mi	11.04.2012	11.07.2012	12:00	14:00	content: The lecture aims to establish a link between the fundamentals of solid state physics and specialized lectures on actual research topics. The following topics will be covered: - Structure of solids, thin films, and surfaces - Electronic states in 3-, 2-, and 1-dimensional solids, quantum stability - Magnetism, phase transitions, magnetoresistance, principles of spin electronics The course program will cover the basics of each topic but likewise discuss current methods and problems of solid state physics. The relevant experimental techniques (diffraction and imaging techniques, spectroscopic techniques, and magnetometry) will be introduced and discussed using examples from actual research. targetGroup: Master students during the coursework phase. requirements: Solid state physics and quantum mechanics are helpful. literature: Ashcroft/Mermin: Solid state physics; Kittel: Introduction to solid state physics; Lüth: Solid surfaces, interfaces and thin films; Bland and Heinrich, Ultrathin magnetic structures.
					Fr	13.04.2012	13.07.2012	12:00	14:00	
205001-S12	Wolfgang Kuch	Advanced Solid State Physics	Übung	1.1.53 Seminarraum E2	Mi	18.04.2012	11.07.2012	10:00	12:00	
								14:00	16:00	
Advanced Biophysics (4+4; 10 LP)										
205010-S12	Joachim Heberle	Advanced Biophysics	Vorlesung	1.3.14 Hörsaal A	Mi	11.04.2012	11.07.2012	10:00	12:00	Inhalt: 10 ECTS only together with practical course 205011-S12! This module will present and substantiate biophysical methods and concepts. Selected methods like spectroscopy and diffraction and their application to proteins, nucleic acids and biomembranes are of particular relevance. The lecture series will cover a selection of the following methods: absorption spectroscopy in the UV, visible and IR region; fluorescence spectroscopy, time-resolved approaches; spectroscopy with linear and circular polarized light; vibrational spectroscopy: Fourier-transform infrared (FTIR), resonance Raman, surfance-enhanced Raman and IR; diffraction with X-rays, Neutrons and electrons; crystallization and protein crystallography; nuclear magnetic resonance (NMR); light scattering; single molecule spectroscopy; optical tweezer; atomic force microscopy; theoretical methods: MD simulations, Poisson-Boltzmann, QM/MM
					Fr	13.04.2012	13.07.2012	10:00	12:00	

205011-S12	Joachim Heberle	Advanced Biophysics	Praktikum	1.1.33 Raum, AG Heberle	Do	12.04.2012	12.07.2012	12:00	20:00	Inhalt: 10 ECTS only together with lecture 205010-S12! Donnerstag 12 - 20 Uhr - Arnimallee 14 SR FB (1.1.33). The advanced laboratory course in biophysics will contain selected spectroscopic techniques on relevant biomolecules like proteins and artificial membranes. Among others, the course will include stationary and time-resolved optical and vibrational spectroscopy of proteins, impedance spectroscopy and application of a quartz micro balance to artificial membranes as well as activity measurements of a molecular proton pump by the stopped-flow technique. Groups of two students each have to perform four experiments during this course. Evaluation of the experiments will be done in a written form. Literatur: Respective literature can be found in the scripts of the practical course.
Quantum Field Theory and Many Body Physics (4+2; 10 LP)										
205020-S12	Felix von Oppen	Quantum Field Theory and Many Body Ph	Vorlesung	1.3.14 Hörsaal A	Di Do	10.04.2012 12.04.2012	10.07.2012 12.07.2012	10:00 10:00	12:00 12:00	Inhalt: Introduction to (non-relativistic) Quantum Field Theory: Green functions, diagrammatic perturbation theory and Feynman diagrams, selected applications to condensed matter systems Zielgruppe: Masters students in physics Voraussetzungen: Advanced quantum mechanics (e.g. P. Brouwer's course in the winter semester 2010/11) or equivalent
205021-S12	Felix von Oppen	Quantum Field Theory and Many Body Ph	Übung	0.1.01 Hörsaal B	Fr	13.04.2012	13.07.2012	10:00	12:00	
Theoretical Solid State Physics (4+2; 10 LP)										
205030-S12	Piet Brouwer	Theoretical Solid State Physics	Vorlesung	1.3.14 Hörsaal A	Di Do	10.04.2012 12.04.2012	10.07.2012 12.07.2012	14:00 14:00	16:00 16:00	Lectures and exercises address a selection of advanced topics in solid state physics, such as Fermi Liquid theory, Quantum Transport, Screening, Magnetism and magnetic impurities. Prerequisites: Bachelor-level course in Solid State Physics; Advanced Quantum Mechanics. Literature will be assigned in the lecture.
205031-S12	Piet Brouwer	Theoretical Solid State Physics	Übung	1.1.16 FB Raum	Do	12.04.2012	12.07.2012	16:00	18:00	
Modern Methods Theoretical Physics(c) (2+2; 8 LP)										
205040-S12	Ana-Nicoleta Bondar	Modern Methods Theoretical Physics(c)	Vorlesung	0.1.01 Hörsaal B	Mi	11.04.2012	11.07.2012	12:00	14:00	Inhalt: Understanding the electronic structure of condensed matter is an essential topic for theoretical physics. The lecture will build upon a brief review of the theoretical background in quantum mechanics and statistical mechanics to develop a discussion of the most recent developments in methods and computer simulations to describe electronic structure. We will discuss the applicability of the various methods and computational approaches introduced in the lecture for describing nanostructures, water and aqueous solutions, chemical reactions. The specific topics that will be covered during the lecture include the foundations of molecular orbital theory; approximate electronic-structure methods; the problem of including electron correlation in molecular orbital computations; combined quantum mechanical/molecular mechanical apprroaches. The exercise class will involve mostly computer-based electronic structure calculations, analysis and interpretation of the electronic structure calculations. Zielgruppe: Bachelor, Master and PhD students.
205041-S12	Ana-Nicoleta Bondar	Modern Methods Theoretical Physics(c)	Übung	1.1.53 Seminarraum E2	Fr	13.04.2012	13.07.2012	12:00	14:00	
Macroscopic Quantum Phenomena (2+1; 5 LP)										
205050-S12	Tamara Nunner	Macroscopic Quantum Phenomena	Vorlesung	0.1.01 Hörsaal B	Di	10.04.2012	10.07.2012	12:00	14:00	Inhalt: Theory of Superconductivity Phenomenological theory of superconductivity: London theory and Ginzburg-Landau theory, superconductors in magnetic fields, microscopic BCS theory, Josephson effects, unconventional superconductivity
205051-S12	Tamara Nunner	Macroscopic Quantum Phenomena	Übung	1.4.31 Seminarraum E3	Do	12.04.2012	12.07.2012	8:00	10:00	
Quantum Optics/Quantenoptik (2+2; 8 LP)										
205060-S12	Eric Lutz	Quantum Optics/Quantenoptik	Vorlesung	0.1.01 Hörsaal B	Mi	11.04.2012	11.07.2012	10:00	12:00	The lecture is an introduction to the concepts and methods of theoretical quantum optics. It will cover the following topics: Quantization of the electromagnetic field - Quantum states of light - Coherence properties - Photon statistics - Atom-photon interaction - Atoms in cavities - Laser cooling of atoms - Bose-Einstein condensation - Introduction to quantum computing. It will strongly emphasize the connection between theory and experiment and will discuss recent literature.
205061-S12	Eric Lutz	Quantum Optics/Quantenoptik	Übung	1.4.03 Seminarraum T2	Do	12.04.2012	12.07.2012	12:00	14:00	

Spectroscopic Methods(b) (2+1; 5 LP)										
205070-S12	Petra Tegeder	Spectroscopic Methods	Vorlesung	0.1.01 Hörsaal B	Di	10.04.2012	10.07.2012	10:00	12:00	Electromagnetic radiation and its interaction with matter, general features of experimental methods, rotational spectroscopy, vibrational spectroscopy, electronic spectroscopy, photoelectron and related spectroscopies, lasers and laser spectroscopy, femtosecond spectroscopy, non-linear optical spectroscopy
205071-S12	Petra Tegeder	Spectroscopic Methods	Übung	1.4.03 Seminarraum T2	Do	19.04.2012	12.07.2012	10:00	12:00	
Surface Physics/Oberflächenphysik (2+1; 5 LP)										
205080-S12	Leonhard Grill	Basic and current topics in Surface Physics	Vorlesung	0.1.01 Hörsaal B	Mi	11.04.2012	11.07.2012	16:00	18:00	Inhalt: Historic development of Surface Science, experimental requirements, ultrahigh vacuum, geometric and electronic structure of a surface, reconstructions, surface states, work function, image potential, methods (microscopy and spectroscopy), adsorbates, physisorption/chemisorption, growth processes, molecular assembly, reactions on surfaces, applications
205081-S12	Leonhard Grill	Basic and current topics in Surface Physics	Übung	1.1.16 FB-Raum	Do	12.04.2012	12.07.2012	14:00	16:00	
Advanced Statistical Physics (4+2; 10 LP)										
205090-S12	Roland Netz	Advanced Statistical Physics II	Vorlesung	1.3.14 Hörsaal A	Mi	11.04.2012	11.07.2012	08:00	10:00	Inhalt Non-equilibrium thermodyanmics (Entropy production, Onsager relations), causality and fluctuations, stochastic processes (Markov processes, Master equation, Langevin and Fokker-Planck equation), kinetic theory, phase transitions (Landau theory, Gaussian fluctuations, correlation functions, renormalization theory), theory of liquids, hydrodynamic and elasticity theory Zielgruppe: students who have attended the course Advanced Statistical Mechanics I Literature: Non-equilibrium thermodynamics, de Groot and Mazur The Fokker-Planck Equation, Risken Stochastic processes in physics and chemistry, N. G. van Kampen
					Fr	13.04.2012	13.07.2012	08:00	10:00	
205091-S12	Roland Netz	Advanced Statistical Physics II	Übung	1.1.53 Seminarraum E2	Do	19.04.2012	12.07.2012	14:00	16:00	
Special Topics in Molecular Biophysics(a) (2+1; 5 LP)										
205100-S12	Robert Bittl	Special Topics in Molecular Biophysics	Vorlesung	1.1.16 FB-Raum	Di	10.04.2012	10.07.2012	12:00	14:00	Overview The course gives an introduction to electron paramagnetic resonance (EPR) spectroscopy, with main focus on the application to the study of biological systems. It starts from a classical description of the Hamiltonian and the Bloch equations. Continuous wave and pulsed spectrometers are discussed. Description of protein intrincsic paramganetic centers and exogeneous spin probes and spin labels available is given. The advantage of a multi-frequency approach in terms of enhanced spectral resolution is illustrated. An introduction to pulsed spectroscopy and basic pulse sequences is given. Pulsed double resonance methods (electron-nuclear and electron-electron) are described.
205101-S12	Robert Bittl	Special Topics in Molecular Biophysics	Übung	1.1.16 FB-Raum	Di	17.04.2012	10.07.2012	14:00	16:00	
Special Topics in Magnetism (2+1; 5 LP)										
205110-S12	Paul Fumagalli	Introduction to Magneto-Optics	Vorlesung	1.1.16 FB-Raum	Fr	13.04.2012	13.07.2012	10:00	12:00	Contents: Introduction (history, classification of magneto-optic effects) Basics of solid-state optics (Maxwell's equations in material and complex optical quantities, Fresnel's equations, polarization states and sign convention) Classical theory of dispersion (Lorentz theory of absorption and dispersion, microwave cyclotron resonance, magnetic-field induced splitting of the reflectivity minimum) Experimental aspects of magneto-optics (Jones matrix theory, experimental methods, enhancement effects) Microscopic model (Becquerel's equation, Kramers-Kronig relation, origin of spin-orbit interaction, quantum mechanical calculation of the optical conductivity) Magneto-optics of magnetic semiconductors and relation between magnetization and magneto-optics (optical and magneto-optic properties of magnetic semiconductors, magnetic circular dichroism, relation between magnetization and magneto-optics) Magneto-optic data storage (introduction and principle of magneto-optic data storage, material design, technical realization) Related magneto-optic measurement techniques (X-ray magnetic circular dichroism (XMCD), scanning near-field optical microscopy (SNOM), time-resolved magneto-optics) ZIELGRUPPE: Students with interest in optics, magnetism, and solid-state physics. VORAUSSETZUNG: Basic knowledge in quantum mechanics, optics and magnetism.
205111-S12	Paul Fumagalli	Introduction to Magneto-Optics	Übung	1.1.16 FB-Raum	Fr	20.04.2012	13.07.2012	9:00	10:00	

Advanced Astronomy and Astrophysics (2+2+4; 12 LP)

205120-S12	Robert Wolf	Controlled thermonuclear fusion - from the stars to the laboratory	Vorlesung	TU Berlin, Str. d. 17. Juni, Raum MA 545	Do (14-tägig)	12.04.2012	12.07.2012	12:00	16:00	INHALT: Thermonuclear fusion of light nuclei is the process by which the stars produce energy. In the sun a complex series of fusion reactions results in the fusion of four hydrogen nuclei to helium. Thereby, the mass difference is converted into energy. The necessary reaction conditions are maintained by the balance between the gravitational pressure and the inner gas or plasma pressure. At the end of the star development, when the fuel is exhausted, depending on the mass of the star stands a white dwarf, a neutron star or a black hole. On earth there are basically two possibilities to generate thermonuclear fusion with a positive energy balance. Inertial fusion is based on the ignition of a small fuel pellet. For a short moment the plasma pressure is balanced by the inertia of the fuel mass itself. To avoid hydrodynamic instabilities the energy has to be supplied very symmetrically. Besides, the pellet has to have a minimum size to fulfill the reaction requirements. But it must not become too large because the produced energy has to remain controllable. Magnetic fusion is based on the stationary confinement of a fusion plasma by strong magnetic fields. In contrast to inertial fusion which produces conditions similar to those in the core of the sun, magnetic fusion requires significantly higher temperatures of about 100 Mio Kelvin. However, the plasma pressure lies only in the range of a few atmospheres. Leading experiments, aiming at producing burning fusion plasmas for the first time, are the National Ignition Facility (NIF) in the US and the ITER experiment in the south of France. The lecture introduces the basics of thermonuclear fusion. Starting from the description of the fusion processes in the stars and their life cycle to the point of supernovae, which are made responsible for the synthetisation of heavy elements, the possibilities to employ fusion as an energy source are discussed. Many physical processes, as they can be observed in these laboratory plasmas, are also important for understanding of the phenomena in the stars. Zielgruppe: Eligible lecture of the module "Advanced Astronomy and Astrophysics" (Physics / Master). Open also for all students with interest in astronomy and astrophysics Voraussetzungen: Grundkenntnisse in Physik und Mathematik. Kenntnis der Vorlesung "Einführung in die Astronomie und Astrophysik"
205130-S12	Heike Rauer	Highlights in planetary physics	Vorlesung	TU Berlin, Hardenbergstr. 36, Eugen-Paul-Wigner-Gebäude, Raum EW 229	Mo	16.04.2012	09.07.2012	10:00	12:00	ZIELGRUPPE: eligible lecture of the module 'Advanced Astronomy and Astrophysics' (Physics / Master). Open also for all students with interest in astronomy and astrophysics. VORAUSSETZUNG Basic knowledge in Physics and Mathematics. Knowledge of:the physics / B.Sc. Module 'Einführung in die Astronomie und Astrophysik' advised. INHALT: New scientific results on solar system and extrasolar planets: planet detection, dynamical evolution of planetary systems, planetary structure, atmospheres of planets, habitability
205140-S12	Robert C. Tautz	Hydrodynamics	Vorlesung	TU Berlin, Hardenbergstr. 36, Eugen-Paul-Wigner-Gebäude (ehem. Physik-Neubau), Raum EW 246	Di	10.04.2012	10.07.2012	12:00	14:00	INHALT: Hydrostatics, Basic hydrodynamic equations, Sound and gravity waves, Compressible flows, Viscous fluids, Turbulence, Shock waves, Applications from astrophysics, Magnetohydrodynamics. ZIELGRUPPE: eligible lecture of the module 'Advanced Astronomy and Astrophysics' (Physics / Master). Open also for all students with interest in astronomy and astrophysics. VORAUSSETZUNG: Basic knowledge in Physics and Mathematics. Knowledge of the physics / B.Sc. Module 'Einführung in die Astronomie und Astrophysik' advised.

205150-S12	Lee Grenfell	Physics and chemistry of planetary atmospheres	Vorlesung	TU Berlin, Hardenbergstr. 36, Eugen-Paul-Wigner-Gebäude (ehem. Physik-Neubau), Raum EW 114	Di	10.04.2012	10.07.2012	14:00	16:00	INHALT: Atmospheres, Numerical Models, Climate, Photochemistry, Modern Earth, Early Earth, Terrestrial Planets, Giant Planets, Moons, Exoplanets, Biomarkers, Habitability. ZIELGRUPPE: eligible lecture of the module 'Advanced Astronomy and Astrophysics' (Physics / Master). Open also for all students with interest in astronomy and astrophysics. VORAUSSETZUNG: Basic knowledge in Physics and Mathematics. Knowledge of the physics / B.Sc. Module 'Einführung in die Astronomie und Astrophysik' advised.
200590-S12	Daniel Kitzmann Beate Patzer	Astrophysical practical course	Praktikum	Praktikumsräume in der Takustr. 3a	Mi	11.04.2012	11.07.2012	14:00	18:00	ANMERKUNGEN: Empowering to participate is limited and is done in sequence of registration. For registration please send an e-mail to praktikum@astro.physik.tu-berlin.de specifying name and time of the practical course (FU, Wed 14-18) Postgraduate practical course on astronomy and astrophysics, Practical part of the module 'Advanced Astronomy and Astrophysics' (Physics / Master). ZIELGRUPPE: One can choose - if possible - between the PR Astrophysical practical course and PR Astrophysical Numerikum. Open also for all students with interest in astronomy and astrophysics. (Note: empowering to participate is limited!) Constitutes a module for the Master course only together with two accompanying lectures. Accompanying lectures can be taken in the same or in subsequent semesters. VORAUSSETZUNG: Knowledge of the Physics / B.Sc. Module 'Einführung in die Astronomie und Astrophysik' advised. INHALT: Method: teamwork (small groups) on different astronomical topics. Subject: Classification of stars, RV method, rotation of the Sun, stellar spectroscopy, observation with telescopes, astronomical systems of coordinates, galactic rotation curve, properties of eclipsing binaries, light curves of dwarf novae.
200610-S12	Stefan Harfst	Computational Astrophysics practical course	Praktikum	TU Berlin, Hardenbergstr. 36, Eugen-Paul-Wigner-Gebäude (ehem. Physik-Neubau), room EW 177	Mo	16.04.2012	09.07.2012	16:00	20:00	INHALT: Numerical methods for solving astrophysical problems in hydrodynamics, stellar dynamics, cosmic rays or dust physics related to current research at the Zentrum für Astronomie und Astrophysik. Studenst will write small programs as well as work with existing programs (written in C/C++ and Fortran). VORAUSSETZUNG: Programming knowledge is required to participate in this course. Knowledge of the Physics / B.Sc. Module 'Einführung in die Astronomie und Astrophysik' advised. ANMERKUNGEN: Empowering to participate is limited and is done in sequence of registration! Please send for registration an e-mail to numerikum@astro.physik.tu-berlin.de specifying the name and the time of the practical course (FU-Numerikum, Mon 16-20). Beginning: 16.04.2012. ZIELGRUPPE: Postgraduate practical course on astronomy and astrophysics. Practical part of the module "Advanced Astronomy and Astrophysics" (Physics / Master). One can choose - if possible - between the PR Astrophysical practical course and PR Computational astrophysics practical course. Open also for all students with interest in astronomy and astrophysics. (Note: empowering to participate is limited!) Constitutes a module for the Master course only together with two accompanying lectures. Accompanying lectures can be taken in the same or in subsequent semesters.

History of Physics/Geschichte der Physik (2+1; 5 LP)										
205160-S12	Elvira Scheich	Atoms for Peace: Physicists against Nuclear Armament	Vorlesung	1.1.26 Seminarraum E1	Mi (14-tägig)	11.04.2012	11.07.2012	14:00	16:00	World War II ended with the atomic bombs over the Japanese cities Hiroshima and Nagasaki in August 1945. In this course we will look at how this event was debated within physicist: What were the perspectives they envisioned? How did physicists see their responsibility and what were the actions that were taken? Which differences became acute during the Cold War and how were they related to the recent history? We will analyze how the professional memory of the recent past was constructed and how this informed physics' relation to politics. In addition, we will examine the public view of physics in the post-war period, the fears and the hopes that were thus articulated.
					Mo-Fr	16.07.2012	20.07.2012	14:00	16:00	
205161-S12	Elvira Scheich	Atoms for Peace: Physicists against Nuclear Armament	Übung	1.1.26 Seminarraum E1	Mi (14-tägig)	11.04.2012	11.07.2012	16:00	18:00	
					Mo-Fr	16.07.2012	20.07.2012	16:00	18:00	
Selected Topics in Physics (1+1; 5 LP)										
205170-S12	Emad Flear Aziz Bekhit	Recent developments of spectroscopic techniques for revealing structure and ultrafast dynamics	Seminar	1.1.16 FB-Raum	Di	10.04.2012	10.07.2012	16:00	18:00	1. Methods based on X-rays 2. Methods based on optical spectroscopy 3. Methods based on UV and extreme-UV pulses created by high harmonic generation 4. Core-hole dynamics 5. Applications from simple molecules up to catalysis and solarcells
Modern Methods Experimental Physics(a) (2+1; 5LP)										
205180-S12	Thomas Dittrich	Semiconductor Physics: Concepts in photovoltaic solar energy conversion	Vorlesung	1.3.48 Seminarraum T3	Di	10.04.2012	10.07.2012	8:00	10:00	The course illuminates fundamental aspects of photo-generation, recombination, charge separation, charge transport, injection and electric and passivating contacts in relation to classes of crystalline Si, III-V semiconductor, thin film semiconductor, organic and nano-structured solar cells.
205181-S12	Thomas Dittrich	Semiconductor Physics: Concepts in photovoltaic solar energy conversion	Übung	1.3.48 Seminarraum T3	Di	10.04.2012	10.07.2012	10:00	11:00	
Special TopicsMolecular Biophysics(a)										
205190-S12	Ramona Schlesinger	Production of biological samples in biophysics	Vorlesung	Seminarraum -1.1.18	Mo	17.09.2012	21.09.2012	9:00	18:00	Blockkurs vom 17.-21.09.2012, täglich von 9-18 Uhr, Anmeldung bis zum 31.07.2012 Email: r.schlesinger@fu-berlin.de
205191-S12	Ramona Schlesinger	Production of biological samples in biophysics	Übung	Labore der Genetischen Biophysik (Räume:-1.1.3 bis-1.1.12)	Mo	17.09.2012	21.09.2012	9:00	18:00	6 freie Plätze Lectures about basics e.g. how to mutagenise a protein, cloning techniques, expression and purification of proteins and the underlying cellular processes when expressing a protein will be given prior to the practical exercises in the lab. Practical exercises: -molecular biological techniques e.g. transformation of bacteria with plasmids in preparation of expressing a membrane protein -cultivation of bacteria to express the protein -purification of membrane proteins by affinity chromatography -amplification of DNA by PCR (polymerase chain reaction) -analysis of DNA with enzymes and agarose-gel-electrophoresis and analysis of proteins on SDS-gels. Zielgruppe: Master students, diploma strudents and PhD students with interest in generating their biological samples by themselves for biophysical investigations