BIOL/BBB251: Course Syllabus

FALL 2014

CELLULAR and MOLECULAR NEUROBIOLOGY
BIOLOGY/BIBB 251
COURSE SYLLABUS (REVISED)
FALL 2014

Lectures: Monday, Wednesday, 2:00-3:30
Room LEIDY 10

Instructors:
(MFS) Marc Schmidt (course director), 312 Leidy Labs/6018, 898-9375, marcschm@sas.upenn.edu
(MK) Mike Kaplan, Neurolab (Leidy Labs), 573-2654 mkap@sas.upenn.edu
(TEA) Ted Abel, 10-133 Translational Research Center, 746-1122, abele@sas.upenn.edu

Teaching Assistants
Chris Angelakos can@mail.med.upenn.edu
Janani Saikamar sjanani@sas.upenn.edu
Brendan Whitelaw brwhit@sas.upenn.edu
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Yunshu Fan yunshuf@mail.med.upenn.edu


Lecture notes, slides and other materials available on the class website (canvas.upenn.edu)

<table>
<thead>
<tr>
<th>lecture</th>
<th>date</th>
<th>topic</th>
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<th>readings</th>
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<tr>
<td>1</td>
<td>W Aug 27</td>
<td>Introduction</td>
<td>MFS</td>
<td>TA-MK-MFS chapter 1</td>
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<tr>
<td>2</td>
<td>W Sept 3</td>
<td>Membrane currents and the resting potential</td>
<td>MK</td>
<td>Ch. 6</td>
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<td>3</td>
<td>M Sept 8</td>
<td>Action potential: macroscopic currents, Hodgkin &amp; Huxley</td>
<td>MK</td>
<td>Ch. 7</td>
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<td>4</td>
<td>W Sept 10</td>
<td>Action potential: patch clamp and single channel currents</td>
<td>MK</td>
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<td>5</td>
<td>M Sept 15</td>
<td>Molecular biology of ligand-gated ion channels 1</td>
<td>TEA</td>
<td>Ch. 5</td>
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<tr>
<td>6</td>
<td>W Sept 17</td>
<td>Molecular biology of ligand-gated ion channels 2</td>
<td>TEA</td>
<td>Ch. 5</td>
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<td>7</td>
<td>M Sept 22</td>
<td>Cable properties</td>
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<td>W Sept 24</td>
<td>REVIEW</td>
<td>MK, TA, MFS</td>
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<td>M Sept 29</td>
<td>EXAM 1 (lectures 1-7)</td>
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Part 1: Ion channels and the membrane potential

Part 2: Synapses and synaptic plasticity

8       | W Oct 1  | Synapses 1: Four facts about neurotransmission | MK       | Ch 11, 13; end of Ch. 8 (139-140) |
| 9       | M Oct 6  | Synapses 2: Presynaptic mechanisms            | MK       | Ch. 11, 13, and 15            |
| 10      | W Oct 8  | Synapses 3: ionotropic transmission          | MK, TA   | Ch. 12                          |

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11  M  Oct 13  Synapses 4: metabotropic mechanisms  MK  Ch. 12
12  W  Oct 15  Synaptic plasticity 1: *Aplysia*  TA  Carew chapter 10; Kandel 2001
13  M  Oct 20  Synaptic plasticity 2: *Drosophila*  TA  Carew chapter 11
14  W  Oct 22  Synaptic plasticity 3: LTP  TA  Ch. 16
15  M  Oct 27  Synaptic plasticity 4: LTP and genetics  TA  Ch. 16, Abel 1997
16  W  Oct 29  Integration and dendritic physiology  MFS  Ch. 8 (137-141); Ch. 24 (498-501); *Paper: Magee et al. (2000).*

M  Nov 3  EXAM 2 (Lectures 8-16)

**Part 3: Cell and molecular systems neuroscience**

17  W  Nov 5  Olfaction: molecular maps  TA  Purves, Ch. 15
18  M  Nov 10  Olfaction neural mechanisms  MFS  Purves, Ch. 15; Smear et al. 2011
19  W  Nov 12  Guest lecture: Michela Gallagher*

*(This program is made possible by a grant from the Fund to Encourage Women (FEW) of the Trustees of Penn Women)*

20  M  Nov 17  Ion channel diversity and electrical diversity  MK  Nusbaum and Beenhacker 2002
21  W  Nov 19  Glia  MFS  Ch. 9 (151-157); Ch.10; Ch 15 (305-306)
22  M  Nov 24  Information processing in the retina 1  MFS  Ch. 2 (26-29); Ch. 20 (407-431)
   W  Nov 26  NO CLASS

Nov 27  Thanksgiving break (Nov. 27-30)

23  M  Dec 1  Information processing in the retina 2  MFS  Ch. 20 (407-431)
24  W  Dec 3  Auditory system 1  MFS  Ch. 19 (392-396);
25  M  Dec 8  Auditory system 2  MFS  Ch. 22 (453-467)

Dec 16  FINAL EXAM 6-8 p.m. location T.B.A.

**REVIEW SESSIONS**

**EXAM 1 (Sept. 29)**

Wednesday, Sept. 25  FACULTY REVIEW  2-3:30  LEIDY 10
Friday, Sept 28  TA-led REVIEW  5-6:30  GODDARD 101

**EXAM 2 (Nov. 3)**

Thursday, Oct. 30  TA-led REVIEW  4:30-6:00  LEIDY 10
Friday, Oct. 31  FACULTY REVIEW  3-5:00  LEIDY 10

**FINAL EXAM (Dec. 16):**  TBA

**OFFICE HOURS**

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<thead>
<tr>
<th>Instructors:</th>
<th>Time:</th>
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<tbody>
<tr>
<td>Ted Abel</td>
<td>T.B.A.</td>
<td>204G Lynch Labs</td>
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<tr>
<td>Mike Kaplan</td>
<td>Wednesdays 11:30-1:30</td>
<td>Neurolab, Leidy Labs</td>
</tr>
<tr>
<td>Marc Schmidt</td>
<td>T.B.A.</td>
<td>312 Leidy Labs</td>
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ADDITIONAL READINGS


Smear et al. (2011) Perception in sniff phase in mouse olfaction Nature 479: 397 - 400