



Exchange programme Vrije Universiteit

Vrije Universiteit Amsterdam - Exchange programme Vrije Universiteit - 2022-2023

Exchange

Vrije Universiteit Amsterdam offers many English-taught courses in a variety of subjects, ranging from arts & culture and social sciences, neurosciences and computer science, to economics and business administration.

The International Office is responsible for course approval and course registration for exchange students. For details about course registration, requirements, credits, semesters and so on, please [visit the exchange programmes webpages](#).

Medical Biochemistry

Course Code	AB_1198
Credits	6.00
Period	P1
Course Level	200
Language Of Tuition	English
Faculty	Faculteit der Bètawetenschappen
Course Coordinator	drs. K. Brouwer
Examiner	dr. ing. S.J. van Vliet
Teaching Staff	dr. R.E. van Kesteren, dr. M.H.G. Verheijen, dr. D. Molenaar, dr. ing. S.J. van Vliet
Teaching method(s)	Study Group, Partial Exam, Computer lab, Lecture, Practical, Education

Course Objective

General learning objectives/final objectives

- Knows the specific structure, function and role of the different metabolic molecules, cells and tissues/organs in the human body.
- Can explain the coherence of tissue morphology (histology), hormones (endocrinology) and metabolic pathways (biochemistry) in the proper functioning of humans as an integrated system.
- Understands the human reaction to acute or chronic changes in lifestyle (dieting, sports) and during disease.
- Can explain the underlying cause of tissue-specific effects of gene mutations.
- Understands the biochemical background and working mechanisms of several well-known lifestyle and nutrition-related substances (vitamins) and medicaments (cholesterol reducing agents, aspirin).

Educational track "Mathematic modeling" in Biomedical Sciences:

The student:

- knows how the speed equation for a particular enzyme, that is influenced by effectors, is built up mathematically, can qualitatively predict the behavior of an enzyme based on this equation and can produce graphs that reflect this behavior.
- can construct a qualitative reasoning that explains the behavior of a network by means of simulations of a metabolic network that is built up from connected speed equations.

Educational track "Scientific thinking and conducting research":

The student:

- master the laboratory skills to quantitatively determine the levels of glucose in blood, is able to describe these experiments in a lab journal and to draw the correct conclusions from the described results.
- is able to recognize some human tissues under the microscope, and to correlate their coherence in form and function.

Course Content

This course builds on the general biochemical fundament of year 1 from the courses "Biochemistry" (Biomedical Sciences) and "Building blocks of Life" (Health and Life sciences).

This course aims to teach the students about:

- the human metabolism of carbohydrates, proteins and lipids (sugars, amino acids, lipids and nucleotides) and the accompanying digestion, molecular processes and mechanisms of regulation.
- how in the human body various organs and tissues play specialized roles in metabolism (intestine, liver, kidney and lungs).
- how this metabolic system enables healthy people to adequately respond to changes in behavior (diet, lifestyle, sport, stress).
- how pathological changes can be caused by genetic disorders or by

lifestyle and environmental factors (obesity, alcohol, anorexia, infections).

e. how many common conditions can be diagnosed in body fluids (clinical chemistry) and treated with some generic drugs (cholesterol reducing agents, aspirin, antacids) to illustrate the underlying biochemical processes and metabolic pathways in sick and healthy people.

f. the concept of metabolic pathways, their regulation by metabolites and hormones and the mathematical modeling of these pathways.

Additional Information Teaching Methods

1. Lectures (28 hours).
 2. Practical assignments: modeling, histology and biochemistry (16 hours).
 3. Study groups biochemistry and preparation (18 hours)
 4. Self-study/ literature (108 hours)
- Total: 168 hours

Method of Assessment

The summative examination will comprise two closed, digital (partial) examinations (week 4 and week 8, multiple choice and more complex question forms)

Average grade should be >5,50 to pass the course. One resit will be given per year. This resit comprises all the study material.

The following conditions need to be met to pass the course:

- Obligatory presence and participation in the histology and biochemistry practical assignment. This includes the writing of a lab journal report. (PASS/FAIL)
- Active participation in the study groups on mathematical modeling. (PASS/FAIL)
- Active participation in the study groups on Biochemistry. This includes the writing of an essay, giving a presentation and participation in the discussion (PASS/FAIL)

Literature

Literature:

- Marks' Basic Medical Biochemistry: Lieberman and Peet, 5th edition, ISBN: 9781496387721.

(If the student is still has Lieberman and Peet: Marks' Essentials of Medical Biochemistry, 2nd ed., 2015. ISBN: 9781451190069 from a previous year,

he/she doesn't have to buy the Marks' Basic Medical Biochemistry.)

- Endocrinology and Histology: Martini, Fundamentals of Anatomy and Physiology, 8/9/10/11th edition. Chapter 18 and partially chapters 21, 23, 24 en 26

Additional Information Target Audience

Mandatory for 2nd year students BSc Biomedical Sciences, optional for 2nd year students Health and Life Sciences, major Biomedical Sciences

Additional Information

Labcoat needed for practical classes Biochemistry

Recommended background knowledge

Biochemistry (BMS) or Building blocks of Life(Health and Life sciences).