BMC2
Introduction to biophysics curriculum
2021/22 academic year spring semester

Week	Date	Chapter	Title	Lecturer	Seminar teacher	Seminar topic (chapter)
1	12 January Wednesday	**1**	**1. Introduction to modern physics. Standard of lengths, mass, time.**	JA	JA,NE,SZGT,PF	1
2	17 January Monday	**2**	**2. Motion in one dimension, displacement, velocity, acceleration, motion diagrams.Freely falling objects.**	JA	JA,NE,SZGT,PF	2
	19 January Wednesday	**2**	**3. Motion in two dimensions. Relative velocity.**	JA		
3	24 January Monday	**3**	**4. The laws of motion. Newton's First, Second and Third Law. Application of Newton's Laws. Forces of friction.**	JA	JA,NE,SZGT,PF	3
	26 January Wednesday	**4**	**5. Application of Newton's Laws. Forces of friction.**	JA		
	28 January Friday, 14:00	**1st SCT** material covered up to (including) the 2nd week seminars				
4	31 January Monday	**4**	**6. Energy. Work. Kinetic energy and the workenergy theorem. Gravitational potential energy.**	JA	JA,NE,SZGT,PF	4
	2 February Wednesday	**5**	**7. Spring potential energy. System and energy conservation. Power. Work done by varying forces.**	JA		
5	7 February Monday	**6**	**8. Momentum and impulse. Conservation of momentum.**	JA	JA,NE,SZGT,PF	5
	9 February Wednesday	**6**	**9. Collisions. Elastic and inelastic collisions.**	JA		
6	14 February Monday	**7**	**10. Angular speed and angular acceleration. Rotational motion under constant angular acceleration.**	JA	JA,NE,SZGT,PF	6
	16 February Wednesday	**7**	**11. Centripetal acceleration.**	JA		
7	21 February Monday	**8**	**12. Torque and the two conditions for equilibrium. The center of gravity.**	JA	JA,NE,SZGT,PF	7
	23 February Wednesday	**8**	**13. Rotational kinetic energy. Angular momentum.**	JA		
	25 February Friday, 14:00	**2nd SCT** material covered up to (including) the 6th week seminars				
8	28 February Monday	**9**	**14. States of matter. Deformation of solids. The Youngs's, shear and bulk modulus.**	JA	JA,NE,SZGT,PF	8
	2 March Wednesday	**9**	**15. Density and pressure. Variation of pressure with depth. Pressure measurements. Buoyant forces and Archimedes's principle. Fluids in motion.**	JA		
9	7 March Monday	**10**	**16. Temperature and the zeroth law of thermodynamics. Thermometers and temperature scales. Thermal expansion of solids and fluids.**	JA	JA,NE,SZGT,PF	9
	9 March Wednesday	**10**	**17. Macroscopic description of an ideal gas. The kinetic theory of gases.**	JA		
10	16 March Wednesday	**11**	**18. Energy in thermal processes. Heat and internal energy. Specific heat. Calorimetry. Latent heat and phase change.**	JA	JA,NE,SZGT,PF	10
11	21 March Monday	**12**	**19. The first law of thermodynamics.**	JA	JA,NE,SZGT,PF	11
	23 March Wednesday	**12**	**20. The second law of thermodynamics. Entropy. Refrigerators and heat pumps.**	JA		
	25 March Friday, 14:00	**3rd SCT** material covered up to (including) the10th week seminars				
12	28 March Monday	**13**	**21. Elastic potential energy. Hook's law. Simple harmonic motion. Motion of a pendulum.**	JA	JA,NE,SZGT,PF	12
	30 March Wednesday	**13**	**22.Waves. Frequency, amplitude and wavelength. Interference of waves. Reflection of waves.**	JA		
13	4 April Monday	**14**	**23. Sound. Energy and intensity of sound waves. Shock waves, standing waves. Doppler effect**	JA	JA,NE,SZGT,PF	13
	6 April Wednesday	**15**	**24. Properties of electric charges. Insulators and conductors. Coulomb's law.**	JA		
14	11 April Monday	**15**	**25. Electric field. Electric field lines. Electric flux and Gauss's law.**	JA	JA,NE,SZGT,PF	14
	13 April Wednesday	**16**	**26. Electrical energy and capacitance.**	JA		
15	20 April Wednesday	**16**	**27. The parallel plate capacitor. Combinations of capacitors. Energy stored in capacitors. Capacitors with dielectric.**	JA	JA,NE,SZGT,PF	15
	22 April Friday, 14:00	**4th SCT material covered up to (including) the14th week seminars**				
	22 April Friday 16.00	**17**	**28. Electric current. Current and voltage measurements in circuits. Resistance and Ohm's law.**	JA	JA,NE,SZGT,PF	15
16	25 April Monday	**17**	**29. Resistivity, temperature variation of resistance. Semiconductors and superconductors. Electrical activity of the heart. Defibrillators.**	JA	JA,NE,SZGT,PF	16
	27 April Wednesday	**18**	**30.Direct current circuits. Resistors in parallel and series.**	JA		
17	2 May Monday	**18**	**31. Kirchhoff's rules and complex DC circuits. RC circuits. Conduction of electrical signals by neurons.**	JA	JA,NE,SZGT,PF	17
	4 May Wednesday	**19**	**32. Magnetism. Magnetic field. Earth's magnetic field. Magnetic force on current carrying conductors. Torque on a current loop and electric motors.**	JA		
18	9 May Monday	**19**	**33. Magnetic field of a long straight wire and Ampere's law. Magnetic field between two parallel conductors. Magnetic field of loops and solenoids.**	JA	JA,NE,SZGT,PF	18
	11 May Wednesday	**20**	**34. Induced emf and magnetic flux. Faraday's law of induction. Motional emf. Lenz's law.**	JA		
	13 May Friday, 14:00	**5th SCT** material covered up to (including) the17th week seminars				
19	16 May Monday	**20**	**35. Generators. Self-inductance RL circuits.**	JA	JA,NE,SZGT,PF	19 - 20
	18 May Wednesday	**21**	**36. Alternating current. Resistors, capacitors and inductors in AC circuits.**	JA		
20	23 May MOnday	**21**	**37. The transformer. Properties of electromagnetic waves. The spectrum of electromagnetic waves.**	JA	JA,NE,SZGT,PF	20 - 21
	25 May Wednesday	**22**	**38.The nature of light. Reflection, refraction and dispersion.Total internal reflection and its medical applications.**	JA		
21	30 May Monday	**23**	**39. Lenses and mirrors. Flat mirrors. Images formed by spherical mirrors.**	JA	JA,NE,SZGT,PF	21 - 22
	1 June Wednesday	**23**	**40. Thin lenses. Images formed by lenses. Lens aberrations.**	JA		
	3 June Friday 14.00	**24**	**41. Wave optics. Conditions for interference, polarization of light. Diffraction.**			
22	8 June Wednesday	**25**	**42. The camera, the simple magnifier, the compound microscope, the telescope and the eye.**	JA	JA,NE,SZGT,PF	22 - 23
	10 June Friday, 14:00	**6th SCT material covered up to (including) the21st week seminars**				
23	13 June Monday	**27**	**43.Quantum physics. Blackbody radiation, photoelectric effect, generation of X-ray**	JA	JA,NE,SZGT,PF	24-30
	15 June Wednesday	**28-29**	**44. Some properties of the nuclei. Binding energy. Radioactivity, the decay processes. Medical application of radioactivity. Nuclear reactions. Nuclear fission and fusion. Positron and other antiparticles. Mesons and quarks.**	JA		