



Cardiovascular Research

Vrije Universiteit Amsterdam - VUmc - M Cardiovascular Research - 2015-2016

This study guide contains information on the Cardiovascular Research Master Programme organised by the VUmc School of Medical Sciences for the academic year 2015-2016. All information about the aim of the programme, the structure of the course components, admission, planning, student facilities etc. are available on the faculty website [VUmc School of Medical Sciences](#).

Aim of the study programme

Every day, more than 100 people die of cardiovascular diseases in the Netherlands. To reduce this number of casualties, more scientific research focusing on the pathophysiology and treatment of cardiovascular disease is needed. The Cardiovascular Research Master aims to train (bio)medically oriented bachelors and related bachelors in life sciences to become masters with in depth knowledge, attitudes and skills in the field of cardiovascular research. Duration of the programme is two years (120 European Credits (EC)). The master programme is composed of compulsory courses, optional courses, an academic course, a study of literature and two practical training periods (minor and major internships, 63 credits in total). Cardiovascular research is interdisciplinary by nature and flourishes by the collaboration between clinical researchers and basic scientists. This interdisciplinary approach is a key element of our programme.

VU medical center has identified cardiovascular research as one of its core research areas. This programme forms the perfect start for a career in cardiovascular research. Teaching within the Cardiovascular Research Master programme is provided by staff members of the Institute for Cardiovascular Research (<http://www.vumc.nl/afdelingen/ICar-VU/>).

Course information

The Cardiovascular Research Master programme consists of:

emptyemptyYear 1

Course	Credits	Period
Pathophysiology of heart and circulation	6	September
Clinical aspects of heart and circulation	6	October
Vascular Function and metabolic disease	6	November
Remodelling of the circulatory system	6	December
Biostatistics:	3	January
Writing scientific English	3	January
Academic core	3	Academic year
Minor internship	30	February- June

Year 2

Course	Credits	Period
Optional courses	15	September
Literature study	9	October
Master's Thesis	36	February – June

General information about organisation, education, research and patient's care within VUmc can be found on the VUmc website: www.vumc.nl.

For more information please contact the coordinator Cardiovascular Research Master

Dr. Edwin Kanters

Telephone: 020-4445895

Email: cvrmaster@vumc.nl

Student Service Centre (SSC):

Students can turn to the Student Service Centre with general questions about the graduation, registration for courses and examinations, registration of grades and schedules.

School of Medical Sciences

1st floor (follow signs to corridor D)

Van der Boechorststraat 7 - 1081 BT Amsterdam

Email: studentenbalie@vumc.nl

Summary of requirements and guidelines for participation

Compulsory courses

All students of the Cardiovascular Research Master must attend the compulsory courses of the programme. If a particular course can have more participants, student of other Master's programmes can attend the course, providing that they meet the entry requirements of the programme.

Optional courses

Students have to have a consent from the examination board, if they want to attend an optional course. An approval can be asked via a digital approval: [Approval of Optional Course](#), this form can be found on the faculty website [VUmc School of Medical Sciences](#). Courses attended without the consent of the board of examiners will not be registered. For registration of optional courses students use the VUnet portal. If registration is not possible by using the VUnet portal, contact your master coordinator.

Internships and study of literature

The examination board has to give its approval for all internships and the literature study.

An approval can be asked via a digital approval: [Approval of internships](#), this form can be found on the faculty website [VUmc School of Medical Sciences](#). Unapproved internships will not be registered by Student Service Centre.

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Master Cardiovascular Research - Optional Courses

The Cardiovascular Research Master has reserved 18 ECTS credit points for optional courses. The optional courses are listed underneath. These courses are approved by the examination board of the Cardiovascular Research Master and do not need individual student approvals. Additional optional courses will be announced on the blackboard site

"Cardiovascular Research Master ". If a student wants to follow a course which is not indicated, an individual approval by the examination board is required. Some optional courses are organized together with or by other faculties, like FEW (Faculty of Exact Sciences and FALW)(Faculty of Earth and Life Sciences).

Vakken:

Naam	Periode	Credits	Code
Academic Teaching and Presenting	Periode 3+4	3.0	M_CACTP09
Advanced Cardiac Diagnostics	Periode 3+4+5	3.0	M_CCARDIA09
Advanced Molecular Immunology and Cell Biology	Periode 1	6.0	AM_470656
Containment Strategies of Infectious Diseases in Global Context	Periode 1	6.0	AM_470127
Developmental Biology	Periode 2	6.0	AM_470613
Ethics in Life Sciences	Periode 3	3.0	AM_470707
Extension Practical Training	Ac. Jaar (september)	3.0	M_CEXTENS09
Genomes and Gene Expression	Periode 1	6.0	AM_470614
Life Cell Imaging	Periode 3+4+5	3.0	M_CLIFECE09
Proteomics in Biomedical Research	Periode 3+4+5	3.0	M_CPROTBI09
Radiation Protection Course, Level 5B	Ac. Jaar (september)	3.0	M_CRADPRO09
Research Ethics	Periode 3+4+5	3.0	M_FETHICA14

Master Cardiovascular Research - Compulsory Courses

All students of the Cardiovascular Research Master have to attend the compulsory Courses of the programme. If more study places are available, students of other Master's programmes can attend the course, providing that they meet the entry requirements.

Opleidingsdelen:

- [Academic Core Cardiovascular](#)

Vakken:

Naam	Periode	Credits	Code
Biostatistics	Periode 3	3.0	M_CBIOSTA09
Clinical Aspects of Heart and Circulation	Periode 1	6.0	M_CCLINBIO09
Pathophysiology of Heart and Circulation	Periode 1	6.0	M_CPATHO09
Remodelling of the Circulatory System	Periode 2	6.0	M_CREMODE09
Vascular Function and Metabolic Diseases	Periode 2	6.0	M_CVASCFU09
Writing Scientific English	Semester 2	3.0	M_FWSE09

Academic Core Cardiovascular

Vakken:

Naam	Periode	Credits	Code
Academic Core Cardiovascular 1st year	Ac. Jaar (september)	0.0	M_CACCOREA14
Academic Core Cardiovascular 2nd year	Ac. Jaar (september)	3.0	M_CACCOREB14

Master Cardiovascular Research - Internships

In total, a student has to spend 63 ECTS credit points for two internships: a minor (=>21 ECTS) and a major (=>36 ECTS). Both internships have to be performed at a research laboratory, acknowledged by the examination board of the Cardiovascular Research Master: One internship has to be performed at one of the departments/laboratories of the VU/VUmc and the other one preferentially "outside" the VU. It is not allowed to do both internships outside the VU/VUmc.

Thesis

The Master's thesis includes the results of the major internship, integrated with and from the perspective of the knowledge acquired in the cursory education. The Master's thesis will get an uniform cover provided and designed by the Master. The Master's thesis will be defended in public.

Vakken:

Naam	Periode	Credits	Code
Major Internship	Ac. Jaar (september)	36.0	M_CMAJORI09
Major Internship	Semester 1, Semester 2	36.0	M_CMAJORI15
Minor Internship	Ac. Jaar (september)	21.0	M_CMINORI09
Minor Internship	Semester 2	30.0	M_CMINORI15

Master Cardiovascular Research - Study of Literature

The study of literature will be carried out under supervision, yet highly independent. It is also possible that the student proposes his or her own subject and presents an own question. The study may be focused on a scientific biomedical question, but a more applied or social question is also allowed.

The aim of the literature study is that the student will be able to select, evaluate and discuss critically relevant literature. Based on the study, the student has to explain clearly not only the state of the art, but also the limitations and problems. Depending on the context of the study the student has to formulate recommendations and strategies for further research to solve remaining problems. The literature study is written in the format of a review paper.

Vakken:

Naam	Periode	Credits	Code
Study of Literature	Ac. Jaar (september)	9.0	M_CLITSTU09

Academic Core Cardiovascular 1st year

Vakcode	M_CACCOREA14 ()
Periode	Ac. Jaar (september)
Credits	0.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. E. Kanters
Examinator	dr. E. Kanters
Lesmethode(n)	Werkcollege
Niveau	400

Doel vak

This course is designed to prepare you for your transition from student to scientist, the course spreads out and is part of the 2 year master programme.

Inhoud vak

The course consists of 4 modules: being a scientist during which the students are introduced to their mentor and to science in the field of cardiovascular research. The second module provides the student with skills essential in research. During the third module the relation between research and society is emphasized this includes scientific conduct, research ethics and professional behaviour, In the final module you will learn how to write a job application letter, CV, prepare for an interview and more importantly define what you want as a professional career.

Onderwijsvorm

Interactive lectures and assignments

Intekenprocedure

Students can register for this course and examinations via vunet.vu.nl (under My study, register for courses and exams). The general VU

registration rules apply. Information on registration deadlines can be found in VUnet. Please note that the general VU rules are strict, both for booking of the classes and (resit-)exams. The course is only available for the Cardiovascular Research master Students.

Overige informatie

Contact: e.kanters@vumc.nl

Academic Core Cardiovascular 2nd year

Vakcode	M_CACCOREB14 ()
Periode	Ac. Jaar (september)
Credits	3.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. E. Kanters
Examinator	dr. E. Kanters
Lesmethode(n)	Werkcollege
Niveau	500

Academic Teaching and Presenting

Vakcode	M_CACTP09 ()
Periode	Periode 3+4
Credits	3.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. J.M.H. Swennen
Examinator	dr. J.M.H. Swennen
Lesmethode(n)	Werkgroep, Hoorcollege
Niveau	500

Inhoud vak

During the course you will study theory about how to teach your (future) students as a university teacher and about how to present in an effective and attractive way. You will experience the presentations and lectures of both the course lecturer and your fellow students and learn from their lectures and presentations by reflecting on them.

Being a good teacher and presenter, however, cannot be learned by reading literature or observing others. It is necessary to practice teaching and presenting yourself and to combine theory with practice. Learning from theory, learning from observation and learning from your own practice require that you are able and willing to reflect critically

- on theory: What is useful for me?
- on the practice of self and others: What can I learn from my observations? Am I able to practice this myself?
- on your own practice: What went well? What can I improve?

Advanced Cardiac Diagnostics

Vakcode	M_CCARDIA09 (3120004)
Periode	Periode 3+4+5
Credits	3.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. O. Kamp
Examinator	dr. O. Kamp
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

This course focuses on the physical background and clinical application of different cardiac imaging modalities.

Inhoud vak

- Lectures on the physical background of MRI, SPECT/CT, echo, PCI
- Visits to the abovementioned techniques in the clinic
- Literature study

Toetsvorm

Written exam and literature study.

Literatuur

Lectures/articles handed out during course.

Intekenprocedure

Students can register for this course and examinations via vunet.vu.nl (under My study, register for courses and exams). The general VU registration rules apply. Information on registration deadlines can be found in VUnet. Please note that the general VU rules are strict, both for booking of the classes and (resit-)exams.

Advanced Molecular Immunology and Cell Biology

Vakcode	AM_470656 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. M. van Egmond
Examinator	prof. dr. M. van Egmond
Docent(en)	drs. K. Brouwer, prof. dr. R.E. Mebius, dr. T. van der Pouw Kraan, prof. dr. H.E. de Vries, prof. dr. M. van Egmond, dr. ing. S.J. van Vliet, Dr. M. van Egmond
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

To acquire insight into:

- cellular interactions within the immune system and how molecular diversity is generated to regulate immune responses.
- the various strategies of host immune responses against

pathogens, and how pathogens escape proper immune responses.

- the various strategies of the host to positively or negatively affect immune responses during cancer.
- mechanisms by which the immune system regulates either immune activation or tolerance induction.
- the mechanism of cell migration within the immune system.

End terms:

Knowledge: Knowledge: At the end of the course the student is familiar with current knowledge on the (molecular) pathways involved in the induction and regulation of immune responses in health and disease.

Skills:

- The student is capable of applying the acquired knowledge and can interpret scientific literature and scientific hypotheses of each of the topics described above.
- The student is able to formulate a scientific hypothesis and can design a research proposal addressing the hypothesis.
- The student is able to present and discuss the research proposal with peers.

Inhoud vak

Immunology is a rapid growing field of research in medicine and attracts a lot of attention for its contribution in various diseases such as infection diseases, cancer and auto-immunity. The course will give the student the opportunity to enhance the knowledge on the scientific aspects within the field of immunology. Special focus lies on the immunological processes underlying homeostasis control i.e., tolerance induction, immunity, antigen presentation and processes that lead to the development of inflammatory diseases (infection diseases through pathogens), auto-immunity (neuro-immunology) and cancer. Because this is an advanced course in the field of immunology, and will go into depth, particular on molecular details, students should be familiar with basic immunology preferably via a previous basic training course in immunology.

Onderwijsvorm

The course covers immunological processes at the molecular level, and consists of lectures (H; 22 hours) and study groups (W; 14 hours). In the latter part students will

read review articles as well as primary scientific articles on the subjects and discuss in groups opposing views on the molecular immunological processes that occur in the different stages of homeostasis and disease control. State of the art will be discussed of all topics, which will facilitate the study of scientific articles.

Additionally, there is time for self study as well as time to design a research proposal (pro; 4 hours), which will be presented. The first three weeks

include lectures, study groups, self study and preparation and presentation of the research proposal, whereas the last week mainly covers self study and the exam.

Contact hours with teachers and/ or coordinators: 40

Toetsvorm

A written exam (T) at the end of week 4 includes assay ('open') (90% of grade). A minimum score of 5.5 for the written exam is required in order to pass.

The research proposal (Pres) has to be presented and accounts for 10% of the grade.

Literatuur

Lectures, reviews and scientific papers are part of the material that covers the exam.

Titles reviews and scientific papers (some changes may occur, final list will be posted on BB)

Reviews

1. Rossi M, Young JW. Human dendritic cells: potent antigen-presenting cells at the crossroads of innate and adaptive immunity. *J Immunol*. 2005 Aug 1;175(3):1373-81.
2. Sallusto F, Mackay CR. Chemoattractants and their receptors in homeostasis and inflammation. *Curr Opin Immunol*. 2004 Dec;16(6):724-31.
3. Kumar H, Kawai T, Akira S. Pathogen recognition by the innate immune system. *Int Rev Immunol*. 2011 Feb;30(1):16-34.
4. van de Pavert SA, Mebius RE. New insights into the development of lymphoid tissues. *Nat Rev Immunol*. 2010 Sep;10(9):664-74.
5. De Libero G et al., How the immune system detects lipid antigens. *Prog Lipid Res*. 2010 Apr;49(2):120-7. doi: 10.1016/j.plipres.2009.10.002. Epub 2009 Oct 24.
6. Surana NK, Kasper DL., The yin yang of bacterial polysaccharides: lessons learned from *B. fragilis* PSA. *Immunol Rev*. 2012 Jan;245(1):13-26.
7. Abbott NJ, Rönnbäck L, Hansson E. Astrocyte-endothelial interactions at the blood-brain barrier. *Nat Rev Neurosci*. 2006 Jan;7(1):41-53.
8. Bevan MJ. Helping the CD8(+) T-cell response. *Nat Rev Immunol*. 2004 Aug;4(8):595-602.
9. Drew M, Pardoll. The blockade of immune checkpoints in cancer immunotherapy. *Nature Reviews Cancer* 12, 252-264 (2012)
10. Hansson GK, Libby P. The immune response in atherosclerosis: a double-edged sword. *Nat Rev Immunol*. 2006 Jul;6(7):508-19.
11. Schirmer SH, van Nooijen FC, Piek JJ, van Royen N. Stimulation of collateral artery growth: travelling further down the road to clinical application. *Heart*. 2009 Mar;95(3):191-7.

Research articles

1. Marsland BJ, Bättig P, Bauer M, Ruedl C, Lässig U, Beerli RR, Dietmeier K, Ivanova L, Pfister T, Vogt L, Nakano H, Nembrini C, Saudan P, Kopf M, Bachmann MF. CCL19 and CCL21 induce a potent proinflammatory differentiation program in licensed dendritic cells.
2. Joffre OP, Sancho D, Zelenay S, Keller AM, Reis e Sousa C. Efficient and versatile manipulation of the peripheral CD4+ T-cell compartment by antigen targeting to DNGR-1/CLEC9A. *Eur J Immunol*. 2010 May;40(5):1255-65.
3. Rangel-Moreno J, Carragher DM, de la Luz Garcia-Hernandez M, Hwang JY, Kusser K, Hartson L, Kolls JK, Khader SA, Randall TD. The development of inducible bronchus-associated lymphoid tissue depends on IL-17. *Nat Immunol*. 2011 Jun 12;12(7):639-46.
4. Reboldi A. et al., C-C chemokine receptor 6-regulated entry of TH-17 cells into the CNS through the choroid plexus is required for the initiation of EAE. *Nat Immunol*. 2009 May;10(5):514-23. doi: 10.1038/ni.1716. Epub 2009 Mar 22.
5. Feau S, Arens R, Togher S, Schoenberger SP. Autocrine IL-2 is required for secondary population expansion of CD8(+) memory T cells. *Nat Immunol*. 2011 Jul 31;12(9):908-13.
6. Sierra JR, Corso S, Caione L, Cepero V, Conrotto P, Cignetti A, Piacibello W, Kumanogoh A, Kikutani H, Comoglio PM, Tamagnone L, Giordano S. Tumor angiogenesis and progression are enhanced by Sema4D produced by tumor-associated macrophages. *J Exp Med*. 2008 Jul 7;205

(7):1673-85.

7. Medina RJ, O'Neill CL, Sweeney M, Guduric-Fuchs J, Gardiner TA, Simpson DA, Stitt AW.

Molecular analysis of endothelial progenitor cell (EPC) subtypes reveals two distinct cell populations with different identities. BMC Med Genomics. 2010 May 13;3:18.

8. Coffelt SB, Lewis CE, Naldini L, Brown JM, Ferrara N, De Palma M. Elusive identities and overlapping phenotypes of proangiogenic myeloid cells in tumors. Am J Pathol. 2010 Apr;176(4):1564-76.

Vereiste voorkennis

Solid knowledge on basic immunology is compulsory before the start of the course.

Aanbevolen voorkennis

A bachelor's course immunology is recommended.

Doelgroep

Students with a keen interest to study immunological processes that form a basis for a variety of occurrences of diseases. In particular those that cover the interaction between host-pathogen, host-tumor and homeostatic control.

Overige informatie

Study groups and active participation are compulsory. A substitution assignment is required when one or more workshops have not been attended, or when participation is judged as unsatisfactory.

Biostatistics

Vakcode	M_CBIOSTA09 (3120003)
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. B.I. Witte
Examinator	dr. B.I. Witte
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

The aim of the course is to introduce several standard statistical methods and the use of the statistical software SPSS to the students.

Inhoud vak

This course focuses on the practical application and interpretation of statistical analyses. A lot of attention is given to regression analysis in case of continuous, binary or survival outcome variables. But also the t-test, the chi-square test and analysis of variance are discussed.

- analysis of continuous outcome variables: t-test, ANOVA and linear regression analysis;
- analysis of binary outcome variables: chi-square test and logistic regression;
- multiple regression analysis: association and prediction models;
- repeated measures analysis: repeated measures ANOVA, linear mixed

models.

Onderwijsvorm

The course consists of six lectures, six exercise classes and self-study. In the exercise classes students will actively apply the discussed statistical methods to several datasets using the statistical software SPSS. Final examination will take place at the end of the 4th week via a written (open book) exam (50%) and an SPSS assignment (50%).

Literatuur

Material (i.e. PowerPoint sheets) provided on blackboard. Advised (not compulsory!) books:

1. BR Kirkwood & JAC Sterne (2003). Essential Medical Statistics - 2nd edition. Blackwell Science Ltd, Oxford
2. Gerber, SB and Voelkl Finn, K (2005). Using SPSS for Windows – data analysis and graphics. Springer, New York (electronic access at university via <http://link.springer.com/book/10.1007/0-387-27604-1/page/1>)

Intekenprocedure

Students can register for this course and examinations via vunet.vu.nl (under My study, register for courses and exams). The general VU registration rules apply. Information on registration deadlines can be found in VUnet. Please note that the general VU rules are strict, both for booking of the classes and (resit-)exams.

Overige informatie

Contact: e.kanters@vumc.nl

Clinical Aspects of Heart and Circulation

Vakcode	M_CCLINBIO09 (3120000)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. L.J.M. Juffermans
Examinator	dr. L.J.M. Juffermans
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak

This course focuses on the basic principles and clinical aspects of normal cardiac function and dysfunction.

Inhoud vak

The following topics will be addressed:

Coronary artery disease,
Cardiomyopathies,
Heart failure,
Inflammation of the heart: myocarditis,
Arrhythmias.

Onderwijsvorm

Lectures, working groups, assignments

Toetsvorm

Written exam and assignments

Literatuur

Book: Cardiology, Crawford-Di Marco-Paulus 3rd Ed (recommended).

Intekenprocedure

Students can register for this course and examinations via vunet.vu.nl (under My study, register for courses and exams). The general VU registration rules apply. Information on registration deadlines can be found in VUnet. Please note that the general VU rules are strict, both for booking of the classes and (resit-)exams.

Containment Strategies of Infectious Diseases in Global Context

Vakcode	AM_470127 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. J.F. van den Bosch
Examinator	dr. D.R. Essink
Docent(en)	dr. D.R. Essink, prof. dr. P.R. Klatser, prof. dr. J.F. van den Bosch
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

The endpoint of this course is that the student

- Has acquired in-depth theoretical and practical knowledge in relation to health intervention strategies for infectious diseases.
- Has acquired insights in various infectious diseases and characteristics in relation to containment strategies.
- Has acquired insight into the role of international institutions, such as the WHO, governmental advisory bodies, relevant professionals, executing institutions, NGOs and communities in designing and carrying out health interventions.
- Understands which barriers are important when implementing containment strategies of infectious diseases, with a focus on vaccination programs.
- Has acquired insight in theoretical concepts and methods to interpret results, evaluations and the effectiveness of programs.
- Has learned and practiced interdisciplinary methods and techniques to plan health interventions at community level in an interactive way.

Inhoud vak

This course covers developments in intervention strategies used to address health needs in a global context. Containment strategies of infectious diseases, in particular vaccination programmes, alert systems and intervention strategies, provide specific areas of attention. The containment strategies to be discussed include programmes for known infections (including vaccination strategies and in case of absence of a vaccine, diagnosis and treatment strategies)

and emerging infections (including isolation, prevention and communication strategies).

The student learns how to analyze bottlenecks and opportunities of the various strategies, how to interpret the results and to evaluate the implementation of programmes.

In addition, the student will take part in a group assignment on how to design containment strategies at community level in an interactive way, for e.g. tuberculosis, polio, rabies, malaria, HIV/AIDS, Ebola, etc. A presentation and writing of an essay will be part of the group assignment.

Onderwijsvorm

Lectures, group assignment, presentation, essay, self-study.

Basic background knowledge will be provided by VU lecturers, whereas relevant guest lecturers will present practical field examples.

Group assignment attendance is compulsory.

Contact hours: lectures 34 hrs, group work 8 hrs.

Self-study approx. 80 hrs.

Toetsvorm

Individual exam (60%) and group assignment presentation and essay (40%).

Both parts must at least be sufficient (6 or higher)

Literatuur

R. Webber, 2009. Communicable Disease Epidemiology and Control. 3rd Edition. CAB International, UK and USA. ISBN 978-1-84593-504-7.

Slide sets of lectures as made available on BlackBoard

Lecturers may make further readings available on BlackBoard.

Vereiste voorkennis

Basic knowledge about the pathogenesis of infectious diseases, microbiology and immunology

Aanbevolen voorkennis

Minor course AB_1046 "Infectious Diseases and Vaccine Development"

Doelgroep

Compulsory course within the Master differentiation International Public Health; optional course for students in other differentiations of the Masters Health Sciences, Biomedical Sciences, and Management, Policy Analysis and Entrepreneurship in Health and Life Sciences. Students from other backgrounds, please contact our secretariat for further information at secretariaat.athena@vu.nl

Intekenprocedure

Enrollment through BlackBoard.

Overige informatie

VU lecturers:

Prof. dr. Han van den Bosch

Prof. dr. Paul Klatser

Dr. Dirk Essink

Dr Bernard Ganter

Guest lecturers:

Dr. Jim van Steenbergen (RIVM/LUMC)

Dr. Helma Ruijs (RIVM)

Dr Frank Cobelens (KNCV)
 Dr. Constance Schultsz (AIGHD/AMC)
 Prof. dr. Maarten Postma (RUG)
 Dr. Kitty Maassen (RIVM)
 Dr. Koert Ritmeijer (MSF)
 Prof. dr. Robert Sauerwein (UMC Nijmegen)
 Prof. dr. Cees Hamelink (VU)
 Prof. dr. Guus Rimmelzwaan (EMC Rotterdam)
 Dr. Hans Zaaijer (Sanguin)
 Prof. dr. Christina Vandenbroucke (VUMC)

Developmental Biology

Vakcode	AM_470613 ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Examinator	prof. dr. R.E. Koes
Docent(en)	dr. R.F.G. Toonen, prof. dr. R.E. Koes
Lesmethode(n)	Hoorcollege, Werkcollege, Werkgroep
Niveau	600

Doel vak

The development of a single cell, the fertilized egg cell, into a complex organism with all its tissue and organs in the right place is one of the most intriguing phenomena in biology. Whereas disciplines like molecular and cell biology aim to unravel the molecular mechanisms of a single cell, developmental biology aims to understand how such mechanisms make cells work together in a coherent way to form an entire organism. The overall aim of this course is to provide insight into these molecular mechanisms, such as the regulation of the expression of master genes and cell-to-cell signaling pathways underlying plant and animal development.

Final attainment levels:

- the student has a basic understanding of morphological events that take place during embryogenesis in animals
- the student can describe and distinguish key-concepts in development, such as (i) pattern formation (ii) determination of cell fate, (ii) differentiation and link that to general phenomena known in molecular biology, such as gene regulation, epigenetic phenomena, cell-signalling etc.
- The student can describe the (dis)similarities in the development of animals as different as fruitflies and vertebrates, in terms of morphological events and underlying molecular mechanisms.
- The student can explain the paradox that development of organisms with very different morphologies is governed by deeply conserved genes, and understands the molecular evidence for the current ideas.
- The student acquires experience in the critical analysis and discussion of experimental data as presented in research papers and the presentation of such data for a large(r) audience.

Inhoud vak

The first two weeks will be shared with the MSc course Developmental Neurobiology of the Vertebrate Brain. The first week consists of lectures on general developmental biology. For the second week one of two

paths can be chosen: (1) Development of the brain or (2) Plant development. The first part of the course finishes with a written "mid term exam"

In the third and the fourth week the focus shift to specific "hot topics" and research. Three or four masterclasses will be given by invited speakers/researchers that will give an overview of their own research field and discuss their (recent) experimental results. Furthermore, students (couples) will choose 2-3 recent research papers on a hot topic of their interest that they will study in depth to prepare for a small masterclass at the end of week 4 in which they outline the current status of the chosen subject, and present (and critically evaluate) the latest experimental data. Students can freely choose papers on plant or animal development. This ensures that everyone can follow his/her own preference for animal or plant biology and that, in the end, everyone gets a broad view on what is currently going on in (plant or animal) developmental biology.

Specific issues that we will address in the first two weeks are:

- General key-concepts in development, such as pattern formation, segmentation, determination of cell fate, with emphasis on the experimental evidence on which our current knowledge is based
- Research strategies that are widely used in developmental biology.
- Molecular mechanisms that govern the development of embryos in insects (*Drosophila*) and vertebrates
- Elementary aspects of stem cell biology and "reprogramming" of differentiated cells into stems cells
- Evolutionary aspects: how can it be that deeply conserved genes govern the development of organisms with entirely different bodyplans, like fruitflies and vertebrates, or weed plants and trees.
- Late events in embryogenesis, the formation of organs (organogenesis). This will be entirely focused on development of the brain (for students taking the path Brain development)
- Early (embryogenesis) and late events (development of flowers and leaves) in the development of plants. What are similarities and differences with the development of animals?

In the last two weeks we will focus in depth on research concerning particular "topics that are currently "hot" in developmental biology.

Subjects that will be covered by invited speakers are:

- Development and functioning of stem cells and stem cell niches in the intestine.
- Role of Hox genes in the segmentation and later development of vertebrates
- Molecular mechanisms that govern pattern formation in plants

Subjects that will be covered in the masterclasses given by student depends on the choices that are made during the course and are, therefore, not entirely predictable beforehand. Some of the subjects that will almost certainly be covered are:

- Reprogramming of differentiated cells into stems cells and dangers/possibilities for use of such cells in therapy
- Intercellular movement of proteins like transcription factors, which were hitherto always believed to act only in the cells where they are synthesized

Onderwijsvorm

Lectures and masterclasses (~ 58 hrs).

Self study (~ 55 hrs)

Toetsvorm

Written exam (50%)

Oral presentations and (written) abstract (40%)

Active participation to discussions during masterclasses (10%)

Literatuur

There is no specific handbook. You might find it useful to consult, on occasion, a handbook (any) to refresh your memory on some basic cellular processes, like gene regulation, signaling and so on, if that is necessary.

Handouts, incl. PowerPoint files of lectures, pdf files of relevant review and research papers will be provided via the Blackboard site.

Vereiste voorkennis

Basic knowledge (level 1/2) of molecular biology in particular mechanisms underlying regulation of gene expression, cell-signalling.

General affection for molecular biology is recommended

Doelgroep

Master students: Biomolecular Sciences, Biology, Biomedical Sciences

Ethics in Life Sciences

Vakcode	AM_470707 ()
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	prof. dr. J.T. de Cock Buning
Examinator	prof. dr. J.T. de Cock Buning
Docent(en)	prof. dr. J.T. de Cock Buning, dr. J.F.H. Kupper
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak

To provide a toolbox of ethical instruments to analyze properly moral problems related (to one's own) research in the life sciences

- To acquire conceptual knowledge of the central concepts in applied philosophy and professional ethics
- To challenge an ethical reflection on one owns life science specialization and to open it for an impartial and constructive discussion
- To exercise a team based project to enter prepare and execute a moral dialogue
- To acquire the necessary skills to handle ethical issues in an accountable manner, as a professional academic beyond one's own inclinations and prejudgments

Inhoud vak

Researchers in life sciences generate the knowledge that builds the future of our society. Therefore, professional academics should be accountable for their decisions, experimental designs and presentation of results. In this short course, the principles of justification will be illustrated with cases of technology ethics and medical ethics. The way an ethical review committee on animal research works, is simulated by a role play exercise on an actual research protocol. Finally, as a small group training project, an ethical dialogue is prepared and executed together with another team.

Onderwijsvorm

Ethics in the Life Sciences is a fulltime course of four weeks (3 ECTS).

The total study time is 80 hours.

The different elements have the following study time:

- Lectures: 13 hours
- Work groups: 17 hours
- Group assignment: 24 hours
- Exam: 2 hour
- Presentation : 4 hours
- Self working (reading in the first week): 20 hours

Please note that attendance to the work group meetings is compulsory.

Attendance to the lectures is highly recommended. In our experience, relying on self-study alone is insufficient to apply the theory of the lectures in the assignments of the workgroups, and to pass the exam.

Toetsvorm

- Degree of intellectual participation in the workgroups (10%)
- exam (50%) has to be passed
- written and verbal execution of the ethical dialogue (40%)

Literatuur

Available on Blackboard

Vereiste voorkennis

Bsc Biology, Biomedical Sciences, Psychology with profile Biological Psychology or Neuropsychology

Doelgroep

Compulsory course in all FALW Master programmes, except Health Sciences and Neuro Sciences

Overige informatie

Lectures in English, part of the workgroups are in Dutch. All presentations and plenary discussions in English.

In order to maximize the experience of differences in values and preferences, and this increase meaningful ethical inquiry we will place you randomly in the workgroups. Placement will be communicated after the introduction lecture.

Extension Practical Training

Vakcode	M_CEXTENS09 (3120035)
Periode	Ac. Jaar (september)
Credits	3.0
Voertaal	Engels
Faculteit	VUmc

Coördinator	dr. E. Kanters
Examinator	dr. E. Kanters
Niveau	500

Genomes and Gene Expression

Vakcode	AM_470614 ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Aard- en Levenswetenschappen
Coördinator	dr. J.M. Kooter
Examinator	dr. J.M. Kooter
Docent(en)	dr. J.M. Kooter
Lesmethode(n)	Hoorcollege, Werkgroep, Deeltoets extra zaalcapaciteit
Niveau	400

Doel vak

Course objectives:

The student should be able, at the molecular level, to

- describe the composition of eukaryotic and prokaryotic genomes and identify and indicate the function of the different sequences
- explain and dissect the process of transcription initiation, - elongation and - termination, and how these processes are regulated, mainly in eukaryotes
- describe in detail the structure and composition of chromatin, the post-translational modifications of histone proteins, the enzymatic machinery involved and their control
- distinguish between general and the various types of specific transcription factors, and explain their collaboration to induce or repress gene expression
- describe the various forms of DNA modification, their biochemistry, and impact on genome maintenance and gene expression in various somatic tissues
- describe the epigenetic reprogramming during mammalian embryonic development, parental imprinting, and differentiation
- explain how non-protein encoding RNAs can affect gene expression
- explain the various types of RNA processing and post-transcriptional regulation of gene expressing and design experiments to study these processes
- apply currently-used experimental approaches and techniques to perform gene specific and genome-wide expression studies

Inhoud vak

To achieve the course objectives, the following topics will be discussed:

- Genome structure, Transcriptional regulation and Epigenetic mechanisms:
- Genome organization: coding versus non-coding sequences
- Composition and biochemistry of basic transcription machinery
- General and specific transcriptional regulators and their regulation
- Transcription initiation, elongation and termination
- Identification and function of regulatory sequences: promoters,

enhancers, suppressors, boundaries

- Epigenetics: Chromatin structure and histone modifications: writers-readers-erasers
- Epigenetics: DNA modifications (e.g. methylation) and their biochemical properties
- Epigenetic reprogramming during mammalian development
- Monoallelic gene expression and its importance for embryonic development and other biological processes
- 3D Nuclear structure and long range DNA interactions
- Transcriptional regulation and chromatin changes in stem cells, during differentiation, and development
- Cellular memory: establishing and maintenance of differentiation status
- Regulatory networks: the various ways by which regulators themselves are regulated
- Short and long non-coding RNAs and the mechanism by which they affect gene expression
- Experimental approaches and Techniques to study gene expression, differentiation and homeostasis

Post-transcriptional regulation

- integration of transcriptional and post-transcriptional control
- RNA processing, including alternative splicing, and its regulation
- Nucleo-cytoplasmic RNA transport
- RNA stability and degradation pathways
- RNA interference (siRNAs)
- Translation regulation and RNA degradation by micro(mi)RNAs
- RNA-editing and its biological importance
- Experimental approaches and Techniques to study post-transcriptional regulation of gene expression

Onderwijsvorm

- Lectures and interactive meetings, including lectures by guest speakers who are working in a particular field of research that is discussed in the course (ca 45 hr).
- Weblectures by experts (ca 5 hr)
- Self study (ca 100 hr)

Toetsvorm

There are 2 sub-exams:

- First exam is half way the course and consists of Multiple Choice question and accounts for 40% of the final mark
- Second exam is at the end of the course and consists of open questions and accounts for 60% of the final mark. For the second exam, knowledge of the first part is needed. Resit of a sub-exam is not allowed.

Literatuur

- Book: 'Gene Control' 2nd edition, by David Latchman, Garland Science
- Research and Review articles on specific topics, illustrating the latest developments in the field (from Blackboard site)
- PPT - lecture notes

Vereiste voorkennis

Basic concepts in Molecular Biology, Genetics, and Biochemistry

Doelgroep

Master students: Biomolecular Sciences, Biology, Biomedical Sciences, Pharmaceutical Sciences, Oncology, and Medical Natural Sciences.

Intekenprocedure

Enrollment through studentportal: Vunet.vu.nl

Overige informatie

Compulsory portal course for MSc students Biomolecular Sciences, all differentiations.

Life Cell Imaging

Vakcode	M_CLIFECE09 (3120008)
Periode	Periode 3+4+5
Credits	3.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. R.J.P. Musters
Examinator	dr. R.J.P. Musters
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Inhoud vak

Advances in light microscopy, digital image processing, and the development of a variety of powerful fluorescent probes present expanding opportunities for investigating the cardiovascular system. This laboratory and lecture course will provide participants with the theoretical and practical knowledge to utilize novel cell imaging technologies. Students will learn the principles of light microscopy and flow cytometry as well as use of different types of electronic cameras, laser-scanning systems, functional fluophores, delivery techniques, and digital image- processing software.

Literatuur

Syllabus including relevant articles.

Intekenprocedure

Students can register for this course and examinations via vunet.vu.nl (under My study, register for courses and exams). The general VU registration rules apply. Information on registration deadlines can be found in VUnet. Please note that the general VU rules are strict, both for booking of the classes and (resit-)exams.

Overige informatie

Contact: r.musters@vumc.nl

Major Internship

Vakcode	M_CMAJORI09 ()
Periode	Ac. Jaar (september)
Credits	36.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. E. Kanters
Examinator	dr. E. Kanters

Niveau	500
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Major Internship

Vakcode	M_CMAJORI15 ()
Periode	Semester 1, Semester 2
Credits	36.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. E. Kanters
Examinator	dr. E. Kanters
Niveau	500

Minor Internship

Vakcode	M_CMINORI09 ()
Periode	Ac. Jaar (september)
Credits	21.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. W.J. van der Laarse
Examinator	dr. W.J. van der Laarse
Niveau	400

Minor Internship

Vakcode	M_CMINORI15 ()
Periode	Semester 2
Credits	30.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. W.J. van der Laarse
Niveau	400

Pathophysiology of Heart and Circulation

Vakcode	M_CPATHO09 (3120014)
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. W.S. Simonides
Examinator	dr. W.S. Simonides
Lesmethode(n)	Hoorcollege, Werkgroep

Niveau	400
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Doel vak

Obtaining a thorough understanding of cardiovascular function and the role of the underlying molecular components and mechanisms in the development of cardiac pathology.

Developing skills in critically reading research papers; formulating a new research concept; presenting the results of a study in a conference setting and writing a lay summary.

Inhoud vak

This course focuses on the fundamental aspects of normal cardiac function, cardiac dysfunction and the development of heart failure. The physiology of the heart and the circulation in health and disease will be addressed, with emphasis on the molecular mechanisms involved. Note: This is an advanced course and basic knowledge of cardiac structure and function is required to complete the course successfully.

The following topics will be addressed:

- circulation and blood pressure
- fluid dynamics
- electrophysiology
- cardiac contractile function
- cardiac remodelling and heart failure
- cardiomyopathies
- cardiac signal transduction and gene regulation
- mitochondrial function in heart failure

Onderwijsvorm

Written exam and assignments.

Literatuur

Book: Pathophysiology of Heart disease. Ed. L.S. Lilly 5th ed.
Various research articles and selected Chapters from Cardiology. Ed. Crawford-Di Marco-Paulus 3rd ed.

Intekenprocedure

Students can register for this course and examinations via vunet.vu.nl (under My study, register for courses and exams). The general VU registration rules apply. Information on registration deadlines can be found in VUnet. Please note that the general VU rules are strict, both for booking of the classes and (resit-)exams.

Proteomics in Biomedical Research

Vakcode	M_CPROTBI09 (3120006)
Periode	Periode 3+4+5
Credits	3.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	prof. dr. J. de Groot-van der Velden
Examinator	prof. dr. J. de Groot-van der Velden
Lesmethode(n)	Hoorcollege, Werkgroep

Niveau	500
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Doel vak

Function and structure of cells depend on the composition of proteins. During pathological conditions the expression of proteins is altered leading to impaired function/structure of cells. Apart from changes in expression level, post-translational protein changes occur as a result of altered signaling pathways. Detection of these protein changes may provide candidate biomarkers and targets for therapeutic interventions. The present course will provide a solid basis for the understanding and the quantification of the diversity in protein identification by mass spectrometry and the different methods to detect and quantify cellular protein changes. In the second week, experience is gained with gel electrophoresis and mass spectroscopy techniques to identify and quantify isoform expression and the nature and extent of post translational modifications.

Inhoud vak

Protein identification by tandem mass spectrometry and database searching;
 Gel electrophoresis and mass spectroscopy techniques to quantify isoform expression and the nature and extent of post translational modifications;
 Data mining: placing large scale protein expression data in a biological context (network analysis).

Literatuur

Syllabus including relevant articles

Intekenprocedure

Students can register for this course and examinations via vunet.vu.nl (under My study, register for courses and exams). The general VU registration rules apply. Information on registration deadlines can be found in VUnet. Please note that the general VU rules are strict, both for booking of the classes and (resit-)exams.

Overige informatie

Contact:
 Dr. Connie R. Jimenez
 Associate Professor, Head OncoProteomics Laboratory
 Dept. Medical Oncology
 e-mail: c.jimenez@vumc.nl

Radiation Protection Course, Level 5B

Vakcode	M_CRADPRO09 (311164)
Periode	Ac. Jaar (september)
Credits	3.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	G.W.M. Visser BSc
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Doel vak

Aim of the course "Working with Radioactivity" is preparing researchers, assistants and students for safely working with radioactive substances and/or apparatus emitting ionising radiation.

Onderwijsvorm

The course encloses one week, divided in theory (~ 40%) and practical work (~60%). For both parts there will be a guide book in Dutch or English available. The experiments will lead to a practical work report to be used as the guidance for futural radiological activities. Participants shall receive a certificate as proof of their participation at the course, if they are judged to work safely with radioactivity. The with this certificate related allowance to work with radioactivity is limited to the laboratories of the Vrije Universiteit / VUmc.

Toetsvorm

Written exam, twice a year. Only students who pass the Dutch exam and thus obtain the governmental diploma "Stralingshygiëne, deskundigheidsniveau 5B" get 3 ECTS. The diploma gives allowance to work with radioactivity in the Netherlands, and most often even in Europe and America.

Overige informatie

For each course the maximal number of participants is 12. During the year 4 courses (twice in Dutch, twice in English) are given. During the year the possibility of 3 extra courses exists provided the number of participants is at least 8. See for more information:

<http://www.rnc.vu.nl>

M.C. Stolker-Bouknecht is the administrator of the RNC-course, Tel: 020-4449101, mstolker@rnc.vu.nl. N.B. People who do want to do the course but do not understand Dutch, are before application requested to contact: G.W.M. Visser, coordinator of the course, Tel: 020-4449710, gvisser@rnc.vu.nl

Remodelling of the Circulatory System

Vakcode	M_CREMODE09 (3120001)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	prof. dr. J.W.M. Niessen
Examinator	prof. dr. J.W.M. Niessen
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Inhoud vak

This course focuses on the pathophysiological mechanisms of vascular remodelling.

The following topics will be addressed:

- *atherosclerosis: pathology, imaging and animal models
- *cell biology: endothelial cells, smooth muscle cells and adventitia

*immunology: the role of neutrophilic granulocytes, lymphocytes and macrophages

*angiogenesis/arteriogenesis: basic and clinical aspects

*vascular aneurysm: basic and clinical aspects

*therapy: venous bypass, stem cells and antibody therapy

*vascular aspect of pregnancy

The course contains the following practical element:

- journal club

Literatuur

relevant articles

Intekenprocedure

Students can register for this course and examinations via vunet.vu.nl (under My study, register for courses and exams). The general VU registration rules apply. Information on registration deadlines can be found in VUnet. Please note that the general VU rules are strict, both for booking of the classes and (resit-)exams.

Overige informatie

Contact: j.w.m.niessen@vumc.nl

Research Ethics

Vakcode	M_FETHICA14 ()
Periode	Periode 3+4+5
Credits	3.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	prof. dr. G.A.M. Widdershoven
Examinator	prof. dr. G.A.M. Widdershoven
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	500

Study of Literature

Vakcode	M_CLITSTU09 (3120036)
Periode	Ac. Jaar (september)
Credits	9.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. E. Kanters
Examinator	dr. E. Kanters
Niveau	500

Vascular Function and Metabolic Diseases

Vakcode	M_CVASCFU09 (3120002)
Periode	Periode 2

Credits	6.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	dr. E.H. Serné
Examinator	dr. E.H. Serné
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak

This course focuses on the interplay between vascular function and metabolic disease. Pathophysiology, new diagnostics and development of new therapies will be presented.

Inhoud vak

The following topics will be addressed: chronic kidney disease and vascular disease, diabetes and (micro)vascular dysfunction; Microbial modulation of insulin sensitivity; Rheumatic disease and vascular disease; Surrogate markers for cardiovascular disease, sepsis and (micro)vascular failure.

The course contains the following practical elements: in vivo assessment of vascular function in humans; hemodynamics/vital functions during reanimation, literature assignment, participation in 5th symposium of the Rembrandt Institute of Cardiovascular Science.

Toetsvorm

Written exam and assignments

Literatuur

Book: to be announced;
syllabus including relevant articles.

Intekenprocedure

Students can register for this course and examinations via vunet.vu.nl (under My study, register for courses and exams). The general VU registration rules apply. Information on registration deadlines can be found in VUnet. Please note that the general VU rules are strict, both for booking of the classes and (resit-)exams.

Writing Scientific English

Vakcode	M_FWSE09 (3120015)
Periode	Semester 2
Credits	3.0
Voertaal	Engels
Faculteit	VUmc
Coördinator	drs. J.K.A. Meijer
Examinator	drs. J.K.A. Meijer
Lesmethode(n)	Werkcollege
Niveau	400

Doel vak

The aim of this course is to provide Master's students with the essential linguistic know-how for composing a successful research

proposal in English that is well organized, idiomatically and stylistically appropriate and grammatically correct.

At the end of the course students

- know how to structure a research proposal;
- know what the information elements are in parts of their research proposal;
- know how to produce clear and well-structured texts on complex subjects;
- know how to write well-structured and coherent paragraphs;
- know how to construct effective sentences;
- know what collocations are and how to use them appropriately;
- know how to adopt the right style (formal style, cohesive style, conciseness, hedging)
- know how to avoid the pitfalls of English grammar;
- know how to use punctuation marks correctly;
- know how to cite sources effectively;
- know what their own strengths and weaknesses are in writing;
- know how to give effective peer feedback.

Inhoud vak

The course will start with a general introduction to writing a research proposal in English. Taking a top-down approach, we will then analyse the structure of a research proposal in more detail. As we examine several sections of a research proposal, we will peel back the layers and discover how paragraphs are structured, what tools are available to ensure coherence within and among paragraphs, how to write effective and grammatically correct sentences and how to choose words carefully and use them effectively.

Topics addressed during the course include the following:

- What makes a good proposal?
 - o 5 crucial questions you must always answer
 - Considering your readers: who are they? What do they expect? How do they read your text? How does that affect your writing?
 - o The importance of considering reading strategies
 - What is the basic structure of a research proposal and what are the key elements of each section?
 - How do you "sell" your project / research? Why language matters!
- Strategies for writing successful research proposals: using the English language effectively and enhancing readability
- o Keeping it brief: don't waste words
 - o Writing well-structured and coherent paragraphs
 - o Writing effective sentences (sophisticated word order, information distribution)
 - o Using modality and boosters to your advantage
 - o Using appropriate and effective vocabulary
 - o Arguing convincingly
 - o Using active constructions (but also using the passive effectively)
- Understanding grammar (tenses, basic word order, agreement, prepositions, etc.)
 - Understanding punctuation
 - Referring to sources: summarising, paraphrasing, quoting (how and when?)
 - Avoiding plagiarism

Onderwijsvorm

Research proposal writing in English is a four-week course that consists of 4 contact hours a week. Students are required to spend at least 6 to 8 hours of homework per week. They will work through a phased series of exercises that conclude with the requirement to write several text parts (e.g. Introduction/Background, Relevance section, Summary). Feedback on the writing assignments is given by the course teacher and by peers.

Toetsvorm

Students will receive 3 course credits when they meet the following requirements:

- Students hand in three writing assignments (e.g. Introduction, Relevance section, Summary) and get a pass mark for all writing assignments;
- Students provide elaborate peer feedback;
- Students attend at least 7 out of 8 sessions (or, in case of 6 sessions, they attend at least 5);
- Students are well prepared for each session (i.e. do all homework assignments);
- Students actively participate in class;
- Students do not plagiarise or self-plagiarise.

Literatuur

Effective Scientific Writing: An Advanced Learner's guide to Better English (A. Bolt & W. Bruins, ISBN 978 90 8659 6171). VU bookstore: €27.95.

Doelgroep

This course is only open to students of the two-year Master's programme Oncology. These students are only eligible to the course if they have already conducted scientific research (e.g. for their Bachelor's thesis) or if they will be working on a research project when taking Scientific Writing in English.

Intekenprocedure

Students can register for this course and examinations via vunet.vu.nl (under My study, register for courses and exams). The general VU registration rules apply. Information on registration deadlines can be found in VUnet. Please note that the general VU rules are strict, both for booking of the classes and (resit-) exams. This course is only meant for Master Oncology students.

Overige informatie

- To do well, students are expected to attend all lessons. Group schedules are to be found on Blackboard.
- A VUnet registration for this course automatically gives access to the corresponding Blackboard site. Group registration only takes place via Blackboard (general groups: registration by students following FALW programmes containing this course, groups assigned to specific studies: registration through programme and course coordinator).
- Make sure Scientific Writing in English does not overlap with another course.
- If you have registered for a group in Blackboard, you are expected to attend all sessions (eight). If you decide to withdraw from the course, do so in time, both on Blackboard and in VUnet. This all will avoid a 'fail' on your grade list for not taking part in this course and allows other students to fill in a possible very wanted group spot.
- For specific Blackboard matters concerning this course, please contact by sending email to masteroncology@vumc.nl

