Basic course in neuroanatomy (credits 1:1) 14 hours lectures : 14 hours lab

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This course aims to familiarize students with the fundamentals of neuroanatomy using a comparative approach.

Theory:

Module 1: (2 - 3 hours) (SV, **NS**)

- The need for an understanding of the anatomical organization of the nervous system; Terms and definitions in neuroanatomy ; A comparative study of nervous system evolution;(SV - August)
- **Organizational principles of the nervous system. (NS)**
- **Central and peripheral nervous system, anatomy of autonomous nervous systems (NS)**
- **Gray and white matter, brain areas and nuclei, meninges, ventricles of the brain, CSF, choroid plexus. The basic concepts of the blood-brain barrier. (NS)**
- Classical and new methods in neuroanatomy, **Neuronal tracing techniques, Brain imaging techniques.** (NS, JPC)

Module 2: Vertebrate neuroanatomy – structure function relations (6 hours) (NS)

- **Organization of mammalian brain: cerebral hemispheres and cerebellum, basal nuclei, brainstem, cerebellum and spinal cord, Concept of archicortex, paleocortex and neocortex, Broadmann's areas of the cortex. (NS)**
- **Sensory and motor areas of the cortex, Cortical association areas, Ascending and descending pathways. (NS)**

Module 3: Invertebrate neuroanatomy – comparison across taxa (4 hours). (SV August September)

Module 4: Guest lectures on human anatomy by a Clinician (2-3 hours)

Laboratory:

- **Demonstration vertebrate brain dissection (sheep brain) (3 hours) (NS)**
- **Dissection and staining of mouse brain (3 hours - Demo) (NS, JPC)**
- Dissection and staining of invertebrate nervous system (earthworm, flies) (3hours - Demo)(SV August September)
- Hands-on practice of preparation of slices and whole mounts of **vertebrate** and invertebrate nervous tissue and imaging using epifluorescence microscopy (**(NS, JPC, SV)**10 hours or more, in practice it will take about 3 days for completion of process of immunohistochemistry)

Reading Material: In addition to the following textbooks, you will be asked to refer to articles and websites by instructors for specific modules

Textbooks:

- Principles of Neural Science; Eric R. Kandel, James H. Schwartz, Thomas M. Jessell McGraw-Hill Companies; 4th edition
- Neuroscience ; M. Bear, et al (2006); 3rd Ed. Lippincott Williams & Wilkins
- Neuroscience; Purves, D. et al. (2008); 4th Ed. Sinauer Associates.