

**Program of Study** : DENTISTRY  
**Course** : MEDICAL BIOPHYSICS  
**Abbreviation** : LBF/ZAB11  
**Schedule** : 15 hours of lectures  
                   45 hours of tutorials  
**Course Distribution** : first year, winter term  
**Number of Credits** : 3  
**Course Form** : lectures, tutorials

**Lectures:** odd Tuesdays 9:30 – 11:00

**Teachers:** Mgr. Svatopluk Binder, Ph.D.  
 Mgr. Kateřina Langová, Ph.D.  
 Ing. Ladislav Doležal, CSc.

	Date	Subject	Hrs.	Teacher
1	20.9.	Introduction to Biophysics. Ionizing radiation. Imaging methods using ionizing radiation in medicine and dentistry.	2	BINDER
2	4.10.	Biophysics of electric manifestations in organism, and their use in therapy. Electric equipment in dentistry.	2	BINDER
3	18.10.	Biophysics of blood circulation. Biophysics of respiration.	2	BINDER
4	1.11.	Biophysics of the human optical analyzer. Optical system of the human eye, refractive disorders and their correction.	2	BINDER
5	15.11.	Sound and its properties. Human voice. Biophysics of hearing. Mechanical properties of substances and their applications in dentistry.	3	BINDER
6	29.11.	Therapeutic ultrasound application in medicine. Imaging systems.	2	DOLEŽAL
7	13.12.	Introduction to biostatistics.	2	LANGOVÁ

**Tutorials:** each Wednesday 10:00 – 12:15

**Teachers:** Mgr. Svatopluk Binder, Ph.D.  
 Mgr. Kateřina Langová, Ph.D.

**Practical tutorials** – by cyclic exchange in working groups

	Date	Subject	Hrs.
1	21.9.	Introduction lesson - basic instructions, laboratory work rules, safety instruction.	3
2-13	28.9. 5.10. 12.10. 19.10. 26.10. 2.11. 9.11. 16.11. 23.11. 30.11.	1. <u>Work with Computer</u> : Data analysis, protocol processing. 2. <u>Work with Computer</u> : Statistic data description, Excel. 3. <u>Work with Computer</u> : Image analysis in dentistry. 4. <u>Work with Computer</u> : Internet - Electronic information resources, electronic mail. Medmont – Computer aided perimetry. 5. Biophysics of blood circulation. 6. Electrocardiography and Holter monitoring systems. 7. Measuring of Radioactivity. 8. Basics of ultrasound imaging. 9. Basic methods of spirometry.	3

	7.12. 14.12.	10. Basic audiometric examination. 11. Basic methods in physiological optics. 12. Computer aided perimetry.	
14	21.12.	Demonstration of instrumental technique.	3
15	4.1.	Demonstration of instrumental technique.	3

**Completed by:** Practicavit (Course Unit Credit), Practical exam (at least grade E, final grade weight 25 %) and theoretical exam (written test, at least grade E, final grade weight 75 %)

**Requirements:** 100% attendance at practical classes, measurement reports

**Recommended literature:**

Moodle /portal.upol.cz/ - study materials for lectures and practical exercises.

Herman, I.P.: Physics of the Human Body, Springer, 3rd edition, 20016.

Hobbie, R.K.: Intermediate Physics for Medicine and Biology, Springer, New York, 4th edition, 2007.

Hrazdira, I., Mornstein, V.: Fundamentals of biophysics and medical technology, Brno, 2007.

Ronto, G., Tarján, I.: An Introduction to Biophysics with Medical Orientation, Akadémia Kiadó, Budapest, 1999.

Grosman, Z.: Lectures on Medical Biophysics, Olomouc, 1994.

Prof. RNDr. Hana Kolářová, Ph.D.  
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