

MA Biomedical Sciences

Fac. Health, Medicine and Life Sciences

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Please bear in mind that the programme information is continuously updated. It is therefore wise to check the online prospectus regularly.

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Table of content

Mechanisms in Health and Disease.....	3
Modern Approaches to Diagnosis and Thera.....	5
Basic Skills for 'Upcoming' Scientists.....	7
Junior Practical Training - Internship.....	9
Laboratory Animal Science.....	11
Safe Microbiological Techniques.....	12
Market your Science.....	14
Designing Scientific Research.....	16
Thesis.....	18
Poster Presentation.....	20
Senior Practical Training - Internship.....	22

Mechanisms in Health and Disease

Academic year 2014-15

Date last modified

24-5-2014 1:28

Period

Period 1 Startdate: 15-Sep-14 Enddate: 24-Oct-14

Code

BMS1001

ECTS credits

9.0

Organisational unit

Fac. Health, Medicine and Life Sciences

Coordinator

T.M.C.M. de Kok

Description

1. Course summary This theoretical course aims to provide knowledge and understanding of contemporary methods necessary for the experimental approach to research on the molecular mechanisms of health and disease. These topics are approached from various disciplinary angles (i.e. molecular genetics, embryology/developmental biology, immunology, oncology, cardiology, neurology), so as to give students insight into ongoing health-related and (pre)clinical research projects within UM and UH. 2. Content The course consists of four two-week modules (i.e. eight weeks in total). The students are divided into tutorial groups of eight to ten students. Module topics 1. Predisposition: genetic (linkage analysis, SNPs, mouse models)/environmental (nutrition, diet, drugs). Chronic diseases such as diabetes, cancer, Alzheimer and asthma are presented in terms of genetic and environmental factors that influence their induction and progression. Experimental models and methods that make it possible to study those genetic and environmental factors are presented and discussed. Students read research papers, and discuss and evaluate them. They also give a lecture to their fellow students on a particular topic. 2. Gene regulation: research and disease (transcription, (post) translation, epigenetics) 3. Defective signalling in ischemia and hypoxia (cell signalling, molecular cross-talk, cellular effects) 4. Systemic communication and interaction: function (homeostasis) and failure (disease) (regulation proliferation, apoptosis, inter- and intra-tissue communication, cell adhesion, interaction) 3. Skills training Presentation skills: Each group of students must prepare a presentation on a relevant topic in English, to be presented to other students.

Goals

2. Objectives (Applying) knowledge and understanding o Detailed knowledge of the molecular processes involved in the regulation of gene expression (transcription, (post)translation, epigenetics) o Broad knowledge and understanding of the genetic and environmental factors (nutrition, medication) that play a role in the predisposition to disease, as well as methodologies for studying them (linkage analysis, SNPs, mouse models) o Broad knowledge and understanding of the

molecular and cellular processes involved in homeostasis, cell-cell communication, signal transduction, cell proliferation and cell death, and methodologies for studying them
o Knowledge of laboratory animal models for biomedical research
Forming an opinion
o Critical evaluation of scientific publications (hypothesis, problem definition, research approach, interpretation of results, conclusions, limitations)
Communication
o Experience with oral presentations and written reports for specific assignments
o Active participation in academic discussions
Learning skills
o Experience with Problem-Based Learning

Instruction language

EN

Prerequisites

Recommended literature

Original recent research articles that will be made available via Eleum/Blackboard.
o Suggested literature for self-study or to brush up knowledge:
- Molecular Biology of the Cell: Bruce Alberts; Alexander Johnson; Peter Walter; Julian Lewis; Taylor & Francis
- Janeway's Immunobiology; Kenneth M. Murphy; Paul Travers; Mark Walport; Taylor & Francis
- At the bench: A laboratory navigator; Kathy Barker; Cold Spring Harbour Laboratory Press
- Communicating in Science; Vernon Booth (or a similar book; but this one is short and concise); Cambridge University Press
- Biochemistry: International Edition; Jeremy M. Berg; John L. Tymoczko; Lubert Stryer; Palgrave Macmillan

Teaching methods

ASSIGNMENT(S)

WORK IN SUBGROUPS

LECTURE(S)

PBL

PRESENTATION(S)

Assessment methods

ASSIGNMENT

WRITTEN EXAM

Key words

(epi)genetics, molecular biology, immunology,

Modern Approaches to Diagnosis and Thera

Academic year 2014-15

Date last modified

30-9-2014 1:32

Period

Period 2 Startdate: 27-Oct-14 Enddate: 19-Dec-14

Code

BMS1002

ECTS credits

9.0

Organisational unit

Fac. Health, Medicine and Life Sciences

Coordinator

F.R.M. Stassen

Description

The course consists of three two-week modules (i.e. six weeks in total). The students are divided into tutorial groups of eight to ten students. The modules deal with the following topics: 1) prevention 2) screening & diagnosis 3) therapy. These will be discussed using as examples diseases that are study focuses here in Maastricht. Examples are the metabolic syndrome, cardiovascular diseases, Alzheimer, Parkinson, cancer, and infectious diseases. Next to lectures, students will have Journal Clubs on seminal papers discussing these diseases and will study one of these diseases in groups, analyzing different aspects of the diseases such as nutrition, immunology, prevention, genetics, hypo/hyperplasia, etc. Finally, one module-spanning assignment investigating the above- mentioned topics using one disease as an example will be carried out per group.

Goals

Knowledge and understanding o Basic knowledge of and insight into the latest work on the molecular mechanisms involved in the onset of chronic diseases. o Broad knowledge of innovative research for improving molecular screening, preventive measures, diagnostics and therapy. o Detailed knowledge of experimental (pre)clinical research. Applying knowledge and understanding o Integration of methodologies of different disciplines for application in the diagnostics and treatment of disease. Forming an opinion o Critical evaluation of scientific publications (hypothesis, problem definition, research approach, interpretation of results, conclusions, limitations) Communication o Active participation in scientific discussions o Experience with oral presentations and written reports of specific assignments Learning skills o Experience with Problem-Based Learning

Instruction language

EN

Prerequisites**Recommended literature**

Basic Immunology Updated Edition: Functions and Disorders of the Immune System by Abul K. Abbas

Teaching methods

ASSIGNMENT(S)

WORK IN SUBGROUPS

LECTURE(S)

PBL

PRESENTATION(S)

Assessment methods

ASSIGNMENT

ATTENDANCE

PARTICIPATION

PRESENTATION

WRITTEN EXAM

Key words

Prevention, screening, diagnosis, therapy of disease., Vascular biology, immunology, infectious disease, neurology, metabolic, syndrome,,

Basic Skills for 'Upcoming' Scientists

Academic year 2014-15

Date last modified

30-9-2014 1:32

Period

Period 2 Startdate: 08-Dec-14 Enddate: 19-Dec-14

Code

BMS1003

ECTS credits

3.0

Organisational unit

Fac. Health, Medicine and Life Sciences

Coordinator

C.J.H. van der Kallen

Description

This third course aims to teach students statistical approaches to study design. The emphasis is on applied statistics and hands-on experience. Set-up of experimental groups in away that allows calculation and correction of session effects; calculation of risk factors; 'meet-in- the-middle' approach to link exposure to results (biomarker discovery). In addition, practical preparation of the junior internship will take place: diligent keeping of a lab-journal in the light of scientific fraud; moreover, students will receive tasks for the internship on science and communication (writing of a short article for a daily newspaper on their junior internship), and ethics and fraud, that will be analysed in block 1.5 (after the internship).

Goals

Knowledge and understanding o Knowledge of study design, practical considerations of experimental setups from a statistical point of view: session effects and factor correction; outlier analysis. o Power calculation, risk analysis in epidemiological studies, confounding factors. Applying knowledge and understanding o Applied statistics in practical sessions. Setup of experiments to improve statistical analysis. Forming an opinion o Critical evaluation of statistical data in research publications. Communication o Active participation in practical trainings. Learning skills o Experience with Problem-Based Learning

Instruction language

EN

Prerequisites

Recommended literature

Good clinical practice guide by Medicines and Healthcare products Regulatory Agency Make Your Mark in Science: Creativity, Presenting, Publishing, and Patents, A Guide for Young Scientists by Claus Ascheron and Angela Kickuth
Turning Points: Changing Your Career from Science to Patent Law by Dustin T. Holloway Scientific Integrity: Text and Cases in Responsible Conduct of Research by Macrina, Francis
[http://www.vsnu.nl/files/documenten/Domeinen/Onderzoek/Code_wetenschapsb_eoefening_2004_\(2012\).pdf](http://www.vsnu.nl/files/documenten/Domeinen/Onderzoek/Code_wetenschapsb_eoefening_2004_(2012).pdf) (in Dutch)

Teaching methods

ASSIGNMENT(S)
WORK IN SUBGROUPS
LECTURE(S)
PAPER(S)
PBL

Assessment methods

ASSIGNMENT
ATTENDANCE
COMPUTERTEST
FINAL PAPER

Key words

statistics, popular writing, valorisation of knowledge and patents, Good, Clinical Practice, scientific integrity,

Junior Practical Training - Internship

Academic year 2014-15

Date last modified

30-9-2014 1:32

Period

Period 3 Startdate: 05-Jan-15 Enddate: 12-Jun-15

Code

BMS1004

ECTS credits

36.0

Organisational unit

Fac. Health, Medicine and Life Sciences

Coordinator

H.R. Gosker

Description

This 22-week internship period provides students with their first practical experience of setting up and conducting scientific research. It emphasises the exploration of new and relevant research techniques and methodologies. Students are introduced to and gain practical experience in several state-of-the-art techniques/methodologies. Internships may take place within the UM or another host institute. The internship includes an obligatory 3-week course on laboratory animal research. Students may choose either the theoretical course or the certified animal course. During the theoretical course, the following topics will be taught and discussed: Opportunities and limitations of animal models in modern research - choice of an optimal model; animal nutrition, genetics, law and ethics, animal health. A limited number of places are available for a certified animal course (Article 9), which enables the successful participant to work with laboratory animals in the Netherlands once he or she has obtained a Master's degree. Then all students are obliged to follow a 1-week course on Safe Microbiological Techniques (SMT) unless they can present a valid certificate showing that they have the required experience and have received specific instructions. The certificate obtained during the Maastricht BMW (Biomedische Wetenschappen) BSc qualifies. All other certificates will have to be approved by the Biosafety Officer. In addition, some elective courses are offered: a 2-week certified course "working with radionuclides" that allows the successful participant to work with radioactive material in the Netherlands (Certificate 5b) and a 1-week "Advanced microscopy and vital imaging course". The total number of course weeks within the internship may however not exceed 6 weeks (including the obligatory courses).

Goals

Objectives: (Applying) knowledge and understanding: Experience in setting up experimental research/focused experiments; Practical understanding of modern research techniques and methodologies (possibilities and limitations); Practical experience in an ongoing research project. Exposure to the real-life research environment;

Experience in keeping a laboratory journal. Communication: Active participation in academic discussions in professional practice; Exchange of newly acquired knowledge by reporting to other students and or scientists and writing a report

Instruction language

EN

Prerequisites

Recommended literature

L.F.M. van Zutphen, V. Baumans, A.C. Beijnen, Handboek Proefdierkunde. Elsevier Gezondheidszorg

Teaching methods

ASSIGNMENT(S)

WORK IN SUBGROUPS

LECTURE(S)

PATIENTCONTACT

PAPER(S)

PRESENTATION(S)

RESEARCH

SKILLS

TRAINING(S)

Assessment methods

ATTENDANCE

FINAL PAPER

OBSERVATION

PARTICIPATION

PRESENTATION

WRITTEN EXAM

Key words

Practical training internship / placement; research; animal course with, certificate; radiology course with certificate 5b; microscopy course;, safe microbiological course with certificate; scientific report /, thesis,;

Laboratory Animal Science

Academic year 2014-15

Date last modified

24-5-2014 1:28

Period

Period 3 Startdate: 05-Jan-15 Enddate: 12-Jun-15

Code

BMS1104

ECTS credits

0.0

Organisational unit

Fac. Health, Medicine and Life Sciences

Coordinator

A. Herrler

Description

Goals

Instruction language

EN

Prerequisites

Recommended literature

Teaching methods

Assessment methods

Key words

Safe Microbiological Techniques

Academic year 2014-15

Date last modified

24-5-2014 1:28

Period

Period 3 Startdate: 05-Jan-15 Enddate: 12-Jun-15

Code

BMS1204

ECTS credits

0.0

Organisational unit

Fac. Health, Medicine and Life Sciences

Coordinator

H.R. Gosker

Description

Many investigators use micro-organisms, cells, tissues, biological materials or animals. Most of them may have some risks for the worker and the environment. Therefore the employee has to be informed about the risks and has to be competent to control them. This course on safe microbiological techniques is based on the guidelines of the committee on education of the Dutch Society of Biosafety Officers for working with genetically modified bacteria, viruses and cells and the European and Dutch legislation on this subject. It also addresses safe working with biological materials like blood and primary cell lines. The target groups of this course are PhD- and master students of the faculties of Medicine and Health Sciences of Maastricht University. Moreover researchers at the Academic Hospital Maastricht and other European institutions and companies are welcome. The course is composed of a theoretical and an instructional part. The concepts of infection and defence and risk control are explained in lectures. Basic techniques, the evolution of possible risks and control measurements like disinfection and working in a biological safety cabinet are part of the practical assignments. The course is obligatory for students who have no SMT license (details will be explained prior to the course) and is organized by CRISP.

Goals

Instruction language

EN

Prerequisites

Recommended literature

Teaching methods

Assessment methods

Key words

Market your Science

Academic year 2014-15

Date last modified

24-5-2014 1:28

Period

Period 6 Startdate: 15-Jun-15 Enddate: 26-Jun-15

Code

BMS1005

ECTS credits

3.0

Organisational unit

Fac. Health, Medicine and Life Sciences

Coordinator

C.J.H. van der Kallen

Description

The course consists of one two-week module. The students are divided into tutorial groups of eight to ten students. Tasks on popular scientific writing will be presented. Ethical issues and integrity issues will be discussed using recent examples from newspapers concerning (Dutch) scientists. Lectures on entrepreneurship, good clinical practice, valorisation, quality control will be coupled to Journal Clubs.

Goals

Knowledge and understanding o Knowledge of requirements for good clinical practice and valorisation of experimental results. Students will get an overview over the life sciences industry and health care organisation. Applying knowledge and understanding o Students will discuss ethical issues of clinical studies as well as scientific integrity and fraud. Forming an opinion o Critical evaluation of ethical issues in patient research. Critical evaluation of popular scientific articles in daily papers. Communication o Active participation in tutorial groups. Writing of a popular scientific article based on the junior internship. Communication of scientist with laypeople. Learning skills o Ability to independently maintain and extend professional knowledge and competences

Instruction language

EN

Prerequisites

Recommended literature

Good clinical practice guide by Medicines and Healthcare products Regulatory Agency Make Your Mark in Science: Creativity, Presenting, Publishing, and Patents, A Guide for Young Scientists by Claus Ascheron and Angela Kickuth

Turning Points: Changing Your Career from Science to Patent Law by Dustin T. Holloway Scientific Integrity: Text and Cases in Responsible Conduct of Research by Macrina, Francis
[http://www.vsnu.nl/files/documenten/Domeinen/Onderzoek/Code_wetenschapsb_eoefening_2004_\(2012\).pdf](http://www.vsnu.nl/files/documenten/Domeinen/Onderzoek/Code_wetenschapsb_eoefening_2004_(2012).pdf) (in Dutch)

Teaching methods

PBL

LECTURE(S)

TRAINING(S)

Assessment methods

PARTICIPATION

WRITTEN EXAM

Key words

statistics, popular writing, patent, Good Clinical Practice, scientific, integrity,

Designing Scientific Research

Academic year 2014-15

Date last modified

3-5-2014 1:28

Period

Period 1 Startdate: 01-Sep-14 Enddate: 24-Oct-14

Code

BMS2001

ECTS credits

12.0

Organisational unit

Fac. Health, Medicine and Life Sciences

Coordinator

R. Shiri - Sverdlov

Description

1. Course summary Eight-week course focusing on the various aspects of writing an academic research proposal. 2. Content This theoretical course aims at familiarising students with setting up fundamental or applied research and writing an academic research proposal. The central theme of the second year of the master's programme is the practical application of the scientific process: hypothesis " problem definition " experiment " result " interpretation " conclusions. The general point of departure is the setup of a follow-up study which relates to ongoing research at UM or UH, or elsewhere (see Internship abroad). This provides students with preparation for the senior practical training (course 2.2), which concludes the master's programme. 3. Skills training The course pays explicit attention to English academic writing (by way of practical exercises) and presentation skills. Students also gain an understanding of study design (e.g. epidemiology, control groups, the setup of statistical analysis, and the evaluation of results). In addition, students will follow lectures at the UH campus on the following topics: Life Sciences Industry, Clinical Studies: Conception and Organisation, Quality Management in the Laboratory.

Goals

- o Understanding of the scientific process
- o Ability to formulate a hypothesis to be tested and set up an executable research project using the concept of the scientific process
- o Ability to draw up various research strategies to approach certain research questions
- o Ability to formulate expected end results (preparation for course 2.2)
- o Ability to defend a research proposal, and in doing so enter into academic discussions with colleagues and supervisors
- o Ability to comment critically on other research proposals

Instruction language

EN

Prerequisites**Recommended literature**

Science Research Writing: A Guide for Non-Native Speakers of English by Hilary Glasman-Deal Grant Writing For Dummies by Beverly A. Browning

Teaching methods

PRESENTATION(S)

TRAINING(S)

Assessment methods

FINAL PAPER

PRESENTATION

Key words

designing research proposal, scientific english, epidemiology,

Thesis

Academic year 2014-15

Date last modified

22-8-2014 1:30

Period

Period 2 Startdate: 27-Oct-14 Enddate: 19-Jun-15

Code

BMS2002

ECTS credits

48.0

Organisational unit

Fac. Health, Medicine and Life Sciences

Coordinator

R.C.J. Langen

Description

1. Course summary During this 30-week internship, students participate in ongoing scientific research at UM or UH, at other knowledge centres in the Netherlands/Belgium, or in other countries (see below). The internship is prepared during course 2.1. A practical, hands-on experience, it offers students a unique opportunity to gain experience in independently carrying out a research project which they personally designed. The length of the training period ensures the acquisition of valuable, in- depth experience, necessary for students' development into independent researchers. The internship in the CMS specialisation consists of subjects related to clinical diagnostics and therapy of chronic diseases, while that in the MHS specialisation looks at the relationship between exogenous circumstances and chronic diseases. Students following the ODB specialisation will work on a project relating to cancer or developmental biology. 2. Content Students work individually and take part in ongoing research projects, supervised by a tutor or researcher. In this framework, they also participate in the regular meetings of the relevant research team. Further, they return to the university three times during the internship period to present their progress and comment on other students' projects. The internship period concludes with a final presentation to the other students as well as tutors and other experts. The final internship report is prepared in the form of an extensive scientific paper, which constitutes the master's thesis. The optional courses are integrated into the internship period.

Goals

Objectives (Applying) knowledge and understanding o Ability to carry out a research project independently in a research environment o Experience in adhering to a research plan (in terms of content and time management) o Experience in problem solving during research o Ability to revise or set up follow-up research (adjusted to the results obtained) Forming an opinion o Ability to process, interpret and report results Communication o Active participation in regular discussions in the research environment o Ability to present and discuss interim and final results to and with colleagues and supervisors

Instruction language

EN

Prerequisites**Recommended literature**

Science Research Writing: A Guide for Non-Native Speakers of English by Hilary Glasman-Deal

[http://www.vsnu.nl/files/documenten/Domeinen/Onderzoek/Code_wetenschapsb_eoefening_2004_\(2012\).pdf](http://www.vsnu.nl/files/documenten/Domeinen/Onderzoek/Code_wetenschapsb_eoefening_2004_(2012).pdf) (in Dutch)

Teaching methods

PAPER(S)

PRESENTATION(S)

Assessment methods

FINAL PAPER

Key words

practical lab work, research project,

Poster Presentation

Academic year 2014-15

Date last modified

4-11-2014 1:17

Period

Period 2 Startdate: 27-Oct-14 Enddate: 19-Jun-15

Code

BMS2102

ECTS credits

0.0

Organisational unit

Fac. Health, Medicine and Life Sciences

Coordinator

R.C.J. Langen

Description

Present your research from the senior practical training for fellow students at a conference on a poster. Best abstracten will be selected for oral presentations. Posters and orale will be scored and are part of the SPT mark.

Goals

making a poster, presenting your results, scientific discussion

Instruction language

EN

Prerequisites

Recommended literature

Teaching methods

PAPER(S)

PRESENTATION(S)

Assessment methods

ASSIGNMENT

ATTENDANCE

PARTICIPATION

PRESENTATION

Key words

poster, oral, discussion,

Senior Practical Training - Internship

Academic year 2014-15

Date last modified

30-9-2014 1:32

Period

Period 2 Startdate: 27-Oct-14 Enddate: 19-Jun-15

Code

BMS2202

ECTS credits

0.0

Organisational unit

Fac. Health, Medicine and Life Sciences

Coordinator

R.C.J. Langen

Description

A 30 week practical training period in a lab setting.

Goals

performing experiments, participating in a research group

Instruction language

EN

Prerequisites

Recommended literature

[http://www.vsnu.nl/files/documenten/Domeinen/Onderzoek/Code_wetenschapsb_eoefening_2004_\(2012\).pdf](http://www.vsnu.nl/files/documenten/Domeinen/Onderzoek/Code_wetenschapsb_eoefening_2004_(2012).pdf) (in Dutch)

Teaching methods

RESEARCH

SKILLS

TRAINING(S)

WORKING VISIT(S)

Assessment methods

FINAL PAPER

ATTENDANCE

PARTICIPATION
PRESENTATION

Key words

practical work full participation in research,