**Biophysics**

**Course Syllabi**

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| **Course** | **Biophysics** |
| Type | Semester | ECTS | Code |
| OBLIGATORY (O) | 1 | 3 |  |
| **Course Lecturer** | Prof. Asst. Dr. Isak Aliji |
| **Course Assistant** | Prof. Asst. Dr. Isak Aliji |
| **Aims and Objectives** | * The purpose of this course is to provide students with an understanding of the theoretical and practical challenges of Physics.
* The purpose of this course is to enable the student to have general information about nature-physics.
* To provide knowledge that the student can apply in the future, such as in medicine, medical technical sciences, physiology, biology and laboratory courses.
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| **Learning outcomes** | Upon satisfactory completion of the course, a student will be able to: * Understand the basic concepts of physics, respectively Biophysics.
* Solve problems in selected areas of fundamental physics and biophysics, apply mathematical models to describe and understand the natural world.
* Measure basic physical phenomena, analyze data and verify mathematical models
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| **Alignment of Course’s Learning Outcomes to Programs’ Learning Outcomes.** | **1. Application of theoretical knowledge:**- (Outcome 1, 2,): Focuses on the application of contemporary teaching methods.- The subject of Biophysics: Emphasizes the description of natural phenomena through the laws of physics, encourages the critical discussion of models, theories and applications of the laws of physics in practice.**2. Evaluation and critical analysis:** - (Outcome 1,2. ): To focus on the reflection of physical phenomena in certain models from nature.The learning outcomes of the program enable students to understand the main theories, principles and conceptual knowledge, to apply the acquired knowledge and to execute the same when solving statistical tasks and calculations.**3. Evidence-based approach:**- (Outcome 1,2): Apply knowledge from the subject of Physics to professional problems: measurement of masses, lengths, treatment of forces, molecular phenomena.- The subject of Physics: Emphasizes the development and evaluation of phenomena based on models, laws, theories, and principles |
| **Course Content** | **Course Plan** | **Week** |
| Introduction; Vectors; Scalar product of two vectors; Derivation; Integration; SI system | 1 |
| Cause and effect of motion (motion; force; mass; Newton's Laws; Inertial Systems) | 2 |
| Force; Work; Energy (gravitational, electrostatic, magnetic field and force, power, potential) | 3 |
| Atoms and molecules (Atomic models, Bohr's postulates, Pauli's exclusion principle, elementary particles, wave nature of matter, quantum theory, nucleus, spontaneous decay, application of radioisotopes, chemical bonds) | 4 |
| Macroscopic substances (gases, ideal gases, temperature, real gases, Boltzmann distribution, Maxwell distribution), Grid energy, elastic deformations, pressure in liquids, surface tension. | 5 |
| The 1st law of thermodynamics (thermal movement in gases and solids, internal energy heat, thermal expansion of gases), the 2nd law of thermodynamics | 6 |
| 1-st Colloquium | 7 |
| Transport phenomena (ideal fluids, heat transfer, real fluids, Bernoulli's Law, viscosity, diffusion, osmosis, electric charge transport, Ohm's Law) | 8 |
| Characteristics of electromagnetic fields, electromagnetic spectrum, (sources of electromagnetic fields, electromagnetic induction, electric circuits) | 9 |
| Electromagnetic waves (scattering of waves, optical radiation, reflection, refraction, absorption of EM waves, photoelectric effect, diffraction of waves), Lasers | 10 |
| EM spectrum, Non-ionizing radiation, standards for the protection of workers from the negative effects of EM waves, optical and laser beams. | 11 |
| Atomic nuclei, subatomic particles, radioactive nuclei, radioactive decay, natural radioactivity. | 12 |
| Dosimetry and protection from natural radiation, applications of ionizing radiation in medicine | 13 |
| 2-nd Colloquium | 14 |
| Final exam | 15 |
| **Teaching/****Learning****Methods** | **Teaching/Learning Activity – Weights (%)** |
| 1. **Lecture: 30%**
* Purpose: To present the concepts, models, theories and basic laws of physics.
* Relevant for: Building fundamental understanding and providing a theoretical mathematical and practical framework for the subject.
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| 1. **Group discussions and seminars: 20%**
* Purpose: To encourage interactive learning, exchange of ideas and development of critical thinking.
* Relevant for: Discussing different models and theories in depth and reflecting on their application in medical and applied medical sciences.
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| 1. **Project work: 20%**
* Purpose: To promote creativity, application of practical skills and collaborative learning.
* Important for: Developing creative new ways of applying knowledge and identifying barriers and facilitators to knowledge management.
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| 1. **Laboratory exercises: 30%**
* Purpose: To enhance research skills and the ability to critically analyze information.
* Relevant for: In-depth study of specific topics within knowledge management, increasing the understanding through research.
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| **Total** | **100 %** |
| **Assessment****Methods** | **Assessment Activity – Weights (%)** |
| 1. **Written exams: (70%)**
* Purpose: To assess the understanding of the basic concepts, theories and laws of Physics.
* Important for: Assessing basic knowledge and the ability to remember, explain and describe principles, theories and basic laws.
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| 1. **Group projects and presentations: (10%)**
* Purpose: To assess collaborative skills, application of knowledge and presentation skills.
* Relevant for: Assessing the development of practical approaches to knowledge management andthe ability to work effectively in teams.
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| 1. **Research paper or assignment: (10%)**
* Purpose: To assess in-depth research skills and critical analysis.
* Important for: Allowing students to conduct detailed research in specific areas of knowledge management from Biophysics, demonstrating their ability to engage with complex material.
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| 1. **Participation in class and discussions: (10%)**
* Purpose: To assess engagement, understanding of course material and the ability to contribute thoughts to discussions.
* Important for: Assessing active participation and the ability to articulate thoughts and ideas related to Physics - Biophysics.
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| **Total** | **100%** |
| **Course Resources** | **Means** |
| 1. **Textbooks and Academic Journals**:
* Purpose: Provide foundational knowledge and current research findings.
* Examples: Standard textbooks of Physics, Medical Physics, Biophysics.
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| 1. **Online databases and research articles:**
* Purpose: Provides access to a wide range of academic research and scientific circles.
* Examples: Access to databases such as PHET and other sources for knowledge about the Physics science.
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| 1. **E-learning platforms and MOOCs:**
* Purpose: Provision of materials and supplementary teaching materials.
* Examples: Online materials and lectures from platforms such as Coursera, edX or Khan Academy that cover relevant topics.
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| 1. **Library resources:**
* Purpose: Provides a wide range of additional reading material.
* Examples: Access to physical and digital libraries of books, dissertations and theses on healthcare management and knowledge management.
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| **ECTS Workload** | **Activity type** |  |  |
| 1. Lectures
 | 30 h | 30 % |
| 1. Group Discussions and Seminars
 | 40 h | 40 % |
| 1. Project Work
 | 20 h | 20 % |
| 1. Laboratory work or assignments
 | 10 h | 10 % |
| **Total** | **100 h** | **100.0 %** |
| **Literature** | 1. EngjellHasanbegasi, Fizika ne mjekësi, Tiranë,2000
2. Ymer Halimi; Fizikë mjekësore me Biofizikë, FM. Prishtinë,1997.
3. Marenglen Spiro; Teodor Karaja; Fatbardha Babani; Biofizika, Tiranë 2001.
4. F. J. Keller, W. E. Gettys, M. J. Skove: Physics, 2nd ed., McGraw-Hill. Inc., 1993, NewYork

 John D. Cutnell, Kenneth W. Johnson: Physics, 3rd ed.,  JohnWilley&Sons, Inc.,1995 |
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**Pre-requirements for the course**

This course does not have any pre-requirements.

**Assessment of Competence**

For the class to reach a BSC level of learning, students must prepare by reading the given material, complete all assignments for each class. Students will be evaluated for participation as:

* Full participation in class activities and group work.
* Participation in class discussions (without dominating the conversation).
* Demonstrating understanding of the content of the material read.
* Providing critical thinking about the subject matter.
* Adding ideas to class discussion.
* Helping others clarify an idea.
* Supporting others as they share their ideas and speak in class.
* Raising new ideas and questions.
* Arriving on time and staying throughout the lesson.

**Participation policy**

Students are expected to attend all lectures and exercises. The importance of class attendance is reflected in the percentage of the grade associated with attendance. You cannot receive attendance grades if you are not in class. If you have an emergency and cannot attend class, please email me in advance to let me know. Class will start on time to honor everyone's commitment. If you are late, please enter the classroom quietly. Participation marks will be deducted for lateness.

**Students must be present at least 80% of the activities.**

**Rules and Regulations**

**Attendance**

UBT College undertakes the responsibility of training future professionals to the highest standards. One of these standards is taking responsibility for personal actions. If a student misses a particular session, the student has lost that instruction forever. They can never be repeated. When a student is late to class, the entire class is interrupted. Such interruptions will not be tolerated. Students have a responsibility and a contract to stay in class for the duration of the sessions, for each day. Students who leave sessions early, even if they leave with permission, cause disciplinary problems that will not be tolerated.

You made a contract with the UBTs to be in class and attentive throughout the learning process. Every student must be in every session, every day that is scheduled, throughout the semester.

All teaching sessions begin at their designated times in the lesson timetable. All sessions start and end at designated times in the class schedule. Any student who leaves the class session early will be considered absent.

**Electronic Devices**

It is distracting to everyone in the classroom when cell phones ring during class. This is even worse if it happens during a test or quiz. Since this is a classroom and not a room for listening and/or viewing electronic devices such as smart phones, personal laptops and/or other electronic devices will not be allowed.

The classroom will be a cell phone free zone. If you must bring a cell phone to class, it must be turned off or set to vibrate. It is distracting for a classroom to have students constantly answering cell phones during class. If you absolutely must answer the call, leave the classroom. A student who accepts calls during class will be asked to leave class. Hearing devices will not be allowed in the classroom for any reason.

**Tests And Quizzes**

Tests and quizzes are usually scheduled at the beginning of the lesson. Tests and quizzes are one-way teachers measure a student's knowledge. Failure to participate in tests or quizzes interferes with this process. UBT College does not reward students who do not take their tests or quizzes on time; therefore, the teacher cannot allow students to take tests or quizzes after the deadline.

Tests and quizzes must be taken by each student, any student who asks for help or helps other students during a test or quiz will be removed from the test and will be graded zero for that test or quiz. It is the student's responsibility to prepare for tests and quizzes at all times. It is the student's responsibility to know when there are tests or quizzes to take.

**Seminars and Projects**

Seminars and projects must be done on the student's own time, not during class.

Never allow another student to copy your seminars and projects.

Never copy another student's seminars and projects.

**Due Dates**

One thing all professionals must learn is to be on time. Excuses do not make the student and teacher feel better about their wasted time. For all assigned tasks, sufficient time is given to complete, and all work must be completed in the time set by the teacher. **No delay in the completion of the works will be accepted**.

**Proper Attire**

Professionals must dress appropriately. Any student who does not dress appropriately during class time will not be allowed to participate in class activities.

**Conduct**

Students at UBT College must learn to work in groups, regardless of group composition. Tolerance, courtesy, respect, and a peaceful environment are required in the classroom.

All students are expected to be respectful to other students and to the teacher during class and in dealing with class matters. Disrespectful behavior will affect your participation grade. Examples of respectful behavior in the classroom include, but are not limited to:

* Listening to each other and exchanging ideas.
* Arrival and departure according to the class schedule, except in cases of emergency.
* Turn off the cell phone ringer and do not receive calls in class.
* Speak so that others can hear and understand what you are saying.
* Engaging in class discussion (avoiding side conversations during class and dominating class discussion).
* Listening (not speaking) when the teacher or other students are addressing the class.
* Working collaboratively with a specific or selected group.
* Completion of class work on time.
* Focusing on class topics and not on personal matters or work unrelated to the class.
* Viewing your computer and/or cell phone only when related to class work.
* Raising questions when there is no clarification about the work in class.

**Academic Dishonesty**

Violations of Academic Integrity include, but are not limited to, the following actions:

* Cheating on an exam.
* Plagiarism.
* Working together on an individual assignment, paper, or project when the instructor has specifically stated students should not do so.
* Submitting the same term paper to more than one instructor or allowing another individual to assume one’s identity for the purpose of enhancing one’s grade.