

Overview of topics, INF5610, fall 2014

1 Topics and lectures

Not covered means this topic will not show up on the exam, and is not very relevant for the exam topics and questions. Topics listed as *self study* are not central to the course, and will not be addressed explicitly at the exam. However, some of these topics are relevant for understanding key topics in the course.

- Chapter 1 Biochemical reactions
 - *Section 1.1-1.3* Covered in lectures. 1.1 is very central and important, 1.2-1.3 are used in some later derivations, but otherwise not that central.
 - *Section 1.4* 1.4.1, 1.4.2 and first part of 1.4.4 (to page 17) are central topics that have been covered in lectures. The rest of the section is not covered.
 - *Section 1.5-1.6* Not covered.
- Chapter 2 Cellular homeostasis
 - *Section 2.1, 2.2.1-2.2.3* 2.2.2 has not been covered in detail, but is implicitly used in some derivations. The other parts are central topics that have been covered in lectures.
 - *Section 2.4* This is an important topic that has been covered in the lectures. Some of the formulae are too complex to be remembered in detail, but the general idea is important. In particular, what are the key differences between uniport and symport/antiport (cooperativity), and what is the consequence for exchanger efficacy?
 - *Section 2.6* Everything except 2.6.2 are key topics that have been covered in lectures.
 - *2.7-2.9* Not covered.
- Chapter 3 Membrane ion channels
 - *Section 3.1* Introduction has been covered in lectures.
 - *Sections 3.1.1-3.4* are not covered.
 - *Sections 3.5-3.6* These have been covered in lectures. 3.5 is particularly central.

- Chapter 4 Passive electrical flow in Neurons
 - *Sections 4.1-4.2.3* have been covered. 4.1 is particularly important.
- Chapter 5 Excitability
 - *Section 5.1* Everything up to 5.1.2 has been covered. The model itself is particularly important, but one should also have some knowledge of the experimental techniques employed to derive the model.
 - *Section 5.1.3* has been covered in the lectures, but is not very central
 - *Section 5.2* Introduction and 5.2.1 have been covered. The rest is less important.
- Chapter 6 Wave propagation
 - *Section 6.1* is useful background knowledge/
 - *section 6.2* 6.2.1 has been covered in lectures. It is important to know the general behavior of the bistable equation, but the detailed analysis is not relevant.
- Chapter 7 Calcium dynamics
 - Chapter introduction is important, as a general overview of the calcium system, see also the figures in the slides.
 - *Section 7.2* Introduction is important, 7.2.1-7.2.3 are not important, a general overview of 7.2.4 (serca pump) is useful, but exclude the detailed formulae.
 - 7.2.5-7.2.8 Not covered.
 - 7.2.9 Covered in lecture, a general overview is useful.
- Chapter 12 The Heart
 - *Section 12.1: The electrocardiogram.* This is not very important, but nice to read as a background material for those not too familiar with the electrical activity of the heart. Self-study.
 - *Section 12.2: Cardiac cells.* This follows up from the cell models, ionic channels etc introduced previously, and explains what is special about cardiac cells. Not very important, but may be useful reading to understand the other parts, such as muscle contraction etc.
 - *Section 12.3: Cellular coupling.* Section 12.3.3 is a key topic that has been covered in the lectures. The rest of the section is nice to read as background material, but it is not necessary to be familiar with all the detailed mathematical derivations etc. Self study.
 - *Sections 12.4-12.9.* Not covered.
- Chapter 15 Muscle

- *Sections 15.1-15.4.2* Covered in lectures. Some details have left as self-study.
- *Sections 15.4.3 and onwards.* Not covered.
- Chapter 11 The circulatory system.
 - *Sections 11.1-11.6* Covered in overview lecture October 8th. Some details are left as self study.
 - *Section 11.7* Not covered
 - *Section 11.8.2* Covered in overview lecture.
 - *Sections 11.8.1,11.8.3,11.8.4.* Not covered, but 11.8.1 (15.8.1) may be useful for understanding 11.8.2.

2 Exam format

We practice a lecture form for the oral exam. You will receive six topics two weeks before the exam date, and prepare a 15-20 minutes presentation on each topic. On the exam, you draw one topic and present this. After the presentation, we will ask a few questions related to the other topics of the course.