

Course Coordinator: Dr. Jacqueline Vanderluit

The aim of the Systems Neuroscience course is to ensure that students have a fundamental knowledge of Neuroscience concepts: organization of the nervous system, sensory and motor systems and higher integrative function and a range of neurological diseases and disorders.

Timeline and Room:

Lectures

Tues and Thurs 1:00 – 3:00 (Sept. 8 to Dec. 13), schedule given below
Room# 2M201

Labs

Lab #1 Thursday Sep 15, 2016, 1:00 – 4:00pm, Room MELSS-2804
Lab #2 Thursday Sep 29, 2016, 1:00 – 4:00pm, Room MELSS-2819
Lab #3 Thursday Oct 13, 2016, 1:00 – 4:00pm, Room MELSS-2819
Lab #4 Thursday Oct 27, 2016, 1:00 – 4:00pm, Room MELSS-2819
Lab #5 Thursday Nov 10, 2016, 1:00 – 4:00pm, Room MELSS-2819
Lab #6 Thursday Nov 24, 2016, 1:00 – 4:00pm, Room MELSS-2819
Lab Review Thursday Dec 1, 2016, 1:00 -4:00pm, Room MELSS-2819
Lab Exam Tuesday Dec 6, 2016, 1:00 – 2:00pm, Room MELSS-2804

Topics and Timeframe:

Part 1

General organization and Motor Systems Cortex, spinal cord, basal ganglia, cerebellum, voluntary movement, motor planning, postural control and locomotion. Neurodegenerative diseases – Parkinson's and Huntington disease.

Time: ~8 h

Part 2

Sensory Systems using somatosensory and vision as model systems but also including session on olfaction/taste. Neurodegenerative disease – Multiple Sclerosis. **Time: ~7 h.**

Part 3

BrainStem, Neuroregulation and Higher Function: brainstem and cranial nerves, feeding, drinking, stress, memory and learning, addiction, motivation, reward pathways. Neural related disorders – Stroke.

Time: ~8 h

Part 4

Neuroanatomy Labs

Time: 12 h

Evaluation:

Quizzes (50%)

There will be a quiz after each section of the course

Part 1: Oct 6, 1:00 – 4:00 (15%) Room # 1M102

Part 2: Nov 1, 1:00 – 4:00 (20%) Room # 1M102

Part 3: Dec 13, 1:00 – 4:00 (15%) Room # 1M102

Neuroanatomy (35%)

Lab Exam: Dec. 6, 1:00 – 2:00 Room # HS Library Computer RoomB

Disease Presentations (15%)

Presentation #1 (5%): Nov 8, 1:00 – 4:00

Presentation #2 (10%): Nov 22, 1:00 – 4:00

Proposed Readings: The following textbooks have been used in preparing lectures (specific chapters, for each section, are given in the table below):

Squire et al (3rd edition), Fundamental Neuroscience,

Kandel et al (4th or 5th edition), Principles of Neural Sciences

Blumenfeld (1st or 2nd edition), Neuroanatomy through Clinical Cases

Alberts et al (5th edition) Molecular Biology of the Cell

MED 6196 Fall 2016

Times: Tuesdays and Thursdays 1-4pm

Location: Lectures 2M201, Labs - MELSS

| Date | Lectures | Labs & Quizzes | Readings | Lecturers |
|-----------------------------|---|--|---|--------------------|
| <i>CNS Overview</i> | | | | |
| Sept. 8 | Introduction and Organization of the Course (0.5h) | | | Jackie Vanderluit |
| | Nervous system organization, hierarchical and topographic representation, meninges, CSF, blood supply (1 h) | | Kandel et al. (4 th ed) Ch. 17, 18, Appendix C | Jackie Vanderluit |
| Sept. 13 | Overview of neurons and glial cells, neurotransmitters, receptors, action potential (1.5 h) | | Kandel et al., (4 th ed) Ch. 2, 4, 15 | Michiru Hirasawa |
| Sept. 15 | | Lab #1 Overview of the nervous system, blood supply, ventricular system (2h) | | Jackie Vanderluit |
| <i>Motor Systems</i> | | | | |
| Sept. 20 | Cortex, spinal cord, motor pathways. (1h) | | Kandel et al. (4 th ed) Ch. 17, 33, 37 | Jackie Vanderluit |
| | Cerebellum (1 h) | | Kandel et al. (4 th ed) Ch. 42 | Michiru Hirasawa |
| Sept. 22 | Basal ganglia (1h) | | Kandel et al (4 th ed) Ch. 43 | Xihua Chen |
| | Voluntary movement, motor planning, posture, locomotion (1h) | | Kandel et al (4 th ed) Ch. 33, 37 and 41 | Michelle Ploughman |
| Sept. 27 | Disease Lecture #1 Parkinson's Disease & Huntington's Disease (1.5h) | | Kandel et al (4 th ed) Ch 43 | Matthew Parsons |
| Sept. 29 | | Lab #2 Motor Systems, Basal ganglia, Cerebellum (2h) | | Jackie Vanderluit |

Sensory Systems

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|---------|---|---|--|----------------------------|
| Oct. 4 | Touch, pain and temperature (1h) | | Kandel et al (4 th ed) Ch. 22 – 24 | Xihua Chen |
| | Proprioception (muscle spindles and stretch receptors, stretch reflex) (1h) | | Kandel et al (4 th ed) Ch. 36 | Karen Mearow |
| Oct. 6 | | Quiz #1 Introduction & Motor Systems | | Jackie Vanderluit |
| Oct. 11 | Disease Presentations: <i>Introductory Session</i> (0.5h) | | | Jackie Vanderluit |
| | SMARTBoard Session HSIMS (A Siscoe) (0.5h) | | | Adam Siscoe (HSIMS) |
| Oct. 13 | | Lab #3 Somatosensory pathways, Autonomic nervous system (2h) | | Xihua Chen |
| Oct. 18 | Olfaction and taste (1.5h) | | Kandel et al (4 th ed) Ch. 32 | Samantha Goodman |
| Oct. 20 | Vision and Visual Pathways (2h) | | Blumenfeld (Neuroanatomy Clinical Cases) Ch. 11 | Bob Gendron, Xihua Chen |
| Oct. 25 | Disease Lecture #2 Multiple Sclerosis (1.5h) | | Kandel et al (4 th ed) Ch. 4 | Craig Moore |
| Oct. 27 | | Lab #4 Special Senses – Visual, Auditory, Olfactory Systems (2h) | | Xihua Chen |
| Nov. 1 | | Quiz #2 Sensory Systems | | Jackie Vanderluit |

Neuroregulation and Higher Brain Functions

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|--------|---|--|---|--------------------------------|
| Nov. 3 | Brainstem and Cranial Nerves (2h) | | Kandel et al (4 th ed) Ch. 44 | Michelle Ploughman |
| Nov. 8 | Student Disease Presentations #1 | | | Craig Moore, Jackie Vanderluit |

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| Nov. 10 | | Lab #5 Brainstem & Cranial nerves (3h) | | Matt Parsons |
| Nov. 15 | Learning & Memory (2h) | | Kandel et al. (4 th ed.) Ch. 62 and 63 | Matt Parsons |
| Nov. 17 | Addiction, Reward, Motivational Pathways (1.5 h) | | Kandel et al. (4 th ed) Ch. 51 and 60 | Xihua Chen |
| Nov. 22 | Student Disease Presentations #2 | | | Craig Moore, Matt Parsons |
| Nov. 24 | | Lab #6 Higher Cerebral Function (2h) | | Michiru Hirasawa |
| Nov. 29 | Hypothalamus and regulatory systems, neuroendocrine & autonomic nervous system (1h) | | Squire et al (2 nd ed) Ch 34, 35, 38 – 40 | Michiru Hirasawa |
| | Disease Lecture #3 Stroke (1.5h) | | Kandel et al. (4 th ed) Ch. 61 | Michelle Ploughman |
| Dec. 1 | | Neuroanatomy Lab Review Session (2h) | | Jackie Vanderluit |
| Dec. 6 | | Neuroanatomy Lab Exam (1h) | | Jackie Vanderluit |
| Dec. 8 | <i>No class</i> | | | |
| Dec. 13 | | Quiz #3 Neuroregulation & Higher Function | | Jackie Vanderluit |