Schedule for Cell Biology, 15 hp, spring 2019 (3MB002 & 5MO100)

Course dates: Start January 21 – end March 25, 2019. (18/1-19)

Lecture hall: Jan 21 – Feb 22, lecture hall 6A103 (“Astrid Fagreus salen”), building 6A.
           Feb 25 – March 25: lecture hall 6A103 or as indicated in the schedule

Course leader: Martin Gullberg 090-785 67 03, martin.gullberg@umu.se

Instructors for the practical part of the course: Nayyer Taheri (nayyer.taheri@umu.se)
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Course secretary: Lina Helgesson, lina.helgesson@umu.se


Mandatory exercises:
  "Practical Professional Training (PPT), 2 ECTS-credits, comprises oral presentation at four mini-case de-
  briefing sessions.
  Practical exercises (i.e. experimental work and "Practical training in quantitative cell biology"). Note that also
  scheduled introductions to these exercises are mandatory.

The following rules apply to all mandatory activities of the course:
  i) In case of absence from a mandatory exercise, the student should notify the course leader as soon as possible.
     The reason for absence must to be stated in this mail.
  ii) Provided that there is a valid reason (e.g. illness or something else that give the right for absence from an
      ordinary job), students will be given the opportunity to perform a complementary exercise within four weeks.
  iii) Students must report by mail to the course leader the intention to participate in a complementary exercise.
  iv) In case of discontinuation of the course; this should be reported to the course secretary.

Lecture handouts (based on materials originally produced by Dr. Per Holmfeldt)
Introduction to the cell biology course (6 figures)
Lecture 1: How to study cells (29 figures)
Lecture 2: Membrane biology and cellular organelles (30 figures)
Lecture 3: Cell organelles and intracellular trafficking (30 figures)
Lecture 4 & 5: Cellular communication part I & II (54 figures)
Lecture 6 & 7: Cell cycle and cell death part I & II (54 figures)
Lecture 8 & 9: Cytoskeleton part I & II (56 figures)
Lecture 10: Cell adhesion and ECM (28 figures)
Lecture 11: Cytoskeleton, cell cycle & disease (30 figures)
Lecture 12: Summary lecture with a tumor biology perspective (36 figures)

Week 4 (course week 1)
Monday 21/1, 13.00-16.00: Roll call and introduction to study question/mini-case sessions
Lecture 1: How to study cells
Tuesday 22/1, 13.00-15.30: Lecture 2: Membrane biology and cellular organelles
Wednesday 23/1, 13.00-16.00: Lecture 3: Cell organelles and intracellular trafficking
Thursday 24/1: 13.00-15.00: “Flipped class room” & question time, study questions week 1
               Time allocated to work on the study questions
Friday 25/1, 12.00-16.00: De-briefing of study questions week 1

Week 5 (course week 2)
Monday 28/1, 13.00-15.30: Lecture 4: Cellular communication I
Tuesday 29/1, 13.00-16.00: Lecture 5: Cellular communication II / Uniaden
Wednesday 30/1, 13.00-16.00: Second chance: De-briefing of study questions week 1
                                  Time allocated to work on the study questions
Thursday 31/1 13.00-15.00: “Flipped class room” & question time, study questions week 2
                              Time allocated to work on the study questions
Friday 1/2, 12.00-16.00: De-briefing of study questions week 2
Week 6 (course week 3)
Monday 4/2, 13.00-16.00: Lecture 6: Cell cycle I
Tuesday 5/2, 13.00-16.00: Lecture 7: Cell cycle II and cell death
Wednesday 6/2, 13.00-16.00: Lecture 8: Cytoskeleton I
Thursday 7/2, 10.00-12.00 PPT Arbetsliv och karriär, biomedicinstudenter, Victoria Sörensson.
(Lokal: Trippel Helix i samverkanshuset)
13.00-15.00: “Flipped class room” & question time, study questions week 3
Time allocated to work on the study questions
Friday 8/2, 12.00-16.00: De-briefing of study questions week 3

Week 7 (course week 4)
Monday 11/2, 13.00-16.00: Lecture 9: Cytoskeleton II
Tuesday 12/2, 13.00-16.00: Lecture 10: Cell adhesion and ECM
Wednesday 13/2, 13.00-16.00: Lecture 11: Cytoskeleton, cell cycle & disease
Thursday 14/2, 13.00-15.00: “Flipped class room” & question time, study questions week 4
Time allocated to work on the study questions
Friday 15/2, 12.00-16.00: De-briefing of study questions week 4

Week 8 (course week 5)
Monday 18/2, 13.00-16.00: Lecture 12: Summary lecture with a tumor biology perspective
Tuesday 19/2, 13.00 – 16.00 Second chance: De-briefing of study questions week 2-4
(Locality: Guanine, building 6K, 2nd level, close to the lunch room)
Wednesday 20/2, 13.00-14.00: Introduction to course activities termed “Practical training in quantitative cell biology” and lecture series “Cell biology by the numbers”, by Ron Milo
14.30 – 16.30: Time for review and questions
Thursday 21/2, Time allocated to final preparation before the exam
Friday 22/2, 09.00-15.00 Exam (theoretical part of the course): Östra Paviljongen
Re-exam: Place and date to be announced
Preliminary schedule for the practical part of the course

This part involves the following exercises:

I. Practical training in quantitative cell biology, which serves as an entry point for students to explore some of the key numbers of cell biology and make connections with previous course segments.

As examination, each student should submit i) a brief vignette which illustrate some quantitative aspect of cell biology and ii) a detailed account of calculations related to a specified task.

II. Experimental work that involves model systems and methodology for cell biological studies. This includes training in independently planning experiments and analyses.

Examination is based on participation in the practical exercises and individual lab reports.

Week 9 (course week 5, week 1 of the practical part of the course)
Optional time and locality: Ron Milo lecture 1 - 6: “Quantitative reasoning in molecular and cell biology”. Search YouTube: Ron Milo Cell Biology by the Numbers, 2014 class, Lecture 1 (Lecture 2, Lecture 3 etc). It will help you a lot to make notes while viewing these lectures.

Monday 25/2: 11.00 – 13.00  Introduction to the laboratory course: Safety issues

Introduction to Lab I
Lab safari, pipettes, centrifuges, cytopsin etc.

15.00 – 17.00  Gang A: initiation of Lab I

Tuesday 26/2, 09.00 -16.00  Gang A: continuation of Lab I (Day 2)
15.00 – 17.00  Gang B: initiation of Lab I

Wednesday 27/2, 09.00 -16.00: Gang A: continuation of Lab I (Day 3)
15.00 – 17.00  Gang B: continuation of Lab I (Day 2)

15.00 – 17.00  Gang C: initiation of Lab I

Thursday 28/2: 09.00 -16.00:  Gang B: continuation of Lab I (Day 3)
09.00 -16.00:  Gang C: continuation of Lab I (Day 2)

Friday 1/3: 09.00 10.30:  Introduction to Lab II
10.30 – 17.00:  Gang C: continuation of Lab I (Day 3)

Week 10 (week 2 of the practical part of the course)
Optional time and locality: “Practical training in quantitative cell biology”, task 1 - 4.

Monday 4/3, 08.30 – 12.00:  Gang A: initiation of Lab II

Tuesday 5/3, 09.00 – 16.00:  Gang A: continuation of Lab I (Day 2)
13.00-15.00:  Gang B and C, Practical training in quantitative cell biology, session I:
Discussion of task 1-4 (6A103)
(Studentssportardagen, fettisdagen)

Wednesday 6/3, 08.30 – 12.00  Gang B: initiation of Lab II
12.30 – 17.00 Gang A: continuation of Lab II (Day 3)

Thursday 7/3, 09.00 – 15.00  Gang A: iii. continuation of Lab II (Day 4)
09.00 – 16.00:  Gang B: continuation of Lab II (Day 2)

Friday 8/3, 12.30 – 17.00:  Gang B: continuation of Lab II (Day 3)
13.00-15.00:  Gang A: Practical training in quantitative cell biology, session I: Discussion of task 1-4 (6A103)
Week 11 (week 3 of the practical part of the course)
Optional time and locality: “Practical training in quantitative cell biology”, task 5 - 8.
Monday 11/3, 08.30 – 12.00: Gang C: initiation of Lab II (Day 1)
09.00 – 15.00: Gang B: continuation of Lab II (Day 4)
Tuesday 12/3, 09.00 – 16.00: Gang C: continuation of Lab II (Day 2)
Wednesday 13/3, 12.30 – 17.00: Gang C: continuation of Lab II (Day 3)
09.00 – 11.00: Opportunity for consultation concerning "Practical training in quantitative cell biology" (6A103)
Thursday 14/3, 09.00 – 15.00: Gang C: continuation of Lab II (Day 4)
12.00 – 18.00: Gang A, B & C: computer lab according to separate schedule: Gating and analysis cells of flow cytometry data. Locality: Old library /Guanidine, building 6K, Molecular Biology Dept, 3rd level (located above the lunch room)
Friday 15/3, 08.00 - 11.00: Cleaning of laboratory
15.00 - 17.00: Instructions for report and seminars (Lab II): How to prepare figures and interpretation of data (6A103)

Week 12 (week 4 of the practical part of the course)
Optional time and locality: “Practical training in quantitative cell biology”, task 9 - 12.
During this week students are expected to work on tasks that serve as examination of this course segment, namely i) a brief vignette which illustrate some quantitative aspect of cell biology and ii) a detailed account of calculations related Task 13.
Monday 18/3: 09.00 – 13.00: Analysis of data and preparation of lab seminars
09:00-13:00 Spare time for microscopy for all gangs.
13.00-15.00: Practical training in quantitative cell biology, session II: Discussion of task 5-8 (6A103)
15.00-17.00: Opportunity to consultation concerning lab II report: How to prepare figures and interpretation of data (6A103)
Tuesday 19/3, 12.00 – 17.00: Gang A: lab seminar (6A103)
12.00 – 17.00: Gang B and C: Analysis of data and preparation of lab seminars
Wednesday 20/3, 12.00 – 17.00: Gang B: lab seminar (6A103)
09.00 – 17.00: Gang C: Analysis of data and preparation of lab seminars
Thursday 21/3, 12.00 – 17.00: Gang C: lab seminar (6A103)
Friday 22/3, 08.00 – 13.00: Work on Lab report and the examination task for “Practical training in Quantitative cell biology”
13.00-15.00: Practical training in quantitative cell biology, session III: Discussion of task 9 – 12.
Note: Föreläsninsal C, Unod T9, Hospital “Norra entren”, top floor by the cafeteria.
At this session, there is also time for questions concerning the obligatory report on this course segment.

Week 13 (week 5 of the practical part of the course)
Monday 25/3: Work on Lab report and obligatory report on “Practical training in Quantitative cell biology”
17.00 Deadline lab report II
17.00 Deadline for reports on “Practical training in quantitative cell biology”
13.00-16.00 PPT Arbetsliv och karriär, biomedicinstudenter, Victoria Sörensson.
Examinationstillfälle och därmed obligatorisk närvaro.
Lokal: Trippel Helix i samverkanshuset)