

PHYSICS FOR DENTAL STUDENTS I.
LECTURE

2013/2014, 1st semester, 1st year, Dental students
Fall semester: 2 September – 7 December 2013

Place: Faculty of Dentistry, B Building, White Room
Time: Wednesday 9.00-11.00 (2 hours/week)
Exam: Examination
Credit: 2

Date	Lecture	Lecturer
04. 09. 2013.	1. The science of biophysics and basic concepts of thermodynamics (principles of thermodynamics, enthalpy and entropy).	Dr. Kinga Turzó associate professor
11. 09. 2013.	2. Flow of liquids and gases (flow of ideal and real fluids, laminar and turbulent flow, the properties of blood flow).	Dr. Kinga Turzó
18. 09. 2013.	3. Motion of molecules, diffusion, osmosis.	Dr. Kinga Turzó
25. 09. 2013.	4. Flow of heat (conduction, convection, radiation) melting and evaporation. Thermal properties of materials used in dentistry.	Dr. Zsolt Tóth senior research fellow
02. 10. 2013.	5. Transport processes through biological membranes (mechanisms of transport, passive and mediated diffusion, active transport).	Dr. Kinga Turzó
09. 10. 2013.	6. Membrane potentials and their origins. Diffusion potential. Experimental methods for determination of membrane potentials. Phenomenology and molecular description of action potentials (Na^+/K^+ ion pumps).	Dr. Kinga Turzó
16. 10. 2013.	7. Radiations: characteristic parameters, classification, electromagnetic spectra, reflection, absorption, scattering.	Dr. Zsolt Tóth
30. 10. 2013.	8. Luminescence (fluorescence and phosphorescence) spectroscopy and medical-dental applications.	Dr. Zsolt Tóth
06. 11. 2013.	9. Lasers and their applications in dentistry.	Dr. Zsolt Tóth
13. 11. 2013.	10. Ultrasonic imaging, Doppler methods.	Dr. Kinga Turzó
20. 11. 2013.	11. X-rays: production, spectra, interaction with matter. Physical basics of X-ray imaging and computer tomography (CT).	Dr. Zsolt Tóth
27. 11. 2013.	12. Nuclear radiations: principles of radioactive decay and radioisotopes. Diagnostical and therapeutical applications.	Dr. Kinga Turzó
04. 12. 2013.	13. Dosimetry: units and instruments measuring dose. Factors determining the effect of radiation. Physical basics of nuclear magnetic resonance spectroscopy (NMR) and imaging (MRI).	Dr. Kinga Turzó

Recommended literature:

1. J.W. Kane and M.M. Sternheim: Physics, 3rd edition, John Wiley, 1988
2. Z. Csernátorny, S. Damjanovich, J. Fidy, J. Szöllösi (eds.): Medical Biophysics. 3., rev. ed. Budapest: Medicina, 2009. 667 p.

Conditions of accepting the semester and the credits:

- Active participation on lectures and seminars, based on the study and exam regulations of the University and of the Faculty of Dentistry,
 - Requirements of participation on lectures and seminars and replacement of absenteeism based on the study and exam regulations of the Faculty of Dentistry
 - Method of proof of the absence on seminars and lectures based on the study and exam regulations of the University and of the Faculty of Dentistry
 - It is mandatory the fulfillment of the **WRITTEN TESTS (1st and 2nd)**. The average mark of the tests should be at least 2.0. Unsatisfactory test should be corrected; there is only ONE possibility for the correction at the end of the semester!
 - **The mark of the Examination (Lectures)** is established in the following way:
if the average of the Written tests is between 4.0 and 5.0 then an **offered mark** can be given to the student.
 - Calculation of the average: $[1^{\text{st}} \text{ Written test} + 2^{\text{nd}} \text{ Written Test}]/2$.
 - If the average is between 4.0-4.50 then good (4) is given, if the average is between 4.51-5.0 then excellent (5) can be given. In case the average is below 4.0 the student will perform an oral examination. An offered good (4) mark can be improved, too on oral examination.
- The final exam:
- the student pulls from the topics two items,
 - there is 20 minutes preparation time. During preparation the students should not use any tool!
 - From each topic an oral summary is given.
 - For successful exam it is required to meet at least sufficient (2) knowledge of each topic.

PHYSICS FOR DENTAL STUDENTS I. SEMINAR

2013/2014, 1st semester, 1st year, Dental students
Fall semester: 2 September – 7 December 2013

Place: Faculty of Dentistry, B Building, White Room
Time: Wednesday 8.00-9.00 (1 hour/week)
Exam: Evaluation (5)
Credit: 1

Date	Topics	Teacher
04. 09. 2013.	1. Importance of physics in dentistry. Introduction to biophysics.	Dr. Kinga Turzó associate professor
11. 09. 2013.	2. Dental implications of thermodynamics	Dr. Kinga Turzó
18. 09. 2013.	3. Dental implications of flow of liquids and gases and movement of molecules	Dr. Kinga Turzó
25. 09. 2013.	4. Thermodynamic properties of dental materials.	Dr. Zsolt Tóth senior research fellow
02. 10. 2013.	5. The transport processes and membrane potential: dental implications.	Dr. Kinga Turzó
09. 10. 2013.	6. WRITTEN TEST (1.)	Dr. Zsolt Tóth
16. 10. 2013.	7. Radiation, luminescence and lasers in dentistry	Dr. Zsolt Tóth
30. 10. 2013.	8. Dental implications of ultrasound.	Dr. Kinga Turzó
06. 11. 2013.	9. Dental usage of x-ray based imaging	
13. 11. 2013.	10. Nuclear radiations	Dr. Kinga Turzó
20. 11. 2013.	11. Dosimetry and Nuclear Magnetic Resonance in dentistry.	Dr. Kinga Turzó
27. 11. 2013.	12. WRITTEN TEST (2.)	Dr. Kinga Turzó
04. 12. 2013.	13. Consultation, additional or replacement WRITTEN TEST	Dr. Kinga Turzó Dr. Zsolt Tóth

Recommended literature:

1. J.W. Kane and M.M. Sternheim: Physics, 3rd edition, John Wiley, 1988
2. Z. Csernátorny, S. Damjanovich, J. Fidy, J. Szöllősi (eds.): Medical Biophysics. 3., rev. ed. Budapest: Medicina, 2009. 667 p.

Conditions of accepting the semester (Seminar):

- Active participation on the seminars based on the study and exam regulations of the Faculty of Dentistry.
- Requirements of participation seminars and replacement of absenteeism based on the study and exam regulations of the Faculty of Dentistry
- Method of proof of the absence on seminars based on the study and exam regulations of the University and of the Faculty of Dentistry
- The students at the beginning of the semester choose a seminar subject. Then they have to prepare a five - ten-slide PowerPoint presentation (max. 5 min). The presentation is followed by a discussion about technical and scientific issues. The evaluation of the presentation considers the students' opinions.
- The evaluation of the seminar is based on the student activity and the presentation.