

SEMESTER I

LSM4213 SYSTEMS NEUROBIOLOGY

Prerequisite: LSM3215 and LSM3216

Workload: 30 lecture hours + 8 Tutorial hours + 4 Practical Hours + 8 Self-Directed Learning (SDL) hours

Course description:

The primary goal of this module is to understand (a) how neurons, assembled into circuits, mediate behavior and (b) how technology can remediate neural dysfunction by affecting the circuits. This course draws on basic knowledge of the cell biology and physiology of neurons.

S/N	Topics	Proposed Lectures
1.	Sensation and motor behavior Functional neuroanatomy (2hr) General scheme of sensory processing (2hr) Somatosensation and pain (2hr) Basis of vision (2hrs) Organizational features of motor processing (2hr)	10 hr Sanjay Khanna
2.	Higher brain function and synaptic plasticity Object recognition: edge detection and simple forms (2 hr) Object recognition: complex objects, face recognition and beyond (2 hr) Memory (2 hr) Memory and goal directed behaviour (2 hr) Neural basis of working memory (2 hr) Developmental plasticity in vision (2 hr) Plasticity and simple motor learning (4 hr)	16 hr Andrew Tan Fu Yu
3.	Neurotechnology Parkinson's disease and deep brain stimulation (2 hr) Tetraplegia and brain-machine interfaces (2 hr) Practical: muscle-machine interface	4 hr Andrew Tan Wong Boon Seng
		Total Lectures: 30 hrs Tutorials: 8 hrs Practicals: 4 hrs SDLs: 8 hrs
Total hours:		50hrs

TEXT BOOK: Bear MF, Connors BW, Paradiso MA, (eds.), Neuroscience: Exploring the Brain, 3rd edition

MODE OF ASSESSMENT: 45% CA (reports based on SDL), 55% Final Exam

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