Block 1:

Core Courses:

EUH2002: European Public Health in a Globalising World – introducing policy, research and practice

Full course description

The course provides an overview of modern health challenges in Europe and how they are embraced by a variety of stakeholders: policy makers, researchers, practitioners and the civil society.

The course focuses on three perspectives: Firstly, health in Europe, hence, what is the health status across the European countries, how do the health systems look like, what are major challenges for individual countries. Secondly, the perspective of European health which focuses on Europeanisation and European integration within the European Union (EU) and more widely according to the WHO European region. Lastly, European health in a globalised world is assessed. The course combines theory with practice through lectures, tutorials and a field visit.

This course consists of 32 class hours divided over 7-8 weeks. Students earn 6 ECTS credits when they obtain a passing grade. Students who need more credits can sign up for the extended course format, which includes an Independent Study Project (ISP) worth an additional 3 ECTS. The maximum number of credits that can be obtained is 9 ECTS.

This class is a Core Course for students in the Public Health & Medicine in Europe programme.

Course objectives

After participating in the course students should be able to:

- Describe in brief the historical developments in European health
- Describe the main contemporary health challenges at national levels, European level and from a global perspective
- Describe the main characteristics of how different European health systems are financed and managed
- Know examples of EU related health policies, strategies, institutions and projects
- Describe examples of cross-border collaboration across Europe
- Identify examples of global trends that influence European health and how Europe influence global health

Prerequisites

To facilitate a fruitful learning environment a moderate level of health-related knowledge is required. Hence, the course is directed towards students attending bachelor or master courses in medicine, public health science, sociology, anthropology, political science, economics, European studies etc.

A minimum of 9 students is required for the course to take place.
Recommended reading

The literature is based on EU documentation, reports from the WHO and the European Observatory as well as general research papers concerning European public health. All literature is freely available on the internet.

LIT2005: Going Dutch: Literary Reflections of the Low Countries in the 19th and 20th Century

Full course description

With its great treasure of visual arts and architecture, it is often overlooked that the Netherlands and Belgium also have a rich heritage and thriving presence in literary fields of expression. All of this is directly linked to the history of Western civilisation and European culture.

The class "Going Dutch: Literary reflections of the Low Countries in the 19th and 20th Century" invites students to explore the history of the Netherlands and Belgium guided by literary texts reaching back to the 17th century and moving to the 20th century (using English translations). From the fight for independence against Spanish oppression into the Golden Age of Dutch and Flemish culture when the Netherlands became a European superpower, through the changes coming into being through industrialisation in the 19th century, on into the 20th century with Modernism, Fascism, the German occupation in World War II and the ensuing times of the Cold War.

The selected texts for this class, written by leading Dutch and Flemish authors and recognised as being part of World Literature, provide an authentic view of the history and culture of the ‘low countries’ within the European context. In the art of writing, the unique characteristics of the Netherlands and Belgium and their inhabitants are reflected within the process of Western civilization, often with an ingenious combination of realistic depiction with fantastic, even grotesque elements.

Starting with Vondel and his dramatised discussion of cultural and religious struggles in the 17th century, followed by a portrait of Holland in the 19th century, the literary journey will reach the realms of decadence at the turn of the century. The turbulent events of the 20th century and the effect they had on the ‘low countries’ will then be explored from Dutch and Flemish perspectives, including comic book-art, a movie viewing, the depiction of the Maastricht region in fiction and vice versa views from the United States with Williams Carlos Williams and Joseph Heller. Artistic concepts and writing styles from Symbolism to Post-modernism will be central elements of the class discussion, together with the continuing presence of the Dutch and Flemish past.

The class comes with a day-long academic field trip to the UNESCO World Heritage city of Bruges in Belgium, exploring and tasting one of the European capitals of Decadence.

This course consists of 32 class hours divided over 7-8 weeks. Students earn 6 ECTS credits when they obtain a passing grade. Students who need more credits can sign up for the extended course format, which includes an Independent Study Project (ISP) worth an additional 3 ECTS. The maximum number of credits that can be obtained is 9 ECTS.

This class is a Core Course for students in the European History, Culture & Arts programme.

Course objectives
The aim of this course is to provide a genuine European experience, in literature and on site, using Maastricht and the Netherlands as the starting point. Students will receive a thorough introduction to Dutch and Flemish culture within the context of Western civilisation. A chosen collection of literary examples, including other media and an excursion, will provide the material to discuss artistic movements, political and social history as well as philosophical and cultural ideas. Students will learn about methods of literary criticism and gain experience in analysing fictional texts as well as learning more about the Netherlands and Belgium.

**Prerequisites**

None. A minimum of 7 students is required for the class to take place.

**Recommended reading**

- Joost van den Vondel, Lucifer (engl. translation)
- Multatuli, Walter Pieterse: A Story of Holland (engl. translation)
- Georges Rodenbach, Bruges-la-morte (engl. translation)
- Williams Carlos Williams, Pictures from Brueghel
- Hugo Claus, Wonder (engl. translation)
- Cees Nooteboom, In the Dutch Mountains (engl. translation)
- Joseph Heller, Picture This
- Harry Mulisch, The Discovery of Heaven (engl. translation, or movie) The following movie will be shown: Winter in Wartime (Jan Terlouw).

CES students receive their books on loan from CES.

Additional Courses:

BMW3001: Diseased Cells (12 quarter/8 semester units)

Full course description

The block "diseased cells" (8 weeks) has as central theme cancer and the underlying complex molecular pathways. It aims to integrate morphology (histology), molecular pathophysiology and cell biology. Cancer is primarily an environmental disease with about 90% of cases attributed to environmental factors (not inherited genetically) and only about 10% due to genetics (inherited genetically). Common environmental factors that contribute to cancer death include tobacco, diet, infections, radiation and environmental pollutants. Cancer comprises biological capabilities of the cell acquired during the multistep development of human tumors. These so called "hallmarks" include sustaining proliferative signaling, evading growth suppressors, resisting cell death, enabling replicative immortality, inducing angiogenesis, and activating invasion and metastasis. Underlying these hallmarks are genome instability, which generates the genetic diversity that expedites their acquisition, and inflammation, which fosters multiple hallmark functions. In the block BMW3001 cases are presented that illustrate these "hallmarks of cancer", multistep development and impact of environmental factors. The practicals focus on the cell cycle, visualization of a virus causal related to cancer and genome instability. In a written report the student will design his own knock out mouse to study a monogenic disease.

Course objectives

Main objectives (insight in) - Cell types and their normal grow and adaption reactions - Normal cell cycle, cellular differentiation and disturb intercellular communication - Basic genetic concepts and progression models for cancer - Grading and staging of tumors - Processes of apoptosis and necrosis - Processes of invasion and metastasis - Angiogenesis and hypoxia - Immunology of tumors - Mechanisms of cell damage - Morphologic cellular reactions during persistent stress - Model systems (transgenic and knock-out Mouse models) - Viral carcinogenesis i.e. HPV - Genetic alterations during carcinogenesis - Genetic predisposition for cancer - Impact of nutrition on cancer - Mechanisms for acute and chronic inflammation - Composition of extracellular matrix during wound healing - Wound healing, stem cells, repair and regeneration (skin, liver) Practicals - Tackling the kinetics of the cell cycle - Protocol development and "hands on experiment" for (F)ISH and immunocytochemistry for the visualization of HPV and chromosomal aneusomy - Imaging of FISH and image analysis (imageJ basic) Written report - Design your own knock-out mouse model

https://www.maastrichtuniversity.nl/meta/328553/diseased-cells?print=1
BMW3002: Molecular Nutrition (12 quarter/8 semester units)

Full course description

Molecular nutrition is one of the most rapidly developing fields in nutritional science. Nutrition provides the building blocks of cells, tissues and finally our complete body. In addition, it provides fuel to construct and sustain our body. In fact, nutrients actively regulate the molecular processes that enable us to be what we are. Our knowledge about the active role that nutrients play on the molecular level has increased tremendously in the past few years. In some cases, nutrients exert an indirect effect, such as the induction of insulin release by glucose. In many cases, nutrients also directly influence the levels of rate-limiting metabolites. They directly interact with transcription factors and thus regulate the activity of genes, in particular of genes involved in metabolic processes. Knowledge about molecular activities of nutrients enables us to deliberately influence the metabolism through nutrient intake and thus to prevent disease or to improve physical and mental performance. At the same time, the border between medical drugs, pharmaceuticals, and bioactive nutrients, i.e. nutraceuticals, begins to fade.

This course provides insight knowledge on various ways by which nutrients can influence molecular processes in the body. In addition, different molecular strategies are addressed, which are currently applied to improve or sustain human health by making use of nutrients. Finally, students will be trained to adopt a critical attitude towards health claims of nutrients and to make evidence-based judgements with respect to those claims.

Special themes:

- Nutritional epigenetics
- Transcription factors/Orphan nutrient receptors
- Gut-brain axis in food intake regulation
- Vitamins, more than antioxidants
- Bioactive food components, functional foods
- Personalized nutrition and nutraceuticals
- Nutrigenetics, gene-diet interaction

Course objectives

In detail, each student will have:

- Knowledge on the molecular processes underlying epigenetic influences of nutrition
- Understanding of the activity of transcription factors and the way by which nutrients influence the activity of transcription factors
- Knowledge on the roles of vitamins as essential regulators of gene expression
- Insight into the importance of the gut and the gut flora for food intake regulation and on body weight
• Understanding of the strategies aimed at preserving or improving human health with specific nutrients
• Understanding of modern genetic methods applied to detect genetic variation associated with nutrition-related traits/disorders
• Knowledge on the societal developments regarding personalized nutrition
• Insight into health claim regulations.

Application of knowledge and understanding:

Each student will be able to:

• Define nutrients that can have a healthy effect or a rather unfavorable effect
• Make a prediction about the foreseen impact of molecular nutrition in the near future
• Design experiments to assess the influence of a nutrient or dietary component on health.

Interpretation:

Each student will be able to:

• Judge from available data (or the lack of relevant data) whether a health claim is justified
• Extract relevant information on molecular nutrition from the scientific literature.

Communication:

Each student will be able to:

• Give an oral presentation on an executed research project for fellow students
• Answer the questions asked during or after such an oral presentation
• Actively ask critical questions during the presentations of fellow students.

Learning abilities:

Each student will acquire skills in:

• Searching for and critical reading of scientific publications
• Providing feedback to the tutorial group and practicing scientific discussions with fellow students.

Recommended reading

Needed as basic knowledge: Molecular Biology of the Cell by Bruce Alberts.

https://www.maastrichtuniversity.nl/meta/327409/molecular-nutrition?print=1
BMW3003: Training (12 quarter/8 semester units)

Full course description

The main aim of this course is to gain insight into the structural, metabolic, and functional adaptations to regular physical activity, or exercise training. Over the past decades, it has been well established that regular physical activity represents one of the key factors for leading a healthy life. Physical activity, or exercise training, results in a range of structural and metabolic adaptations, improving exercise capacity and leading to increased functional performance. In this course, the adaptive response of the human body to regular exercise training will be studied from the whole-body down to the molecular level, including the mechanisms underlying these adaptations and the different factors affecting the training response (i.e. type of training, nutrition, etc.). With exercise inducing important health benefits, students will become familiar with more general exercise effects (i.e. in healthy or trained subjects), as well as exercise as a therapeutic means for several pathologic conditions. While the focus will be on skeletal muscle, various other organ systems are also involved in the adaptation to exercise training and are, as such, topic of study. Finally, the effect of physical inactivity will also be studied, such as seen during bed rest or immobilization. Additional lectures on specific topics (e.g. rehabilitation in children, overtraining) will also be provided. Apart from cases and lectures, students will work in small student teams on a project in which they will implement a 5wk trianing program. In several practicals, the adaptaitons to the program will be determined.

Course objectives

Knowledge and comprehension

At the end of the course the student should possess:

- Knowledge on principles and terminology of general exercise physiology
- Knowledge on different training modalities
- Knowledge on structural, metabolic, and functional adaptive responses to these different training modalities (from whole-body to cellular level)
- Insight in the mechanisms underlying the adaptive response to regular exercise (including molecular pathways)
- Knowledge on the role of nutrition in supporting and/or augmenting the training response
- Insight in how to adjust different training modalities to balance exercise intensity and workload with exercise capacity such as in more compromised populations

Applying knowledge

At the end of the course, students should be capable of applying the above-mentioned knowledge:

- To define a specific training program to induce a specific adaptive response.
- To assess the structural, metabolic, and functional adaptations to exercise training.
- To explain how the adaptive response to a certain exercise program is accomplished.
Interpretation

At the end of the course the student should be capable of:

- Interpreting results from the practicals: analyze and evaluate experimental data to determine the adaptive response to a specific exercise training program
- Selecting the training program and the appropriate methodology to assess training effects based on the desired adaptive response

Communication

At the end of the course the student should be able to write a well-structured, concise, and well-argued report on the findings from the practicals.

Overall

At the end of the course the student should be capable of:

- Independently measuring, interpreting, and reporting the effects of a training program
- Performing/supervising a specific training program 3. Setting up a short study design to evaluate the adaptive response to an exercise training program The following end terms apply: A4, A5, A6, B3, C1, D1, E2.

https://www.maastrichtuniversity.nl/meta/326933/training?print=1
EPH3011: Health Systems in Europe + EPH3007 Introduction (12 quarter/8 semester units)

Full course description

The aim of this module is two-fold: first, to explore the harmonization of health systems and the impact of health care reforms in Europe with special attention given to health systems in transition and second, to analyze the European challenges of cross-border care and patient mobility given by the execution of the sanction of the European Union of the free movement of goods, individuals, services, capital and payments in terms of health. The aims will be achieved through self-study, tutorials, lectures, group work and field trips introducing students to relevant parts of health economics, organizational and network theory as well as cases and best practices from the field. The module prepares the excursion to Poland to apply knowledge and gain insight of an eastern European health system in transition. Students are introduced to the European institutions and the legal basis for the EU taking up health issues. This module focuses much more on national health systems and national health systems within the context of European policy and practice.

The module introduces a system approach to health in Europe. The responsibility of providing access to health is placed within the Member States of the European Union, and therefore there is a high degree of diversity within the organization of health systems among European countries. With the enlargement of the EU an even bigger gap is seen between countries having a highly developed system of provision of health services and countries facing severe difficulties in meeting the needs of their populations. The module will focus on the European differences paying special attention to Eastern European countries with health systems in transition – a special focus will be on Poland. Due to the enormous political and socioeconomic changes the countries in the region have engaged in various health reforms and challenges still lie ahead in the transition process such as strengthening of the health care financing, provision of a continuum of care, improving the quality of health services, linking up with communities and advancing in public health. In the module special attention will be given to theory on the organization of health services, basic health economics and the financing of health systems in order to enhance the ability to analyze health systems in a European perspective. Cross-border care is included as an emerging field of interests from patient’s points of view as well as from decision maker’s point of view. Cases from the European Court of Justice have raised the awareness among politicians and providers of the need for a closer cooperation among Member States, and also the effect of a change in health consumer behaviour and patient mobility in Europe influencing the way Member States in the EU are organizing the national health systems and tackling the demand for treatments carried out as cross-border care. Though the number of patients and professionals crossing borders might not seem alarming in a Europe wide perspective, the implications and consequences are complex for all stakeholders involved and introduce challenges for patients and professionals as well as policy makers and providers. The module provides the students an opportunity to analyze regional cross-border projects in order to create awareness of these challenges facing Europe now and in the near future. Organizational theory as well as theory on networking is presented as tools to analyze cross-border care and health systems in transition.
Health care systems can be positioned in different domains of society, namely as systems that contribute to the dynamics of the state and the market or to the dynamics of daily life and social participation of citizens. So constructed, each system offers its own internal dynamics with distinct functions and operations which might be at conflict with the functions and operations being distinct for related systems. The interconnection of this system ‘interplay’ will be addressed, showing how various systems claim they operate in the ‘interest’ of the citizen, yet displaying differential effects on autonomy, choice and good life of citizens. Thus, the notion of ‘transition’ (or related concepts such as progress and innovation) can be identified as a social arena, in which different notions of justice and injustice in public health practices are emerging, struggling and conflicting with each other.

In this module students will be focus at two different domains. They will be introduced to writing their first drafts of a curriculum vitae and a covering letter; but first students will be trained in bargaining and negotiation skills. As they will be working in a society which can be described a bargaining society, learning these skills will be important for their professional life. In workshops they will learn the basics of distributive bargaining and integrative negotiation. Negotiation skills will be important for students’ professional life. Later on they have to negotiate with many parties: a boss, (a) member(s) from another country / countries, people from other institutions active in the field of European Public Health. Negotiations will become a part their daily life. As an EPH-professional a student should be able to negotiate in a purposeful and intentional way. In the six workshops students are offered practical experiences and theoretical information about the most important components involved in a negotiation process. The examples and practical exercises will be based on public health professional context. In this semester 1 plenary lecture and six workshops around the skill of ‘Negotiation’ will be offered. The Module will cover such topics as: the interdependence between the negotiators, the possibilities to claim value but also to create value for all parties involved, strategies and tactics of distributive negotiation (often distributed negotiation is also called bargaining) as well as integrative negotiation, planning and chairing negotiations, negotiating in situations in which multiple parties are involved, parties which could have a very different cultural background. There will be one plenary lecture and three –three-hour workshops:

Workshop 1: What do you know and what do you want to know about negotiation?
Workshop 2: Distributive bargaining: win- lose negotiations
Workshop 3: Integrative negotiation (1): win –win negotiations
Workshop 4: Writing a CV

In terms of methodology the objective is to provide specific issues regarding cross national and cross cultural comparison with a special focus on health management, health financing and cross-border care. Furthermore, a focus will be on research in the field of economics.

Course objectives

At the end of the module students should:

- have an insight and knowledge about health systems and health services in Europe
• have an understanding of health care reforms and health systems in transition
• have an understanding of basic concepts within the field of health economics such as supply and demands in an open market, the function of health insurance systems etc.
• have an understanding of the developments and challenges within the field of cross-border care and patient mobility in an European context
• have knowledge about project work and diagnosis of systems/organizations/projects
• have insight in network theory and international cooperation

Application of knowledge and understanding

• can apply knowledge to and elaborate on cases and best practices with regards to health systems in Europe
• can apply knowledge to and elaborate on cases with regards to health care reforms and health systems in transition
• can apply knowledge to and elaborate on cases and best practices within cross-border care in Europe

Making judgement

• are able to analyze health systems in an European context
• are able to reflect on the challenge of health care reforms in Europe
• are able to analyze existing regional cross-border care projects in a multi-disciplinary way
• are able to reflect on best practices and provide solutions and recommendations for future strategies within cross-border care

Communication

• are able to present a paper and discuss their findings
• are able to conduct a field visit professionally

Learning skills

• have practiced their active and self directed learning skills
• have applied, reflected on (in the context of theoretical literature) and improved their group working skills
• have improved their presentation skills
• have developed products (papers and poster) for their portfolio
• have had opportunities to do self reflections of use for their portfolios
• have improved their negotiation skills

Recommended reading


https://www.maastrichtuniversity.nl/meta/324949/health-systems-europe?print=1
EPH1001: Tuberculosis (12 quarter/8 semester units)

Full course description

The module intends to introduce different aspects of an infectious disease with considerable morbidity and mortality, its association with other developments in the society, the primary, secondary and tertiary prevention and the (inter)national collaboration in the surveillance and control of this disease. Tuberculosis is chosen as an example for several reasons. First, it is a disease with a long history, the problem seemed to be solved after the Second World War, but the disease re-emerged unexpectedly. An international strategy to fight tuberculosis has been developed and the fight against tuberculosis is part of the United Nations Millennium Development Goals. The disease is a major problem in developing countries, but also in several new member states of the European Union. The following themes will be addressed in this module: Tuberculosis: medical background The module starts with three problems and two lectures that focus on the medical aspects of tuberculosis. Attention will be given to infectious diseases and the defence mechanisms of the human body. The case of the human immunodeficiency virus (HIV) is used as an example, because this virus inactivates the immune system and enhances infection by other infectious agents including the tuberculosis bacillus. The two other problems deal with the pathogenesis, symptoms, diagnosis and treatment of tuberculosis. Surveillance of tuberculosis Disease surveillance is an essential and integral part of public health. Well-designed and implemented surveillance provides the data for accurate assessment of the health status in a given population and provides a quantitative base to define objectives for action. In the problem, a lecture and an exercise, the principles of disease surveillance and of different health measures such as incidence and mortality rates will be studied. Epidemiology of tuberculosis: Tuberculosis is not evenly distributed. Incidence, mortality and lethality rates differ between populations and have changed over time. Within a population, some individuals run a higher risk than others of becoming infected, developing active disease or dying from tuberculosis. Differences in incidence and mortality rates between populations can be caused by many factors, including differences in age distribution. Methods for comparing incidence and mortality rates, while adjusting for differences in age distribution, will be taught in a lecture and an epidemiological exercise. Public health In low-incidence countries, e.g. the Netherlands, one of the best ways of reducing tuberculosis is through the prevention and investigation of outbreaks. When a case of (infective) tuberculosis is found, an investigation is immediately started to identify the source of the infection and check whether other persons have been infected. The principles of an outbreak investigation will be discussed in the tutorial group. Since the resurgence of tuberculosis, many international strategies have been developed and agreed upon to fight tuberculosis internationally, which has resulted in the development of the DOTS strategy. In 2000 and 2006 the DOTS strategy was integrated into a wider plan to combat tuberculosis: StopTB. Targets set by the WHO have been accepted by most UN member states and are supported by the G8. Public Health research As in all consecutive EPH modules, attention will be given to methods for scientific research, including epidemiology. Besides epidemiological rates and standardization (mentioned earlier) attention will be given to study designs and measures of association. This topic will be studied in a problem, a lecture and an exercise. Tuberculosis as an example of an infectious disease
Tuberculosis has been chosen for the EPH curriculum as an example of an infectious disease. In one of the problems students are asked to apply what they have learned about tuberculosis to other infectious diseases. European added value The main international player in tuberculosis is the WHO. Europe’s role is relatively limited, although the European Centre for Disease Prevention and Control (ECDC) was established in 2005. Trajectory Academic Thinking The module includes a training and assignment on Academic Thinking. For the assignment, the tutorial groups are requested to prepare for a role-play applying the educational material to the tuberculosis theme as studied in the EPH course. The roles are ‘the scientist’, the ‘public health professional’, the ‘policy maker’, and the ‘public’. These roles have to be played in four ‘scenes’: three member states and ‘Brussels’. Tuberculosis (TB) is shown as an example of the success of public health. Practice in preventing and treating TB has evolved as the outcome of historical processes in which many factors have played a role: scientific progress, the development of regimes of sanatoria and quarantine, societal attribution of fate and suffering (“get the phtisis”), access to health services, and the growing awareness and willingness among citizens to comply with regimes of screening and risk protection. Thus, public health signifies a continuous, interactive process of science, technology and society. It is as much about science as humanism, as phrased by Thomas Mann in his novel on a TB sanatorium in Davos: “A man lives not only his personal life, as an individual, but also, consciously or unconsciously, the life of his epoch and his contemporaries” (from The Magic Mountain (‘Der Zaubergerg’), 1924)). This appraisal should prepare students for subsequent themes. Relevant theories include: history and sociology of public health and science and technology.

The following topics will be addressed: • Prevalence and incidence of disease: distinguish between different measures of disease frequency and apply and interpret the measures in varying settings. • Standardisation: compare rates between different geographical areas or between different time intervals and learn that standardisation of rates is a necessary tool to be able to adequately compare rates and interpret rate differences. • Introduction to study designs and measures of association: introduction to different types of studies and to quantifying associations between determinants and occurrence of disease.

Two topics will be studied: • How to summarize quantitative variables by means of: the mean, median, mode, standard deviation, distribution and frequency • How to summarize the association of relation between two quantitative variables by means of co-variance, correlation and linear regression analysis.

**Course objectives**

**Knowledge and understanding**

By the end of the module students should have:

- knowledge of the main aspects of infectious and communicable diseases
- knowledge of the main aspects of the immune system
- insight into and knowledge of the main elements of the disease tuberculosis
- knowledge of the main risk factors and risk groups of tuberculosis
• insight into and knowledge of primary, secondary and tertiary prevention of tuberculosis
• insight into and knowledge of the methods of disease surveillance on a national and international level
• insight into and knowledge of the possibilities of national and international efforts to control infectious diseases
• insight into the role of scientific research within the public health domain
• knowledge of the different elements of the research process
• knowledge of main research designs within the domain of public health
• knowledge of epidemiological concepts such as incidence, prevalence and standardisation
• an understanding of the difference between the “standard view” of scientific knowledge versus an understanding of knowledge as the product of interaction between science, technology and society.

Application of knowledge and understanding

By the end of the module students should be able to:

• apply the principles of primary, secondary and tertiary prevention to international health problems
• interpret data from national and international disease surveillances
• calculate incidence and prevalence rates
• adjust for differences in age distribution by calculating age-standardised incidence rates
• interpret epidemiological measures of association

Making judgements

By the end of the module students should be able to:

• appreciate merits and shortcomings of disease surveillance
• advantages and disadvantages of different interventions to control infectious diseases
• appreciate the main elements of the learning process including selecting the most appropriate reading materials, developing effective note-taking strategies and preparing effectively for different forms of examination

Communication

By the end of the module students should be able to:

• communicate in a professional way with professionals and policymakers in the field of tuberculosis and infectious diseases
• write about topics as well as discuss them in a scientific, academic manner
• perform as a member of a (tutorial) group

Learning skills

By the end of the module students should be able to:
- identify the essentials of a portfolio and begin to reflect about learning experiences and giving and receiving feedback

**Recommended reading**


[https://www.maastrichtuniversity.nl/meta/324431/tuberculosis?print=1](https://www.maastrichtuniversity.nl/meta/324431/tuberculosis?print=1)
ITM2101: Circulation and Breathing II

Full course description

This course focuses on basic pathophysiology of cardiopulmonary diseases. The course is built around the major organ system involved: the heart, vasculature, kidneys and lungs. Each of these four parts starts with an introductory lecture on physiology, to refresh the knowledge about each organ system, and ends with a clinical lecture detailing how pathophysiological mechanisms affect patients and how this knowledge can guide treatment. The following diseases are discussed in tutorial groups: • The vasculature: atherosclerosis and myocardial infarction • The heart: arrhythmias, valvular disease and heart failure • The kidneys: renal artery stenosis and acid-base disorders • The lungs: asthma and pneumonia The course includes practica on hemodynamics, anatomy and histology, as well as 'skills lab' training on physical examination of cardiac function, pulmonary function and resuscitation. Each tutorial group will give a short presentation at a poster session about a variety of topics in pulmonary (patho)-physiology. In addition, a workshop on the design of randomized clinical trials will be organized. At the end of the course, we will focus on hypovolemic and septic shock, integrating the (dys)-regulation by the organ systems and the interactions within the cardiopulmonary system.

Course objectives

The following diseases are discussed in tutorial groups: • the vasculature: atherosclerosis and myocardial infarction, • the heart: arrhythmias, valvular disease and heart failure, • the kidneys: renal artery stenosis and acid-base disorders, • the lungs: asthma and pneumonia. At the end of the course, we will focus on hypovolemic and septic shock, integrating the (dys)-regulation by the organ systems and the interactions within the cardiopulmonary system. Skills The course includes practica on hemodynamics, anatomy and histology, as well as skillslab training on physical examination of cardiac function, pulmonary function and resuscitation. Each tutorial group will give a short presentation at a poster session about a variety of topics in pulmonary (patho)-physiology. In addition, a workshop on the design of randomized clinical trials will be organised.

https://www.maastrichtuniversity.nl/meta/324783/circulation-and-breathing-ii?print=1
BIO2001: Cell Biology

Full course description

This course aims to develop a detailed understanding of the cell as the basic unit of life. The cell can be seen as an organism that can perform a wide range of functions. In eukaryotes, these functions are linked to the different compartments/organelles in the cell: nucleus, mitochondria, chloroplasts, endoplasmatic reticulum, lysosomes, endosomes, etc. There is a continuous transport between the different organelles (intracellular vesicular transport) and between the cell interior and the extracellular environment (endocytosis & exocytosis). All these cellular transport mechanisms will be studied in detail. Additionally, the cell contains intracellular structures that regulate shape, strength, and motility, i.e. the cytoskeleton. The cytoskeleton is a highly dynamic structure and the different components of the cytoskeleton (microtubules, F-actin, intermediate filaments) and their assembly and disassembly will be explained. Finally the basic principles of signal transduction will be studied, i.e. how does the cell react to signals from the environment, how are these signals detected and how are these processed into a primary cellular response?

Course objectives

• To present the structure of prokaryote (bacteria) and eukaryote cells (animal, plant, fungal). • To comprehend the structure/function relationship of the plasma membrane. • To understand the functions of cell organelles and sub-cellular structures. • To deepen the knowledge about transport of material in- and out of the cell • To understand communication between the cell interior and exterior of the cell (cell signalling). • To understand the principles of transport between the different cell organelles and how molecules and proteins are reliably transported to the different organelles. • To create understanding of cell motility and how the cell controls its shape (cytoskeleton).

Recommended reading


https://www.maastrichtuniversity.nl/meta/329275/cell-biology?print=1
BIO3002: Ecophysiology

Full course description

Ecophysiology is the study of physiological adaptations of organisms in relation to the environments in which they live. It has become an increasingly important science, because an understanding of the relationship between organism and environment is essential in order to predict the effects of man-made environmental change. The physiology of an organism incorporates many of its most important adaptations to the environment in which it lives. In this course you will consider the variety of environmental pressures imposed on organismal physiology. You will examine the often ingenious solutions that evolve in response to these pressures, and how different organisms and groups of organisms have evolved different physiological means of dealing with the same problem. The course will focus both on the abiotic environment (e.g. issues related to climate, gas exchange) and the biotic environment (e.g. how digestive physiology is adapted to plant toxins). Towards the end of the course you will look at Conservation Physiology, one of the practical applications of ecophysiology. There is a particular focus on the physiological adaptations of animals. Although BIO2004 General Zoology is not a prerequisite for this course, the course is recommended before you take Ecophysiology.

Course objectives

• To understand what ecophysiology is and the role it plays in an academic and applied context. • To gain a basic knowledge of the physiology of certain non-human organismic groups • To understand in detail the characteristics of different abiotic environments that impose strong adaptive pressures on organismal physiology • To understand specific direct physiological adaptations evolved in response to these environmental pressures • To gain an insight into physiological adaptations to the biotic environment • To understand the principle of convergent evolution and how different groups may have evolved different physiological solutions to the same evolutionary pressures

Prerequisites

Cell Biology

Recommended reading

Scientific papers

https://www.maastrichtuniversity.nl/meta/325629/ecophysiology?print=1
BIO2007: Genetics + Optional: PRA2014 Lab Skills: Genetics

Full course description

The course discusses the principles of genetics with application to the study of biological function at the level of molecules, cells, and multicellular organisms, including humans. The topics include: structure and function of genes; chromosomes and genomes; biological variation resulting from recombination, mutation and selection; DNA repair and the genetic basis of disease inheritance; and evolutionary genetics.

Course objectives

• To understand the chemical structure of DNA and the molecular mechanisms of DNA replication. • To get familiar with the basic principles how information stored in genes is converted to a (cellular) phenotype in the form of RNA and protein. • To comprehend and be able to apply the concepts of genome structure, comparative genomics, and functional genomics. • To understand the molecular basis of single gene inheritance (Mendel’s first law), sex-linked single gene inheritance and to interpret human pedigrees. • To use the above information to deduce the concepts of Darwin’s theory of Natural Selection, molecular evolution and the origin of new genes and species. • To have sufficient background for more advanced courses in biochemistry and the life sciences.

Prerequisites

Cell Biology

Recommended reading


https://www.maastrichtuniversity.nl/meta/327181/genetics?print=1

PRA2014 Lab Skills: Genetics

Full course description

The skills trainings are aimed to obtain a basic introduction to techniques and methods in modern Genetics. The first skills take place at a designated skills laboratory at Chemelot campus; subsequent skills training topics "Genomes and Genomics" and are taught in a computer landscape. These days integrate theoretical and practical information. Each student will receive theoretical and practical in silico training in the morning, followed by a limited number of tasks to execute on the computer and answered in a skills report. The final skills consist of a student group presentation where the combined theoretical and practical skills on Genetics are applied to a pre-assigned task.

Course objectives

• To be able to purify genomic DNA from eukaryotic cells and plasmid (circular) DNA from prokaryotic cells and perform quantitative analyses on each product. • To perform and
comprehend polymerase chain reaction (PCR) analysis. • Analyze DNA products using restriction digestion, ligation and agarose gel electrophoresis. • To isolate RNA from eukaryotic cells and apply reverse transcription to generate copy DNA • To study specific proteins by Western immunoblotting. • To independently use genetic and genomic websites, general and specialized databases and determine relationships of genes within and between databases. • To have sufficient technical training for more advanced skills in molecular biology and the life sciences. • To apply genetic principles to a pre-assigned task and present the findings to a larger audience.

Prerequisites

Cell Biology

Recommended reading


https://www.maastrichtuniversity.nl/meta/327031/genetics?print=1
SCI2022: Genetics and Evolution + Optional: SKI2088 Lab Skills: Genetics

Full course description

Within the life sciences there are two kinds of theories that deal with phenomena: proximate-causal theories and ultimate causal theories. Molecular genetics is indispensable for understanding the proximate causation of phenomena. It explains how genetics information, encoded in the DNA, is transcribed and translated into molecules that are involved in the development of characteristics (phenotypes) of an individual. Evolutionary theory tries to solve problems related to the ultimate causation of phenomena. Why have specific genotypes been selected through selection on phenotypes? Its core discipline is evolutionary genetics. Genetics and evolutionary theory will be discussed in this course.

The course starts with the mechanisms that cause evolutionary change: natural selection, inheritance, and gene expression. In order to make these mechanisms understandable for students, this course will deal with the essentials of molecular, Mendel, and population genetics. It then moves on to the evolution of life cycles, sex, and sexual selection. After discussing kin selection it uses genomic imprinting to explain genetic conflicts. Game theory will be used to explain the models that treat conflicts. The course will finish with the evolution of life histories, especially senescence.

Besides theoretical and mathematical models, the course will treat the applications of these models within the fields of biology, medicine, and psychology. For example sexual selection will be used to explain the principles of partner selection in human beings (psychology), kin selection will be treated in the context of conflicts between paternal and maternal alleles during pregnancies (medicine), and the evolution of sex will be treated in relation to rates of mutation and recombination (biology).

Course objectives

- To acquaint students with genetics and evolutionary theory.
- To provide students with insight into the essentials of genetic and evolutionary models and their applications in biology, medicine and psychology.

Prerequisites

This course is designed to be taken in combination with SKI2088 Lab Skills: Genetics. Students wishing to take the Lab Skills should concurrently enroll in, or have completed, this course. Students wishing to take SCI2022 Genetics and Evolution I without taking the Lab Skills may do so.

SCI1009 Introduction to Biology. Students with substantial high school experience in Biology can contact the coordinator to request a waiver.

Recommended reading

https://www.maastrichtuniversity.nl/meta/329661/genetics-and-evolution?print=1
SCI3007: Endocrinology

Full course description

The discipline Physiology deals with the explanation of the biological, physical and chemical factors that are responsible for the origin, development, and progression of life. The first course on Human Physiology – which is compulsory for this course - focused on the specific characteristics and mechanisms of the normal homeostasis in the human body. In this follow-up course disturbances in physiological function (homeostasis) resulting in disease will be studied and used to deepen the knowledge on human endocrinology. These disturbances will be studied through the presentation of patient cases exemplified by; hypertension, renal failure, infertility, steroid abuse, diabetes and starvation. Attention will also be paid to the treatment of these diseases.

Course objectives

- To obtain insight into the endocrine system of the human body by studying illnesses that disturb this homeostatic control mechanism.

Prerequisites

Human Physiology

Recommended reading

- Multiple sources provided by UM/UCM libraries including textbooks on: Physiology, Biochemistry, Physics, Pathology, Internal Medicine, etc. The use of the on-line library Access Medicine (access provided by UB).

https://www.maastrichtuniversity.nl/meta/329723/endocrinology?print=1
Block 2:

Core Courses:

PHI2002: Medical Ethics – Moral health care dilemmas from a European and comparative perspective

Full course description

Those who are working in the medical professions are often confronted with decision making procedures that go far beyond the mere technological aspects that are involved in the cases under investigation. Doctors and nurses are aware of the fact that their fields of operation are characterized by moral parameters as well and they know that ethical reflection has to come in where scientific deliberation is no longer able to answer all the questions that are connected to the medical problems they have to deal with. This means that quite frequently a medical assessment needs the help of an ethical evaluation to cover completely the appraisal of a particular health situation and that doctors and nurses should be conscious of the moral status and implications of the conclusions they draw.

The aim of this course is to give an introductory investigation of the question if, when and how ethical considerations can or must play a role in the practice of the medical professions. It wants to make students aware of the fact that the health sciences are not operating in a moral vacuum and that a good knowledge of both the older and recent ethical debate in this particular field is of the greatest significance.

Besides this it wants to make clear that the European concept of a medical ethics as such is strongly related to typically western assumptions regarding the essence and status of a human being, which indicates that it could be made visible as well that a non-western philosophical anthropology and morality will give rise to a medical ethics that is or can be rather different from its European counterpart. This intercultural way of work serves to yield a clear cut picture of the idea that, indeed, the European medical ethics is a very 'western' one.

This course consists of three parts.

The first part of the course will give an introduction into some fundamental European philosophical ideas of what it means to be a human being. This introduction will be accompanied by an introduction into the most important ethical theories of the West.

The second part of the course will find an introduction into a variety of the most important non-western philosophical ideas of what it means to be a human being. Some major ethical theories of the East will be explained.

The third part of the course wants to discuss some of the most important and well-known ethical problems that can be found within the medical field. They will be approached from a cross cultural perspective: both the western and eastern points of view will be analyzed and compared.

There will be lectures, discussions and the study of cases that reflect the most important problems and topics that make up the moral challenges of the medical discipline of today.

The course includes a field trip.

This course consists of 32 class hours divided over 7-8 weeks. Students earn 6 ECTS credits when they obtain a passing grade. Students who need more credits can sign up for the extended course format,
which includes an Independent Study Project (ISP) worth an additional 3 ECTS. The maximum number of credits that can be obtained is 9 ECTS.

This class is a Core Course for students in the Public Health & Medicine in Europe programme and for students in the Psychology & Neuroscience in Europe programme.

Course objectives

By the end of this course students will have gained in-depth knowledge of the following subjects:

- The concept of a human being in European/western thought.
- The background, importance, concepts and ideas of medical ethics as such.
- The most important ethical theories that could, should or do play a role in the medical field.
- Classic cases that invited and shaped the development of ethical thought in the medical fields.
- The concept of a human being as it can be found in Confucian, Taoist, Hindu, Jain and Buddhist philosophies: its relation to some fundamental ideas of medical ethics in these systems of thought.
- Students will also be able to present an ethical discussion of a medical case for which a purely instrumental and technical approach must remain unsatisfactory. They will be able to offer a sound ethical analysis of this case and they will be able to present the outcome of the analysis in a clear, intercultural and philosophically correct way.

Prerequisites

None. A minimum number of 8 students is required for the course to take place.

Recommended reading

We will use the following books in this course:


CES students receive their books on loan from CES.

ART2002: Dutch Art History

Full course description

The course is about Dutch art – with an emphasis on painting. Ever since the Middle Ages the Netherlands has played a pivotal role in the history of European art and culture. Dutch and Flemish artists were the first to use oil paints, the first to visually document the lives and cultures of ordinary people, and the first to produce art for a free market. Painters such as Van Eyck, Brueghel, Bosch, Rubens, Vermeer, Rembrandt, Van Gogh and Mondriaan are counted among the great masters of history. Their art embodies qualities that are believed to be typical for the country, such as a devotion to truthfulness, attention to detail, and love of textures. But there were many more artists whose works are still considered among the most important in history – if only because they were the first to notice the mundane things nobody else had paid attention to, such as the beauty of a still-life or the wonders of a cloudy sky. From the late Middle Ages through the Renaissance and the Baroque to the modern era, Dutch artists have tried to come to terms with ever-changing principles and conceptions regarding the world around them and have been constantly improving techniques to visualize it. The results of their efforts are the subject of this course.

The course will mostly follow a chronological order. In the first lecture the (religious) significance of art in the Middle Ages, the Renaissance and the Baroque will be introduced. In the following lectures you will be given an overview of the development of Dutch art from the Middle Ages to the modern era.

The course will include tours to various museums in Amsterdam, the Hague or Arnhem to view the original works.

This course consists of 32 class hours divided over 7-8 weeks. Students earn 6 ECTS credits when they obtain a passing grade. Students who need more credits can sign up for the extended course format, which includes an Independent Study Project (ISP) worth an additional 3 ECTS. The maximum number of credits that can be obtained is 9 ECTS.

This class is a Core Course for students in the European History, Culture & Arts programme.

Course objectives

By the end of the course students will demonstrate the ability to:

- Identify and apply (some of) the key concepts in Art History
- Recognize the development of art from the Middle Ages to the present
- Understand the possible cultural ideas and ideals behind works of art
- Understand the significance of art in history
- Have a basic idea of the main discussions within Dutch art history

Skill development

- Write and talk about art in a clear and comprehensible manner
- Reconstruct the original context and significance of works of art
• Have a (more) professional view on art as a whole

**Prerequisites**

None. A minimum of 9 students is required for the class to take place.

**Recommended reading**

Students will receive an extensive reader with electronic articles via the online Studentportal.

[https://www.maastrichtuniversity.nl/meta/325769/dutch-art-history?print=1](https://www.maastrichtuniversity.nl/meta/325769/dutch-art-history?print=1)
**Additional Courses:**

**GZW3014: The Law of Public Health and Care (12 quarter/8 semester units)**

**Full course description**

Healthcare has never been more exciting. We understand more about individual and public health than ever before, at much deeper levels, and we are able to translate that knowledge into treatments and products that make an enormous impact on individual citizens’ lives. Expectations are, therefore very high, as are the increasing costs of this revolution. In the current economic environment, healthcare is a major political question, and the legal safeguards that are in place both to ensure that public health is able to operate effectively and that protect individual patients’ rights are highly important and are contested. Examples of public health threats and the need for coherent safeguards of individual’s rights and freedoms regularly hit the news. Food standards are called into question, for example, with unregulated horsemeat being passed off as beef. Influenza epidemics are regularly reported as likely. Immunization for a wide range of diseases is possible. Epidemiological research using data gathered through eHealth initiatives challenge established ideas about privacy. Personalised medicine begins to question the meaning of ‘public health’ when it becomes clearer that individual responses are more effective than collective approaches. Each of these calls the traditional ideas about public health, the rights and expectations of individuals that have to be safeguarded, and what safeguards are acceptable in modern society.

**Course objectives**

With respect to knowledge and insight, students acquire knowledge about: Public Health law in international, European and domestic settings; The nature of law, and broad legal principles behind the law’s contribution to public health; Particularly about the way that different types of procedures are used to regulate the public health (e.g. medical committees and officials, criminal law, privacy, public interest arguments, etc.); Other normative considerations relating to framing public health responses; How public health responses operate. With respect to application of knowledge and insight, students are trained to: Read and understand legal documents (particularly treaties and European legislation, and guidance documents and codes of practice); Understand how legal and ethical arguments are constructed at different points in relation to public health, particularly how human rights decisions are made at the European Court of Human Rights; Apply these insights to ‘live’ public health issues. With respect to formation of a judgment, students are trained to: Consider the difference between life science, medical, political, legal and ethical judgments; Consider how each type of judgment is constructed; Consider how different judgments are given authority and enforced in society. With respect to learning and communication skills, students are trained to: Construct effective, logical and evidenced arguments to influence political decision-makers; Consider how far discussion can be useful in the creation of normative arguments and responses; Develop effective skills in presenting arguments.

**Recommended reading**

EPH1002: Work-related Stress and Burn-out (6 quarter/4 semester units)

Full course description

The module Work-related stress and burnout focuses primarily on the social environment as determinant of health, in particular mental ill-health of employees (work-related stress and burnout). It is generally believed that stress is the major emerging occupational illness in the European Union. The workplace is an excellent starting point for the promotion of mental health and the prevention of mental health problems. Topics covered in this module are: workplace health and safety, stress and burnout theories, determinants of stress and burnout, the measurement of stress and burnout, interventions with regard to occupational mental health, European developments in the field of occupational (mental) health, and institutionalization and legislation. Based on the literature the students will gain an understanding of the phenomena of stress and burnout and their relationship with health and illness from the perspectives of human biology and work and organizational psychology. In this module, students explore several models. Selye’s (1978) GAS model explains the behavioural responses to stressors in general. Two models dominate European research on the determinants for work stress: the job demand-control-support (JDCS) model (Karasek and Theorell 1990, Le Blanc et al. 2003) and Siegrist’s effort-reward balance model. Lazarus and Folkman’s (1984) model for coping with stress is the leading model when studying the process of stress. Prevention is one of the main building blocks of the new Community strategy and will therefore be studied as the main method of intervention in this module. The module consists of 6 complex problems students have to study in the tutorial group meetings, several lectures, and a training "Applying theories" which is part of the Methodology trajectory. In addition, the module contains lectures and workshops about academic thinking and two Skills sessions. Module coordinator is Hans Bosma (Hans.Bosma@maastrichtuniversity.nl).

Course objectives

Knowledge and insight.

After completing this module students have:

- knowledge about the occupational health area as an important part of public health;
- knowledge about the incidence and prevalence of psychological health problems and stress among employees in Europe;
- insight into and knowledge about various determinants of work-related stress (across Europe);
- insight into and knowledge about concepts related to work-related stress, including burnout;
- insight into and knowledge about the main stress theories, including Selye’s GAS, the Job Demand Control Support Model, the Effort Reward imbalance model, and the Coping framework of Lazarus & Folkma;
- insight into and knowledge about the various operationalizations and measurements of work-related stress;
- insight into and knowledge about European Health & Safety Policies and agencies;
• insight and knowledge about the prevention of work-related stress;
• knowledge about the use of research questions and theoretical models in research;
• Application of knowledge and insight.

After completing this module students should be able to:

• explain the effect of stress on human physiology and its impact on the biochemistry of the human body;
• apply the theoretical frameworks offered during this course in a research proposal;
• compare the various preventive measures with preventive measures discussed in the previous modules and with the principles of risk management in particular.

Formation of a judgement.

After completing this module students should be able to:

• appreciate the merits and shortcomings of specific work stress measurements and study designs.
• discuss the differences between organizational and individual interventions;
• discuss the principles of risk management, including the process of selecting, implementing and evaluating appropriate control measures; critically evaluate the various methods that can be used in stress prevention.

Recommended reading


BMW3004: Clinical Nutrition (12 quarter/8 semester units)

Full course description

The module Clinical Nutrition aims to provide a thorough grounding in all aspects of clinical nutrition and focuses on nutrition and its application in prevention and disease management. Clinical nutrition not only assesses deficiency states, but can be used to improve health by optimizing food selection and nutrition supplementation needs. This course is designed to recall knowledge of the function of macronutrients in the body and to learn how the ingestion of combined macronutrients affects overall metabolism as well as disease risk and recovery. Food intake regulation by hormones and psychologic factors in health and disease will be highlighted. This course reviews the array of assessment tools used in clinical nutrition practice including methodology, application, implications, strengths and limitations. A clinical and laboratory assessment allows the opportunity to develop an individualized therapeutic program. Practical nutritional applications including both dietary therapies and supplements directed at optimizing nutritional status are reviewed in detail. Specific nutrition intervention including diet, vitamins, minerals, essential fatty acids, fibers and amino acids are explored for a variety of diseases commonly encountered in clinical practice. The biochemistry of each intervention is discussed for a full understanding of how to integrate nutrition therapy into patient care. During this course attention goes to various ways by which nutrition can be applied; oral nutrition and suppletions, tube feeding, parenteral nutrition. You will learn when to apply these different nutritional interventions and the pros and cons of the different feeding techniques. Further there will be extensive attention for the composition of nutrition and the altered needs caused by disease in different pathologic situations. Finally you will be trained in the possibilities to perform research in the field of clinical nutrition and the interpretation of the literature.

Course objectives

- The student increases his/her understanding on homeostatic and non-homeostatic regulation of food intake
- The student increases his/her knowledge about food intake and macronutrient metabolism in health and disease
- The student increases his/her understanding on the role of nutrients in pathophysiologic processes in the human body
- The student increases his/her knowledge about normal digestion and absorption
- The student increases his/her understanding on the influence of several disturbing factors on digestion and metabolism of nutrition
- The student has insight in altered nutritional needs during disease (metabolic stress, cachexia, protein-energy malnutrition, trauma, burn wounds, systemic inflammation, intensive care patients, chronic disease (COPD, oncology, kidney disease) gastrointestinal disease
- The student has insight in consequences of malnutrition on the course of disease and recovery
- The student has knowledge about factors influencing food intake (satiety mechanisms, medication, cerebral infarct, dementia, dysphagia, depression)
The student has knowledge about possibilities to fulfill the altered nutritional needs during disease using nutritional support therapy; suppletions, tube feeding (nasal, gastrostomia, jejunostomia), parenteral nutrition

The student has insight in pros and cons of nothing by mouth

The student has insight in therapeutic possibilities of nutrition (probiotics, fibers, immunomodulation) Application of knowledge and understanding

The student is able to use the acquired knowledge to assess nutritional status

The student is able to use the acquired knowledge to set up a plan for route and composition of nutrition for a (critically) ill patient. Interpretation

The student is able to critically read and interpret scientific publications concerning studies on clinical nutrition. Communication

The student has the capacity to give an oral presentation about a scientific publication for his/her fellow students

The student can answer the questions that are asked during or after such an oral presentation

The student is able to actively ask critical questions during the presentations of fellow students

The student is able to participate in a fictive multidisciplinary discussion about nutritional status and nutritional interventions in a critically ill patient (the project)

https://www.maastrichtuniversity.nl/meta/325485/clinical-nutrition?print=1
BMW3006: Chronic Inflammatory Diseases (12 quarter/8 semester units)

Full course description

During this elective Minor course of 8 weeks, students will get acquainted with experimental research in the context of complex chronic inflammatory diseases, like Chronic Obstructive Pulmonary Disease (COPD) and the Metabolic Syndrome. Inter-organ crosstalk and pathophysiology of complex diseases as well as inter/intra-cellular communication are the main focus of the course. The course consists of 4 modules of 2 weeks: - Module 1: Gut - Module 2: Lungs - Module 3: Adipose tissue - Module 4: Muscle Every module starts with an introduction lecture to give an overview of principles and theories related to the central theme of that specific module. In each module, the students will work in small groups on a specific assignment that are directly related to ongoing research projects, supported by the research groups of the Departments of Respiratory Medicine, General Surgery, and/or Human Biology. Special emphasizes will be on the practical education assignments in order to teach the students both general and specific laboratory skills and techniques. The results of these practical assignments will be analyzed by the students themselves and written down in a practical report. In addition, every module includes a research seminar by a senior researcher, presenting state-of-the-art research linked to the central theme. A Journal club will be organized to practice critical reading and evaluation of a recent research paper. A final concept mapping assignment will be used as a wrap-up. By combining the practical assignments with critical evaluating of the obtained experimental results, listening to lectures by experts, group discussions and self-study, the students will learn the basis of experimental research within the domain of Life Sciences.

Course objectives

- Students get acquainted with scientific research within the domain of Molecular Life Sciences while operationalizing using the knowledge and skills obtained during the bachelor phase of their BMW training.
- More specifically, students learn how to adequately select and use research methods and techniques within the domain of Molecular Life Sciences. At the same time, students will have to plan and execute their own learning and ensure quality control of their own experimental work.
- Students learn how to report their own results coherently and scientifically, both in oral and written form. These reports will be framed presented in the context of within the current scientific literature that which will be critically evaluated by the students.

https://www.maastrichtuniversity.nl/meta/325859/chronic-inflammatory-diseases?print=1
BMW3007: Research Methods in Neuroscience and Toxicology (12 quarter/8 semester units)

Full course description

During this elective course of 8 weeks, students will get acquainted with experimental molecular biological, biochemical and immunological research. General concepts and strategies for the design of experiments are the main focus of the course. The students will work in small groups on several assignments that are directly related to ongoing translational research projects of the Departments of Neurosciences and Toxicology. Special emphasis will be on the practical education assignments in order to teach the students molecular laboratory skills and techniques. Results of these practical assignments will be analyzed by the students themselves and then presented to their peers in small workgroups.

By combining the practical assignments with studying independently, listening to lectures by experts and critical evaluating of the obtained experimental results, the students will learn the basis of experimental research within Life Sciences.

Course objectives

- Students get acquainted with scientific research within the domain of Molecular Life Sciences while using the knowledge and skills obtained during the bachelor phase of their BMW training.
- More specifically, students learn how to adequately select and use research methods and techniques within the domain of Molecular Life Sciences. At the same time, students will have to plan and execute their own learning and ensure quality control of their own experimental work.
- Students learn how to report their results coherently and scientifically, both in oral and written form. These reports will be presented in the context of current scientific literature which will be critically evaluated by the students.

https://www.maastrichtuniversity.nl/meta/328691/research-methods-neuroscience-and-toxicology?print=1
BIO3001: Molecular Biology + Optional: PRA3003 Skills: Molecular Biology

Full course description

The general aim of this course is to obtain detailed knowledge about the molecular processes in cell signalling and control of gene expression. Topics include intracellular signalling pathways; chromatin structure and remodelling; recruitment and assembly of transcription factors; eukaryote mRNA synthesis, processing, modification, stability and translation; stem cells and reprogramming; and the culmination of the above factors that drive common complex human disease. The tutorials will be partially in Problem Based Learning (PBL) and multiple-choice format, with exercises designed to provide a perspective of how cutting edge molecular biological techniques are applied to tackle major research questions in modern biomedical research.

Course objectives

• To get acquainted with the best-characterized cell signaling mechanisms in eukaryotic cells. • To understand gene structure/function and different gene regulatory mechanisms (chromatin remodeling and (post)transcriptional regulation) in prokaryotes and eukaryotes. • To understand how molecular biology, when used in combination with other biological disciplines (e.g. biochemistry, genetics, imaging), can provide tools to understand (diagnostics) and intervene (therapy) in the cellular complexity of human disease.

Prerequisites

Cell Biology, Genetics

Recommended reading


https://www.maastrichtuniversity.nl/meta/327239/molecular-biology?print=1

Optional: PRA3003 Skills: Molecular Biology

Full course description

The general aim of this skills course is to obtain detailed knowledge about the techniques that can be applied to address molecular processes in cell signaling and control of gene expression. Topics include the activation of intracellular signaling pathways; analysis of cellular responses; analysis of gene expression; analysis of protein activation; in silico analysis of signaling pathways; and the culmination of the above elements in an essay and assignment to indicate active understanding of the above processes. The skills days are designed to provide a perspective of how cutting edge molecular biological techniques are applied to tackle major research questions in modern biomedical research.
Course objectives

• To grasp the contextual setting which animal models are commonly used in Molecular Life Sciences. 
• To apply DNA cloning, transfection and imaging procedures using prokaryotic and eukaryotic cells. 
• To perform quantitative analyses on (non)coding RNA species and proteins from cell culture and organ biopsies. 
• To apply molecular biological principles to a pre-assigned task and present the findings to a larger audience. 
• To interpret scientific results and to write a scientific proposal on a Molecular Biological approach to relevant human disorders and defend it in a larger audience.

Prerequisites

Cell Biology, Genetics

Recommended reading


https://www.maastrichtuniversity.nl/meta/325783/molecular-biology?print=1
Full course description

Biochemistry is considered the mother of all Life Sciences. Understanding Biochemistry will facilitate learning of more specialised Life Sciences such as Molecular and Cell Biology. This course addresses the biochemistry of the molecular components of cells. We will cover the structures, functions and interactions of the biomacromolecules, including proteins, lipids, carbohydrates, DNA and RNA, which perform many of the activities associated with life. We will provide insight in the specificity and action of enzymes, the biocatalysts of the cell. Further, we will explain principles of the regulation of metabolic pathways that result in the generation of ATP, the major energy currency of the cell. We will highlight the biochemistry of the central dogma (gene --> protein). The theory studied in this course will be explained by examples of biochemistry in every day life. For instance how DNA profiling works in forensic science and how a mutation in a gene changes structure and function of proteins and causes diseases such as sickle cell anemia.

Course objectives

At the end of the course you will be able to: • define Biochemistry and the science of Biochemistry. • describe the general structure and function of the biomacromolecules such as proteins, lipids, polysaccharides and nucleotides. • understand principles of synthesis and degradation of biomacromolecules. • explain the specificity and action of enzymes, the biocatalysts • enter higher level courses on Biochemistry and Molecular Biology to finally allow entrance to various Master programs in the Life Sciences.

Recommended reading


https://www.maastrichtuniversity.nl/meta/324773/biochemistry?print=1
SCI2034: Brain and Action

Full course description

Human beings mostly go through their lives without paying much attention to their actions such as breathing, eating and even learning. Our brain seems to take care of us in an almost effortless way by planning, initiating and executing our actions and by regulating our somatic homeostasis. The course

Brain and Action is concerned with exactly how the nervous system does so. The course deals with the scientific study of the central and peripheral nervous system as well as with some of the latest developments in neuroscience. Via problem based learning tasks, both the anatomy and functions of important neurological structures like the spinal cord and the brain are examined.

Questions that will be raised continually during the course are, e.g.: What is the hippocampus? What function does the corpus callosum have? How does the brain develop both pre- and post-natal? How does neurotransmission take place? Etc.

Course objectives

To make students familiar with the basic division, anatomy and functions of the central and peripheral nervous system.

To gain knowledge of the workings and anatomy of the brain's most important structures.

To gain basic practical knowledge of brain dissection.

Prerequisites

Secondary school biology (for an indication of the relevant topics, see SCI-B, p. vi-viii) and/or a genuine(!) interest in the anatomy of the nervous system.

Recommended reading


Various textbooks on the anatomy of the brain (available in UM library and UCM reading room).

https://www.maastrichtuniversity.nl/meta/324779/brain-and-action?print=1
SCI3050: Advances in Biomedical Sciences

Full course description

The purpose of this course is to introduce students to recent breakthroughs in the physical and biological sciences that are now being explored for biomedical applications. The topics will come directly from the research expertise of the lecturers, all of whom are young principal investigators in the new research institutes at the UM: MERLN and M4I. The course will cover a broad range of topics, including nanomaterials for regenerative medicine, supramolecular biomaterials, big data and computer learning, electron microscopy, imaging and diagnostic mass spectrometry, and structural biology of tuberculosis. Each of these fields has the potential to address some of society’s greatest challenges, including the health and vitality of our ageing population, and this will be discussed in both the lectures and the tasks. Students will gain firsthand experience of scientific research taking place at the UM and will have the opportunity to visit research laboratories as part of a demonstration of some of the topics discussed in the lectures. Students will experience unrestricted access for a firsthand account of a new generation of research lines with a new generation of labs.

In addition to a final content-based oral exam, there will be two papers for evaluation. For their midterm, students will choose a recent discovery reported in the press and investigate the scientific claims and integrity of the reporting. In the final paper, the student acts as the reporter, and will write an opinion piece on a topic of research in either MERLN or M4I; this report will be informed by an interview with one of the lecturers.

This course is designed for top students with a concentration in the sciences who wish to advance their learning to the next level, beyond textbooks. Students will benefit from close contact with young scientists from diverse fields and will be expected to read scientific literature to enhance their learning. Skills learned within this course will be highly applicable for more advanced degrees (Master’s, PhD) within the sciences, and within the competitive job market.

Course objectives

- To gain insight into frontier topics of the biomedical sciences, with first-hand accounts of successes, problems, and a forecast for the future.
- To apply knowledge from the natural sciences towards problems in society.
- To give an accurate account of the work and thought process of academic researchers.
- To learn to critically read scientific news and perform basic literature research.
- To learn how to ask questions of a scientist and report others research to a wider audience.
- To gain familiarity with cutting edge research within the MERLN and M4I institutes.
- To access new labs and research lines starting with young Assistant Professors within UM.
Prerequisites

At least one of the following: Organic Chemistry, Cell Biology, or Physics. Highly motivated students with a different background should speak to the course coordinators.

Recommended reading

Selected scientific articles.