

## Subjects list for Nervous System Lectures – 7-8 December 2017

1. Nervous system components and subdivisions
2. Neuron: structure and compartmentalization
3. Features of axoplasmic transport
4. Neuronal and non-neuronal cells: types and characteristics.
5. Cell membrane potential: Resting membrane potential
6. Diffusion and the cell membrane potential. Nernst potential
7. Voltage-gated Na ion channels
8. Voltage-gated Ca ion channels
9. Ion pumps: characteristics, functions and examples
10. Membrane responses to stimulus current: hyperpolarization current, depolarization current, threshold current
11. Nerve action potential: phases, ionic conductance during AP
12. Na channels distribution and generation of AP. Axon depolarization.
13. Myelin; saltatory conduction
14. Electrical synapse: structure, function, occurrence in the nervous system
15. Chemical synapse: Presynaptic mechanisms - mechanism of transmitter release;
16. Chemical synapse: Postsynaptic mechanisms: ionotropic, metabotropic;
17. Control of transmitter activity in the synaptic cleft
18. Glutamate
19. GABA
20. Acetylcholine
21. Norepinephrine
22. Dopamine
23. Serotonin
24. Ligand-gated ion channels: glutamate receptors
25. Ligand-gated ion channels: nicotinic and muscarinic Ach receptors
26. Ligand-gated ion channels: GABA receptors
27. Explain the differences between ionotropic and metabotropic receptors
28. Excitatory postsynaptic potentials (EPSPs)
29. Inhibitory postsynaptic potentials (IPSPs)
30. Glial cell functions at synaptic level
31. Skeletal muscle structure: components and their functions
32. Organization of proteins in a sarcomere
33. Excitation-Contraction coupling
34. Mechanism of muscle contraction
35. Neuromuscular junction
36. Motor unit
37. Muscle fatigue
38. Classification of the sensory receptors
39. Adaptation of sensory receptors. Tonic vs. phasic receptors
40. Sensory unit and the receptive field
41. Pain receptors and their stimulation
42. Types of pain: fast and slow
43. External layer of the eye- components and function

44. Accommodation
45. Pupillary reflex
46. The lens system of the eye; focal point
47. Emmetropia and refraction errors
48. Visual acuity
49. Photopic and scotopic vision
50. Fluid system of the eye
51. Cellular organisation of the retina
52. Photoreceptor cells
53. Phototransduction
54. Colour vision
55. Optical pathway
56. Cochlea and the Corti organ- structure and function
57. Vestibular receptors- structure and function
58. Air conduction of the sound to the hair cells and signal transduction
59. Sound pitch and intensity determination
60. Hair cells innervation and the main auditory pathway neurons (the four neurons and location of the auditory cortex)
61. Vestibular pathway- neurons, connections and cortical projection
62. Olfactory mucosa- structure and function
63. Olfactory pathway- main neurons and cortical projection
64. Olfactory signal transduction
65. Taste receptors- location, structure and function
66. Gustative pathway and cortical projection
67. Organization of the visceral control system – the sympathetic division
68. Organization of the visceral control system – the parasympathetic division
69. Organization of the visceral control system – the enteric division
70. Classic neurotransmitters of the autonomic nervous system
71. Nonclassic transmitters of the autonomic nervous system
72. Effects of the sympathetic system on visceral targets
73. Effects of the parasympathetic system on visceral targets
74. Central nervous system control of the viscera
75. Reflex loops of the autonomic nervous system