

## Course outline

**SCILIFE202, Human Physiology**  
**Fall 2019**



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<b>Classroom no:</b>	C-19
<b>Class times:</b>	Monday, 11:00-13:00 Thursday, 11:00-13:00
<b>Instructor:</b>	Dr Frans van Overveld
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<b>Tel:</b>	0118 - 655523
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<b>Office hours:</b>	Mon-Fri, by appointment

**I. Track information**

- Prerequisites for this course: Introduction to the life Science (SCILIFE101).
- This course serves as recommended prerequisite for: Molecular Pathology and Genetics (SCILIFE301), Cellular and Molecular Physiology (SCILIFE302), Mechanisms of Diseases (SCIBIOM202), Pharmacology (SCIBIOM301), and Infection and Immunity (SCIBIOM302).
- Other courses which are relevant to this course – e.g. as part of a minor: Human Physiology (SCILIFE202) is complementary and forms a triad with Functional Anatomy (SCIBIOM201) and Mechanisms of Diseases (SCIBIOM202).
- Human Physiology (SCILIFE202) is an essential part of the Pre-Medical program, the Biomedical Science, and the Life Science track.

For further information about these tracks, please see the track documents available on the UCR intranet.

**II. Course description**

**Physiology** is the study of the normal functioning of a living organism and its component parts, including all its chemical and physical processes. In this course, the focus is on the function of the adult human body and of different organ systems. Knowledge of the subject is essential for students with a medical interest and recommended for every student interested in the function (s) of the (own) human body. The course includes fundamental concepts of molecules, cellular and systems physiology to understand how the human body functions and maintains a steady state. Although some medical examples are used to illustrate general physiological principles, this is not a course in medical physiology. Still, the core of physiological knowledge you will learn by taking **Human Physiology** will help you better understand human health and disease.

The course will be divided in 4 units: (1) **Basic cell processes**, (2) **Homeostasis and control**, (3) **Integration of function**, and (4) **Metabolism, growth, and aging**. In addition there will be one **individual assignment**.

Contents of the 4 course units are structure-function relationships (organelles, cells, tissues, organs), energy handling, homeostasis and control systems, signaling and communication,

study of individual organ systems (cardiovascular, respiratory, renal, endocrine, muscles, nervous, digestive, reproduction), and integration of functions.

### III. Study Load

This course earns students four credits (equivalent to 7.5 ECTS). The class meets twice a week for two hours. Preparation time is approximately 10 hours per week.

### IV. Course materials

a) *Required books and literature:*

- Dee Unglaub Silverthorn. **Human Physiology: an integrated approach**, 8<sup>th</sup> Edition 2018 (Global Edition). Pearson Education Inc. ISBN-13: 978-1-2922-5954-3.

b) *Recommended books and literature:*

- Diana Hacker and Nancy Sommers. **A Writer's Reference**. 9<sup>th</sup> Edition, 2018. MacMillan Learning. ISBN-13: 978-1-3191-3305-4.

c) *Other materials:*

- Pearson Education, **Mastering A&P**: Learn the most difficult topics in A&P. Access may be offered in combination with the required textbook. Inform yourself at the bookseller.

### V. Course organization and requirements

a) *General format of class meetings*

In total 24 interactive classes of two hours will be given on the four major topics: (1) **Basic cell processes**, (2) **Homeostasis and control**, (3) **Integration of function**, and (4) **Metabolism, growth, and aging**. The instructor will give an introduction and summarize the chapters listed on the detailed course outline (see section VII). This will be done using PowerPoint® presentations and schematic information on the white board. Approximately 150 hours will be necessary to study the indicated chapters in the textbook and to prepare for the classes. The use of Mastering A&P is highly recommended, because it offers dynamic study modules and assignments, and progression of student learning can be followed up by the instructor (Mastering A&P may be removed from the Dutch market in 2019?). Secondly, classes will be centered on key questions in human physiology. Pathophysiological processes will only be added for illustrative purposes. By means of active communication and discussion, among instructor and students, the concept under investigation will be constructed into a model. The slides presented during the classes will be available through **Moodle**.

During the course, each student is assigned one specific task. This task is a **writing assignment**. Groups of 4 or 5 students each will be formed. These groups are called **Reading Groups**. Each student is asked to write a short paper of about 2000-3000 words. First these full papers will be peer-reviewed by and later discussed with the members of the Reading Group during a one-hour meeting. A short draft or an outline of the paper **is not**

**acceptable** and will have an impact on the final grade. We will use Peergrade®. The members of each Reading Group have to formulate questions, and give feedback on the papers. During the meeting, each writer has to answer these questions and has to defend the paper in front of the other members. This may take approximately 12-15 minutes per paper. In addition, the submitted version will be graded by the members of the Reading Group and the peer-reviewing and grading process will be graded by the instructor. After the meeting, the student will **revise the paper (if needed) within 4 weeks**, taking into account all comments from the Reading Group members and the instructor. Revision of the submitted version into a revised paper is part of the learning process. The final grade will be reflecting the judgement by the peer reviewers, the peer review process, and the revision process of the submitted version into the revised paper. No preliminary grade will be given, and the final grade will be announced after delivery of the final product.

Before each exam a question hour will be scheduled in consultation with the students.

Mobile phones and other devices which connect to the internet are not allowed in class. If you are seen using these devices you will be strictly required to hand in your device at the start of class every session from that point forward.

**Special needs:** students with documented learning disabilities or special needs should make their needs known to the instructor at the start of the course.

*b) What is expected of students*

Besides attending classes, the students have to study the corresponding chapters of the book **Human Physiology: an integrated approach** by Silverthorn (see section VII, course outline) before class. The students need to bring this book every time to class. In the chapters, the student will find extensive descriptive texts, illustrations, and useful examples. To stimulate **regular study** and to test the level of knowledge and insight gained during the course, besides some homework, five written exams will be given.

The students are also expected to study a selected physiologic topic from a list. The selected topic must be approved by the instructor. Subsequently, the student is asked to write a short paper of 4 to 8 pages long, with at least 4 pages of text (2000-3000 words) about this topic. The font type to be used is Times New Roman (12 pt) or Arial (11 pt). The version of the paper (electronic version) should be handed in via Peergrade® at least 5 days before the scheduled meeting of the Reading Group. This allows timely feedback by instructor and each Reading Group member. Handing in the first or the revised version after the deadline without permission will be punished by subtraction of grade points (-20 points for 1 day, -40 points for 2 days, and fail (=F) for >2 days, or by no submission). Each member of the Reading Group will have to read a maximum of 4 submitted papers before the meeting, to formulate questions, and to give feedback on the paper. During the meeting (60 minutes), each writer has to answer questions and to defend the paper in front of the other members. These papers and the performance of the writers will be **graded by the student members** of the Reading Group, using a checklist that will be made available through Moodle. The peer reviewing and the grading activity of each student will be graded by the instructor. After the meeting, the student will have **4 weeks to revise** the paper (if needed), taking into account all the comments from the Reading Group members and the instructor. Each paper has to be summarized in an abstract, which is included in the paper showing a good understanding of the topic discussed.

As is the case for many papers in medical and biomedical scientific journals, the **abstract** should be written in a structured form. This means the abstract is a short summary of the paper and providing the reader with an introduction/ description of the topic, possible treatment and prognosis, and a concluding sentence.

The structure of the paper may include (if appropriate) the following sections: introduction, description of the physiological process, pathophysiology and cause of disease/disorder, diagnosis and treatment, discussion, conclusion/summary, and a bibliography. The bibliography lists all references mentioned in the text and should contain the name of authors, title of the paper, journal name, year of publication, volume, and pages (preferably in Vancouver style, but other referencing styles will also be accepted). The checklist for paper grading contains the following items: appropriate summary, appropriate introduction, clarity of writing, use of figures and their quality (if present), use of tables and their quality (if present), the relation between text, figures and tables, coherence (structure), dosage of information, length of paper, vocabulary and word choice, in-depth knowledge, and clear answers on questions asked during the meeting.

c) *Rules for missing classes, exams and deadlines*

Class attendance is mandatory. The instructor should be informed **before class** in case of illness or any other urgent reason to excuse class. According to UCR academic rules and procedures, the course is failed when 7 or more of the classes are missed. On Tuesday, **December 17**, I will offer **late exams** only for those having excused an earlier exam for a valid reason. **No late exams are possible at any other moment during the semester (= including the Fall break).**

d) *Procedures for communication and use of Moodle*

Moodle is the preferred mode of communication. The assignments (revised papers; score sheets; feedback forms) should all be posted in the Moodle sections specifically created for this purpose. In general, all work must be uploaded in Moodle. **Work that is not present in Moodle at the end of the semester will be considered as not submitted** and will be graded with **F** (fail).

**All assignments will be checked for plagiarism using Urkund®.** Plagiarism is a serious academic offence which carries heavy sanctions. Make yourself familiar with the UCR Plagiarism Policy (see your Student Handbook).

Outside class, the student may contact the instructor also at [f.vanoverveld@ucr.nl](mailto:f.vanoverveld@ucr.nl). In addition, the instructor has set office hours from Monday to Friday, by appointment.

e) *Other*

This course is subject to UCR academic rules and procedures. Both students and instructors are required to know and follow these rules and procedures.

**VI. Assessment***a) Assessment components*

There will be five (5) written **exams** during the course and one (1) **assignment**. An exam will consist of open answer questions, multiple choice questions, and exercises (for examples, see at the end of each book chapter). The student will get maximum 120 minutes (except test #3, which will be 60 minutes) to answer all questions and fill in the exercises. An answer fulfills adequately in case the pre-formulated criteria are met (using a checklist). Please keep your answers short with a maximum of 100 words per open answer question. These 5 exams will be part of the final assessment. The exams 1, 2, 4, and 5 will count for 17.5% of the final grade; test #3 will count for 10%. The writing assignment will count for 20% of the final grade. The average of the five exams should be **C- or higher**. If not, the maximum of the final grade for this course will be **C-**, or **F** (fail) in case the exam average is below 50%.

*b) Main criteria on what aspects students will be graded*

The exam questions can be compared with the questions and exercises at the end of each chapter in the textbook. An answer fulfills adequately in case pre-formulated criteria are met (using a checklist).

The grading of the writing assignment has been described in section Vb.

Grades and feedback for the writing assignment will be completed by the instructor and returned to the author within 2 weeks after handing in of the revised final version of the paper and on the condition that all score sheets have been uploaded on Moodle.

**VII. Course schedule**

<b>Time</b>	<b>Topics to be discussed</b>	<b>Course material used</b>	<b>Assignments and assessment</b>
Week 1 Session 1 26/08/2019	Introduction	Ch. 1	---
Week 1 Session 2 29/08/2019	Compartmentation: cells and tissues	Ch. 3	---
Week 2 Session 1 02/09/2019	Membrane dynamics	Ch. 5	---
Week 2 Session 2 05/09/2019	Communication, integration and homeostasis	Ch. 6	---
Week 3 Session 1 09/09/2019	---	Ch. 1-3-5-6	<b><u>Test 1 (see Moodle)</u></b>
Week 3 Session 2 12/09/2019	The endocrine system	Ch. 7	---

Time	Topics to be discussed	Course material used	Assignments and assessment
Week 4 Session 1 16/09/2019	Neurons: cellular and network properties	Ch. 8	---
Week 4 Session 2 19/09/2019	Efferent division: autonomic and somatic motor control	Ch. 11	
Week 5 Session 1 23/09/2019	Muscles	Ch. 12	---
Week 5 Session 2 26/09/2019	Control of body movement <b>Revision</b>	Ch. 13 ---	Deadline: 26/09/2019 (23:59 h) papers RGs 1+2
Week 6 Session 1 30/09/2019	---	Ch. 7-8-11-12-13	<b><u>Test 2 (see Moodle)</u></b>
Week 6 Session 2 03/10/2019	Reading Group 1 Reading Group 2	Discussion of papers groups 1 and 2	Deadline: 02/10/2019 (23:59 h) papers RGs 3+4
Week 7 Session 1 07/10/2019	Reading Group 3 Reading Group 4	Discussion of papers groups 3 and 4	<b>Deadline: 04/10/2019 (23:59 h) papers RG 5</b>
Week 7 Session 1 10/10/2019	<b>???</b> <b>Reading Group 5</b>	<b>Discussion of papers group 5</b>	
Week Session 1 14/10/2019		--- BREAK ---	
Week Session 2 17/10/2019		--- BREAK ---	
Week 8 Session 1 21/10/2019	Mechanics of breathing	Ch. 17	
Week 8 Session 2 24/10/2019	Gas exchange and transport	Ch. 18	
Week 9 Session 1 28/10/2019	--- Blood	Ch. 17-18 Ch. 16	<b><u>Test 3 (see Moodle)</u></b>
Week 9 Session 2 31/10/2019		MODERATION DAY <u>No class</u> <u>Revision day!</u>	Deadline: revised papers RGs 1+2 (23:59 h)

Time	Topics to be discussed	Course material used	Assignments and assessment
Week 10 Session 1 04/11/2019	Cardiovascular physiology	Ch. 14	Deadline: revised papers RGs 3+4 (23:59 h)
Week 10 Session 2 07/11/2019	Blood flow and the control of blood pressure	Ch. 15	Deadline: revised papers RG 5 (23:59 h)
Week 11 Session 1 11/11/2019	The kidneys	Ch. 19	---
Week 11 Session 2 14/11/2019	Fluid and electrolyte balance	Ch. 20	---
Week 12 Session 1 18/11/2019	Extra time/Revision: Physiological calculations and exercises	Ch. 14 +15 +16 +19 +20	---
Week 12 Session 2 21/11/2019	---	Ch. 14-15-16-19-20	<b><u>Test 4 (see Moodle)</u></b>
Week 13 Session 1 25/11/2019	The digestive system; Metabolism & energy balance	Ch. 21+22	---
Week 13 Session 2 28/11/2019	The digestive system; Metabolism & energy balance	Ch. 21+22	---
Week 14 Session 1 02/12/2019	Reproduction and development	Ch. 26; Guest speaker: Dr. Willem Schoonen, Oss, The Netherlands	
Week 14 Session 2 05/12/2019	Endocrine control of growth and metabolism; Exercise	Ch. 23 (only thyroid and calcium homeostasis) Ch. 25	---
Week 15 Session 1 09/12/2019	Revision Physiology of dying	Ch. 21 +22 +23 +25 +26 Slides	---
Week 15 Session 2 12/12/2019	---	Ch. 21-22-23-25-26	<b><u>Test 5 (see Moodle)</u></b>

### VIII. Student learning outcomes

The aims of the course are to acquire knowledge about the main functional aspects of the human body and its different organ systems. Mastering an integrated concept about function and regulatory mechanisms and demonstrating reasonable argumentation in case of pathophysiological processes.

Learning goals are successful time scheduling to gain knowledge from a textbook, adequate explanation of complex body or organ function to “naïve” fellow students, and understanding the outcomes of disturbed normal function. In addition, the student will acquire skills to allow



scientific pathophysiological argumentation, and to propose restoration of disturbed physiology in humans, and learn the basic principles of measuring the function of the body and several organ systems.

In addition to successful time scheduling to gain knowledge from the textbooks, the student can find relevant scientific papers in the Medline/PubMed databases (via the UU library), analyze and present high-quality content in the field of physiology and/or pathophysiology. The student will be able to read scientific papers, compose a review paper, and can place the discussions about the subject in a broader perspective. The student will also acquire skills to give feedback and is able to grade papers of other students.

<b>Period</b>	<b>Teaching activities</b>	<b>Student is able to do</b>
Period 1 Weeks 1-3	Classes + self-study Answer chapter questions Select a topic for assignment Excursion to function lab	Explain basic principles of human physiology Find relevant scientific papers
Period 2 Weeks 4-6	Classes + self-study Answer chapter questions Writing draft paper	Acquired in-depth knowledge of muscles, the endocrine and nervous system Integrate this information and understand the control of body movement Select and read relevant scientific papers; acquiring writing skills
Period 3 Weeks 6-7	Reading papers Giving feedback Discussion of papers Grading (by students) of papers	Summarize scientific knowledge by abstract writing, and present and explain a scientific paper in front of a small committee Discuss scientific knowledge, give feedback, can grade a paper
Period 4 Weeks 8-12	Classes + self-study Answer chapter questions Finalization paper	Acquired in-depth knowledge of the cardiovascular, respiratory and renal system Acquired in-depth knowledge of measuring body functions Gained skills to respond to reviewer comments and finalize a review paper
Period 5 Weeks 13-15	Classes + self-study Answer chapter questions	Acquired in-depth knowledge of digestion, reproduction and processes in relation to exercise. Explain the working mechanisms of the human body

#### **IX. Appendices** [Course specific materials, e.g. guidelines for essays, presentations, etc.]

A **detailed outline** with actual dates, times, composition of reading groups, names and topics, and subject of classes will be made available separately (through Moodle). The outline

might need adaptations during the course depending on specific wishes, needs or unexpected circumstances.

Useful internet sites are a.o., [www.masteringaandp.com](http://www.masteringaandp.com), [www.physiologyplace.com](http://www.physiologyplace.com) and [www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov).