Introduction to Neurobiology – I (JNL 202) (*Credits: 3:1:0; L:T:P*)

Topics:

1. Orientation; History of neuroscience
2. Structure and function of components of the nervous system; Evolutionary origins of the nervous system.
3. Basic neurodevelopment: introduction to neurulation; boundary formation and patterning of brain compartments, neurogenesis and astrogliogenesis – forebrain, hindbrain
4. Neural migration: Interneurons, axonal pathfinding
5. Defects in neurodevelopment: disorders, models & techniques
6. Origin of membrane potential; passive electrical properties of neuronal membranes; factors affecting ionic current, action potential generation and propagation; introduction to ion channels
7. Intercellular communication by neurons – chemical – synaptic properties; neurotransmitters; receptors; neuromodulation; neuromuscular junction; neuron-neuron signals Intercellular communication – electrical
8. Neuronal plasticity– synaptic networks, behaviour, learning, memory
9. Genetic Basis of Behaviour
10. Glia and the nervous system

Reference Books:

- **Principles of Neural Science**; Eric R. Kandel, James H. Schwartz, Thomas M. Jessell. McGraw-Hill Companies; 4th edition
- **Neuroscience**; Bear, M. et al (2006); 3rd Ed. Lippincott Williams & Wilkins
- **Neuroscience**; Purves, D. et al. (2008); 4th Ed. Sinauer Associates.
- **Neurobiology: Molecules, Cells and Systems**; Matthews G G; Wiley-Blackwell Smith.
- **Cellular Migration and Formation of Neuronal Connections: Comprehensive Developmental Neuroscience**, (2020). John Rubenstein and Pasko Rakic (Eds). Academic Press. ISBN: 978-0-12-397265-1
- **Patterning and cell type specification in the developing CNS and PNS**. (2020); John Rubenstein, Pasko Rakic, Bin Chen and Kenneth Y Kwan (Eds). ISBN: 9780128144053. Academic Press, xxiv, 1098 pages.
- **Neurodevelopmental disorders**. (2020); John Rubenstein, Pasko Rakic, Bin Chen and Kenneth Y Kwan, Wyns haw-Boris, and Anthony Joseph (Eds). ISBN: 9780128144091 ; 0128144092. Academic Press, xii, 414 pages.