

Subjects for Cardiovascular Physiology
Semester 2 – 2018/2019

1. Components of the cardiovascular system
2. Functions of the cardiovascular system
5. Particularities of the cardiac muscle; myocardial cell structure; myocardial properties
7. Myocardial action potentials
8. Ionic conductivity during action potentials at myocardial cell level
9. Cardiac automaticity; specialized excitatory system of the myocardium
10. Refractory periods of the myocardium and their significance
11. Calcium transport systems in myocardial fiber
12. Na⁺/Ca²⁺ exchanger
13. Myocardial conductivity; excito-conductive system of the heart
14. Conduction velocity of AP in the heart
15. Autonomic effects on automatism and conduction velocity
16. Excitation-contraction coupling in cardiac muscle
17. Myocardial contractility (inotropism)
18. Cardiac cycle (CC phases, AS, AD, VS, VD)
19. Heart sounds
20. Ventricular volumes; pressures in the right and left heart
21. Work of the left ventricle
22. Preload and the Frank-Starling law of the heart
23. Afterload and contractility as parameters of the systolic function
24. Pressure-volume loop and its behavior with increased preload, afterload, contractility
25. Inotropic agents (positive, negative)
26. Coronary circulation, coronary blood flow and its regulation
27. Myocardial metabolism - particularities
28. The ECG lead systems
29. Atrial activation and P wave characteristics
30. Ventricular activation and the QRS complex
31. ECG intervals (PR, QT)
32. Atrial repolarization; ventricular repolarization and the T wave
33. Relationship between ventricular AP and QT interval on ECG
34. Rhythm analysis (normal sinus rhythm criteria)
35. QRS axis
36. Blood flow in systemic circulation
37. Pressure inside de vessels – definition, pressure differences, origins of pressure
38. Vascular resistance to blood flow
39. Vascular distensibility, vascular compliance and vascular structure-function relationship
40. Pulse pressure (definition, variation, transmission, damping) and mean arterial pressure

41. Pressure profiles along systemic and pulmonary circulation
42. Systemic veins – roles
43. Central and peripheral venous pressures
44. Roles of lymphatic system; formation of lymph
45. Lymph flow (rate, lymphatic pump)
46. Microcirculation – definition, structure
47. Capillary exchange of solutes
48. Capillary exchange of water and the Starling forces
49. Hydrostatic pressures in the capillaries and interstitium
50. Colloid-osmotic pressure of plasma and interstitium
51. Capillary fluid filtration, fluid reabsorption and Starling equilibrium for capillary exchange
52. Short-term control of microcirculation – metabolic and endothelial factors
53. Autoregulation of microcirculation
54. Long-term control of microcirculation
55. Baroreceptor reflex
56. Effects of sympathetic and parasympathetic on cardiovascular system
57. Chemoreceptor control of blood pressure
58. Low-pressure baroreceptor control of blood pressure
59. Regulation of cardiac output
60. Intermediate and long-term control of the circulation