

IISER Pune - Course Content

Semester	AUG 2024
Open to Semester	5,7,11,13,21
Course Code	BI3154
Course title	Neurobiology - I
Nature of Course	LT - lecture and Tutorial
Credit	4
Coordinator and participating faculty (if any)	Dr. Nixon M. Abraham Dr. Suhita Nadkarni
Pre-requisites	None. However, this course is a prerequisite for Neurobiology II
Objectives	<p>In spite of the phenomenal progress in Neuroscience over last few decades, the brain remains the most mysterious and fascinating organ in the human body. This course is designed to introduce students to essential concepts in the field of Neurobiology and to generate curiosity about the brain functions. We will begin with an introduction to the brain and the history of neuroscience followed by the basics of Neuroanatomy. Later modules will explore the cellular basis of neuronal communication and how this finally generates a well-defined behavior, the ultimate readout of brain functions.</p> <p>We will also introduce the basics of Neurodevelopment and teach how a developed neural circuit undergoes plastic changes that help us to memorize events. We will conclude the course by commenting on the modern techniques used to study the causality in Neuroscience. The content of the course is truly interdisciplinary and will be useful for students, who are eager to learn the basics of brain functions and also attract them to a career in Neuroscience.</p> <p>Please go through the syllabus and get back to us if you have questions (nabraham@iiserpune.ac.in).</p>
Course content	<ol style="list-style-type: none"> 1. Introducing Neuroscience (1 lecture) 2. Organization of nervous system (5 lectures) 3. Membrane channels, ionic basis of resting potential and action potential (6 lectures) 4. Diversity in biophysical properties of ion channels and its effects on membrane excitability (2 lectures) 5. Propagation of action potential and Synaptic transmission

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	<p>(2 lectures)</p> <p>6. Synaptic plasticity Hebbian theory (2 lectures)</p> <p>7. Nervous system development (4 lectures)</p> <p>8. Experience-dependent plasticity, structural plasticity (10 lectures)</p> <p>9. Learning and memory (3 lectures)</p> <p>10. Adult Neurogenesis and Neuropathology (2 lectures)</p> <p>11. Neural basis of behavior – studying causality using Optogenetics, Chemogenetics, In vivo electro/optophysiology (5 lectures)</p>
Evaluation / Assessment	<p>End-Sem Examination-30%</p> <p>Mid-Sem Examination-30%</p> <p>Others-Continuous assessment: 40% (20% in both Mid-Sem and End-Sem)%</p>
Suggested readings	<p>i) E. Kandel, et al., (2000). Principles of Neural Science, 4th Ed. McGraw-Hill Medical</p> <p>ii) M. Bear, et al., (2006). Neuroscience. 3rd Ed. Lippincott Williams & Wilkins</p> <p>iii) D. Purves et al., (2008). Neuroscience . 4th Ed. Sinauer Associates, Inc.</p> <p>iv) C. G. Galizia & P.M. Lledo (2013). Neurosciences – From Molecule to Behavior, Springer Spektrum</p> <p>v) D. Sanes, et al. (2005). Development of the Nervous System. 2nd Ed. Academic Press</p>
When Next	August 2025
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