

MSc Infection & Immunity

Appendix 1

Detailed description of the different elements of the curriculum

Def vs NVAO 180908

SUMMER COURSE 1

Summer Course 1: FUNDAMENTALS			ECTS = 6
Week 1	AM	Basic Lab Skills – Immunology	
	PM	Fundamental Immunology	
Week 2	AM	Basic Lab Skills – Microbiology/Virology	
	PM	Fundamental Microbiology/Virology	
Week 3	AM	Advanced Immunology	
	PM	Advanced Microbiology/Virology	
Week 4	AM	Self study	Exam
	PM	Preparation for exam Overview of available research themes	

Course title	Summer Course 1: Fundamentals
Summer Course 1 coordinators	Jon Laman & Jan Nouwen
Summary	<p>This first course provides an integrated training in lab skills and in the theory of microbiology/virology and immunology. In the first two weeks, practical labs skills will be taught in the morning and fundamental immunology and microbiology/virology in the afternoon. This ensures maximal integration and cross-interaction of theory and practice. Lab skills include a selection of essential microbiological and immunological techniques on the cellular, protein and DNA/RNA levels, as well as basic lab techniques for those students with limited prior experience. The third and last week will subsequently deal in depth with advanced immunology and microbiology/virology. The course is concluded by a written exam that evaluates both the practical and theoretical training. The overall goal of the course is to provide the student with state of the art essential knowledge and skills in these disciplines, required for the subsequent parts of the program.</p> <p>In the last week of this first Summer Course, the participating research groups will present an overview of the available research themes for the students to choose from for their Master of Science research project.</p>

Course	Basic Lab Skills – Immunology
Coordinators	Jon Laman, Ton Langerak & Wim Dik
Content	This course provides a practical labs skills training in immunology. Lab skills include a selection of essential immunological techniques on the cellular, protein and DNA/RNA levels, as well as basic lab techniques for those students with limited prior experience.
Objectives	The goal of the course is to provide the student with state of the art essential immunological practical lab skills, required for the subsequent parts of the program. Specifically, the student needs to acquire sufficient skills and knowledge on the techniques mentioned below as keywords.
Keywords	Auto-antibodies Serology, PCR, Flow cytometry, ELISA, immunoblotting, Cytokines, Elispot, Immunohistochemistry, mRNA analyses, expression systems, SiRNA, Biomarker research, Proteomics, Mass Spectrometry, DNA-micro arrays, Fluorescence Resonance Energy Transfer (FRET) Fluorescence Recovery After Photobleaching (FRAP), Mass Spectrometry
Teaching formats	Lectures, practicals
Lectures by	Paul van Daele Jan van Laar Joop van de Merwe Ton Langerak Vincent van der Velden Mirjam van der Burg Frank Staal Wim Dik Liesbeth Bakker-Jongenes Pieter Leenen Marjan Versnel
Test format	Written exam

Course	Fundamental Immunology
Coordinators	Jon Laman, Ton Langerak & Frank Staal
Content	Together with the Basic Lab Skills Immunology course, this course provides an integrated training in the fundamental theory of immunology, required as a basis for the subsequent parts of the program. Practical labs skills will be taught in the morning and fundamental immunology in the afternoon. This ensures maximal integration and cross-interaction of theory and practice.
Objectives	The goal of the course is to provide the student with fundamental immunological theory, required for the subsequent parts of the program. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Early hematopoiesis, biology of hematopoietic stem cells, T and B cell development, development and differentiation of myeloid cells (dendritic cells, macrophages, granulocytes), antigen presenting cells, expression patterns and functionality Cytokine networks, signal transduction Thymus, spleen, lymph nodes Inflammation and cancer
Teaching formats	Lectures, practicals
Lectures by	Rudi Hendriks Paul van Daele Jan van Laar Joop van de Merwe Ton Langerak Vincent van der Velden Mirjam van der Burg Frank Staal Wim Dik Liesbeth Bakker-Jongenes Pieter Leenen Marjan Versnel Nico Hartwig Tom Cupedo
Test format	Written exam

Course	Basic Lab Skills – Microbiology/Virology
Coordinators	Alex van Belkum & Guus Rimmelzwaan
Content	This course provides a practical labs skills training in microbiology/virology. Lab skills include a selection of essential microbiological techniques from basic (cell) culture and staining techniques to the various serological and molecular techniques available, as well as basic lab techniques for those students with limited prior experience.
Objectives	The goal of the course is to provide the student with state of the art essential microbiological practical lab skills, required for the subsequent parts of the program. Specifically, the student needs to acquire sufficient skills and knowledge on the techniques mentioned below as keywords.
Keywords	Cell and Microbiological culture, staining techniques, serology, PCR, PFGE, MLST, AFLP, real-time PCR, (Quantitative)-PCR, Sequencing Flow cytometry, ELISA, immunoblotting, Cytokines, Elispot, immunohistochemistry, mRNA analyses, expression systems, SiRNA, Biomarker research, Proteomics, Mass Spectrometry, DNA-micro arrays, Fluorescence Resonance Energy Transfer (FRET), Fluorescence Recovery After Photobleaching (FRAP), Mass Spectrometry
Teaching formats	Lectures, practicals
Lectures by	Irma Bakker Alex van Belkum Hubert Endtz Wil Goessens Juliette Severin Norbert Vaessen Alieke Vonk Margreet Vos Mireille van Westreenen Thijs Beersma Annemiek Baltissen - van der Eijk Charles Boucher Gerard van Doornum Martin Schutten
Test format	Written exam

Course	Fundamental Microbiology/Virology
Coordinators	Wil Goessens & Ron Fouchier
Content	Together with the Basic Lab Skills Microbiology/Virology course, this course provides an integrated training in the fundamental theory of microbiology, required as a basis for the subsequent parts of the program. Practical labs skills will be taught in the morning and fundamental microbiology in the afternoon. This ensures maximal integration and cross-interaction of theory and practice.
Objectives	The goal of the course is to provide the student with fundamental microbiological theory, required for the subsequent parts of the program. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Clinical, epidemiology, pathogenesis, pathology, evolution, ecology, diagnosis, treatment, prevention, vaccines, innate immunity, adaptive immunity, emerging infections
Teaching formats	Lectures, practicals
Lectures by	Irma Bakker Alex van Belkum Hubert Endtz Wil Goessens Juliette Severin Norbert Vaessen Alieke Vonk Margreet Vos Mireille van Westreenen Thijs Beersma Rik De Swart Gerard van Doornum Rob Gruters Bart Haagmans Marion Koopmans Thijs Kuiken Byron Martina Ab Osterhaus Guus Rimmelzwaan Georges. Verjans Annemiek Baltissen -van der Eijk Nico Hartwig Kees Vink
Test format	Written exam

Course	Advanced Immunology
Coordinators	Rudi Hendriks & Frank Staal
Content	This course in the third and last week of the first Summer Course will deal in depth with advanced immunology. From the knowledge gained in the first two weeks, the students will be confronted with complex systems and diseases in immunology to be able leap to the next level, necessary for their subsequent training and choice of research project.
Objectives	The goal of the course is to provide the student with advanced immunological theory, required for the subsequent parts of the program. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	V(D)J recombination, somatic hypermutation, class switch recombination, primary immunodeficiencies, immunophenotypic and molecular diagnostics of antibody deficiencies and SCID
Teaching formats	Lectures, practicals
Lectures by	Paul van Daele Jan van Laar Joop van de Merwe Ton Langerak Vincent van der Velden Mirjam van der Burg Frank Staal Floor Weerkamp Wim Dik Liesbeth Bakker-Jongenes Pieter Leenen Marjan Versnel Tom Cupedo
Test format	Written exam

Course	Advanced Microbiology/Virology
Coordinators	Wil Goessens & Ron Fouchier
Content	This course in the third and last week of the first Summer Course will deal in depth with advanced microbiology. From the knowledge gained in the first two weeks, the students will be confronted with complex systems and diseases in microbiology to be able leap to the next level, necessary for their subsequent training and choice of research project.
Objectives	The goal of the course is to provide the student with advanced microbiological theory, required for the subsequent parts of the program. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Clinical, epidemiology, pathogenesis, pathology, (viral) carcinogenesis, evolution, ecology, diagnosis, treatment, prevention, vaccines, innate immunity, adaptive immunity, emerging infections
Teaching formats	Lectures, practicals
Lectures by	Irma Bakker Alex van Belkum Hubert Endtz Wil Goessens Juliette Severin Norbert Vaessen Alieke Vonk Margreet Vos Mireille van Westreenen Thijs Beersma Rik De Swart Gerard van Doornum Rob Gruters Bart Haagmans Marion Koopmans Thijs Kuiken Byron Martina Ab Osterhaus Guus Rimmelzwaan Georges. Verjans Annemiek Baltissen -van der Eijk Nico Hartwig Kees Vink
Test format	Written exam

WINTER COURSE 1

Winter Course 1: ORGAN-SPECIFIC			ECTS = 6
Week 1	AM	Basic Organ-specific Immunology (Skin, Mucosa, CNS/Nerves, Gut, Liver, Bone/Joint)	
	PM	Host-Microbe Interplay	
Week 2	AM	Advanced Organ-specific Immunology (Skin, Mucosa, CNS/Nerves, Gut, Liver, Bone/Joint)	
	PM	Emerging Infectious Diseases	
Week 3	AM	Transplant Immunology Lymphoid Malignancies	
	PM	Clinical Pharmacology I	
Week 4	AM	Self study	Exam
	PM	Preparation for exam Assessment of the research protocol	

Course title	Winter Course 1: Organ specific
Winter Course 1 coordinators	Rogier Hintzen & Teun van Gelder
Summary Winter Course 1	<p>In this winter course the anatomy and function of the immune system within different organ systems will be discussed (gut, liver, nervous system, skin, joints). There will be a description of the physiologic homeostasis maintained by the innate and adaptive immune system, and of the interplay between the host and micro-organisms at the level of different mucosal surfaces. Within this context it will be discussed how external influences can trigger immune response in susceptible hosts, that may become manifest as clinical syndromes or well described pathophysiologic entities. The last week will focus on the host response to allogeneic organ transplantation and mechanisms of action of the currently available immunosuppressive drugs, as well as on the intricate interrelating immunologic, hematologic and microbiologic aspects of lymphoid malignancies. Areas of unresolved clinical problems will be identified and potential ways to study these problems will be explored.</p> <p>In the third week, the will be assessed by members of the various research groups as well as invited national and international experts on the basis of the presentation and the quality of their research proposal</p>

Course	Basic Organ-specific Immunology
Coordinators	Rogier Hintzen & Rudi Hendriks
Content	In this course the anatomy and function of the immune system within different organ systems will be discussed (gut, liver, nervous system, skin, joints). There will be a description of the physiologic homeostasis maintained by the innate and adaptive immune system. Within this context it will be discussed how external influences can trigger immune responses, that may become manifest as clinical syndromes or well described pathophysiologic entities. Areas of unresolved clinical problems will be identified and potential ways to study these problems will be explored.
Objectives	The goal of the course is to provide the student with fundamental knowledge on the theory of local or organ-specific immunology and immunological systems. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Immune Cells of the CNS Immuno privilege Communication Multiple sclerose Immuno-Endocrinology Functional anatomy of nervous immune system Cellular interaction in the joint during infection/inflammation/arthritis The skin immune system, innate and adaptive immunity Communication between innate and adaptive skin immunity Innate and adaptive immune system of the gut Anatomy of the gut immune system Function of specific gut immune cells Anatomy of the hepatic immune system
Teaching format	Lectures
Lectures by	Janneke Samsom Edward Nieuwenhuis Errol Prens Bart Lambrecht Bart Jacobs Rogier Hintzen Jaap Kwekkeboom Jon Laman Rudi Hendriks Errol Prens Dik Kok Erik Lubberts
Test format	Written exam

Course	Host-Microbe Interplay
Coordinators	Alex van Belkum & Hubert Endtz
Content	In this course the physiologic homeostasis maintained by the innate and adaptive immune system, and of the interplay between the host and microorganisms will be discussed. Within this context it will be discussed how external influences can trigger immune response in susceptible hosts that may become manifest as clinical syndromes or well described pathophysiologic entities. Areas of unresolved clinical problems will be identified and potential ways to study these problems will be explored.
Objectives	The goal of the course is to provide the student with fundamental knowledge on the theory of host-microbe interplay in microbiology and infectious diseases. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Molecular mimicry Guillain Barré syndrome and Campylobacter jejuni Infections Moraxella catarrhalis Madurella, mycetomatis Staphylococcus aureus pathogenesis The role of immune modulatory factors and bacteriophages
Teaching format	Lectures
Lectures by	Alex van Belkum Hubert Endtz Wendy vd Sande John Hays Bart Jacobs Willem van Leeuwen Willem van Wamel Jan Nouwen Kees Vink Peggy Godschalk Damian Melles Ron Fouchier Thijs Kuiken
Test format	Written exam

Course	Advanced Organ-specific Immunology
Coordinators	Jaap Kwekkeboom & Janneke Samsom
Content	This course is a sequel to the Basic Organ-specific Immunology course in week 1, and will take students knowledge on the anatomy and function of the immune system within different organ systems, the innate and adaptive immune system, and of the interplay between the host and microorganisms at the level of different mucosal surfaces to an advanced level. Within this context it will be discussed how external influences can trigger immune response in susceptible hosts, that may become manifest as complex clinical syndromes or complex pathophysiologic entities.
Objectives	The goal of the course is to provide the student with advanced knowledge on the theory of organ-specific immunology and immunological systems. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	<p>Monocytes, macrophages and dendritic cells: analysis of expression patterns and functionality</p> <p>Basic aspects of Ig/TCR gene rearrangement / V(D)J recombination processes and repertoire formation</p> <p>Cytokine network</p> <p>T cells: Th1/Th2 en Th17 vs Treg; interaction between innate and adaptive immunity during different stages of arthritis; experimenta arthritis models</p> <p>Skin immunity</p> <p>Skin autoimmunity (vitiligo, bullous disorders, lupus erythematosus)</p> <p>Allergy (atopic dermatitis, contact dermatitis), chronic skin inflammation (psoriasis)</p> <p>Function of specific gut immune cells (peyers patches/paneth cells)</p> <p>Innate mucosal immune responses at the mucosal interface</p> <p>Immunity to pathogens versus tolerance to commensals</p> <p>“Non-Classical” Antigen presentation</p> <p>Function of specific hepatic immune cells (Kupffer cells, sinuoidal endothelial cells, dendritic cells, NK-cells (=pit-cells), NKT-cells, cytotoxic- and helper T-cells) in immunity to pathogens versus tolerance against gut-derived components from commensals</p> <p>Immune privilege: blood nerve/brain barriers and local defense mechanisms</p> <p>Specific pathways of nerve and brain destruction by infections by autoimmune responses</p>
Teaching format	Lectures
Lectures by	<p>Janneke Samsom</p> <p>Edward Nieuwenhuis</p> <p>Errol Prens</p> <p>Bing Thio</p> <p>Bart Lambrecht</p> <p>Bart Jacobs</p> <p>Rogier Hintzen</p> <p>Jaap Kwekkeboom</p> <p>Andrea Woltman</p> <p>André Boonstra</p> <p>Jon Laman</p> <p>Errol Prens</p>

	Dik Kok Erik Lubberts Roy Gerth van Wijk Hans de Groot
Test format	Written exam

Course	Emerging Infectious Diseases
Coordinators	Ron Fouchier & Marion Koopmans
Content	This course will deal with the ever-increasing burden of emerging and re-emerging infectious diseases nationally, internationally and globally. Infectious disease epidemiology, outbreaks and outbreak management, control measures, animal reservoirs etc. will be discussed.
Objectives	The goal of the course is to provide the student with essential knowledge on (re) emerging infections, outbreaks and tools for disease control and outbreak management. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Respiratory infections, enteric infections, neurological disease, tropical diseases, arbo-infections, influenza, viruses, bacteria, parasites, prions, vaccines, treatment, epidemiology, ecology,
Teaching format	Lectures
Lectures by	Thijs Kuiken Ab Osterhaus Byron Martina Bart Haagmans Henri Verbrugh Alex van Belkum Peter Hermans Dik Habbema Sake de Vlas
Test format	Written exam

Course	Transplant Immunology
Coordinators	Carla Baan & Teun van Gelder
Content	This course will focus on the host response to allogeneic organ transplantation and mechanisms of action of the currently available immunosuppressive drugs, as well as on the intricate interrelating immunologic, hematologic and microbiologic aspects. Areas of unresolved clinical problems will be identified and potential ways to study these problems will be explored.
Objectives	The goal of the course is to provide the student with advanced knowledge on transplant immunology and complications of transplantation. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Allorecognition, Tissue damage and disease Transplantation, Immunosuppressive drugs, Immune defence Hyperacute, acute and chronic rejection: mechanisms, immune processes, prevention and treatment, immunosuppression, immunosuppressive drugs Posttransplantation lymphoproliferative disorders, EBV
Teaching format	Lectures
Lectures by	Carla Baan Willem Weimar Teun van Gelder Herald Metselaar Peter van Hal Aggie Balk Jaap Kwekkeboom Luc van der Laan
Test format	Written exam

Course	Lymphoid Malignancies
Coordinators	Jacques van Dongen & Jan Cornelissen
Content	The course will focus on the intricate interrelating immunologic, hematologic and microbiologic aspects of lymphoid malignancies. Areas of unresolved clinical problems will be identified and potential ways to study these problems will be explored.
Objectives	The goal of the course is to provide the student with advanced knowledge on pathogenesis, classification, diagnosis and treatment of lymphoid malignancies. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Theoretic background on molecular diagnostics in lymphoid malignancies Molecular diagnostics of lymphoid malignancies in daily practice Role of antigenic stimulation in lymphoid malignancies Inflammation and cancer EBV
Teaching format	Lectures
Lectures by	Jacques van Dongen Frank Staal Rudi Hendriks Ton Langerak Vincent van der Velden Jan Cornelissen Tom Cupedo
Test format	Written exam

Course	Clinical Pharmacology I
Coordinators	Teun van Gelder & Ron Mathot
Content	The course discusses fundamental aspects of clinical pharmacology, definitions, pharmacodynamics and –kinetics, with a focus on immunosuppressive drugs. Areas of unresolved clinical problems will be identified and potential ways to study these problems will be explored.
Objectives	The goal of the course is to provide the student with fundamental knowledge on clinical pharmacology, required for the subsequent parts of the program. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Definitions and terminology in clinical pharmacology Pharmacodynamics and – kinetics in clinical practice Mechanisms of action of antimicrobial and immunosuppressive drugs Pharmacodynamics of antimicrobial and immunosuppressive drugs Pharmacokinetics of antimicrobial and immunosuppressive drugs Pharmacogenetics of antimicrobial and immunosuppressive drugs
Teaching format	Lectures
Lectures by	Teun van Gelder Ron Mathot Irma Bakker Wil Goessens Johan Mouton
Test format	Written exam

SUMMER COURSE 2

Summer Course 2: TECHNOLOGY & METHODOLOGY			ECTS = 6
Week 1	AM	Molecular Microbiology & Epidemiology	
	PM	Modelling Infectious Diseases	
Week 2	AM	Role of genetic variation in host and microbe	
	PM	Immuno-Endocrinology	
Week 3	AM	Animal Models	
	PM	Microbiological- & Biosafety, incl. Medical law and ethics	
Week 4	AM	Self study	Exam
	PM	Preparation for exam	

Course title	Summer Course 2: Technology and Methodology
Summer Course 2 coordinators	Ron Fouchier & Jan Nouwen
Summary	This second summer course focuses on advanced research technology and methodology, with obvious emphasis on pathogens, genetics, immunity and autoimmune disease. The first week deals with molecular microbiology/virology and epidemiology, as well as with modelling of infectious diseases. The second week provides a basic course on SNPs in infectious and complex diseases. In addition, immuno-endocrinology will be taught. Week 3 is concerned with animal models for infection and immunity, including genetic engineering approaches for both the rodent host and the pathogen. Finally, microbiological safety and general biosafety aspects will be taught with respect to pathogens and genetically modified organisms (GMO).

Course	Molecular Microbiology & Epidemiology
Coordinators	Willem van Leeuwen & Martin Schutten
Content	This second summer course focuses on advanced research technology and methodology, with obvious emphasis on pathogens, genetics, immunity and autoimmune disease. The first week deals with molecular microbiology/virology and epidemiology, as well as with modelling of infectious diseases.
Objectives	The goal of the course is to provide the student with essential knowledge on molecular microbiological techniques and tools and on how to use these in infectious diseases epidemiology and infectious diseases outbreak management. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Transmission Molecular Epidemiology Search and Destroy Nosocomial infections Outbreaks Prevention Molecular Diagnostics Application of molecular-based techniques in virology diagnostics Genome comparison Microbial Typing
Teaching format	Lectures
Lectures by	Alex van Belkum Hubert Endtz Willem van Leeuwen Jan Nouwen Kees Vink Margreet Vos Ron Fouchier Guus Rimmelzwaan Charles Boucher Martin Schutten
Test format	Written exam

Course	Modelling Infectious Diseases
Coordinators	Ron Fouchier & Derek Smith
Content	This second summer course focuses on advanced research technology and methodology, with obvious emphasis on pathogens, genetics, immunity and autoimmune disease. This specific course deals with modelling of infectious diseases using the knowledge, tools and techniques taught in the Molecular Microbiology & Epidemiology and Emerging Infectious Diseases courses.
Objectives	The goal of the course is to provide the student with advanced methodological and statistical theory to be applied in practicals and subsequent parts of the program. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	SIR models, phylogeny & phylodynamics, epidemiology, transmission models, datamining, computational biology
Teaching format	Lectures, practicals
Lectures by	Derek Smith Colin Russell Thijs Kuiken Guus Rimmelzwaan Ab Osterhaus Sake de Vlas Dik Habbema Helene Voeten
Test format	Written exam

Course	Role of genetic variation in host and microbe
Coordinators	André Uitterlinden & Alex van Belkum
Content	This course focuses on host, pathogens, host-pathogen interaction and genetics. It provides a basic course on genetic epidemiology and the use of genotyping techniques (including SNPs) in host and pathogen in infectious and complex diseases.
Objectives	The goal of the course is to provide the student with fundamental knowledge on genotyping, genetics, genetic epidemiology in host and pathogens. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Genetics of complex disease SNP's Genetic epidemiology Linkage analysis by genome searches Genome Wide Association (GWA) Hap Map Haplotypes DNA management and liquid handling Genetic risk factors Prediction models Study design Data analysis
Teaching format	Lectures
Lectures by	André Uitterlinden Alex van Belkum Thijs Kuiken Cornelia van Duijn Jan Nouwen Peter Hermans
Test format	Written exam

Course	Immuno-Endocrinology
Coordinators	Hemmo Drexhage & Leo Hofland
Content	This is a comprehensive, interactive course dealing with the field of clinical and experimental endocrinology and immuno-endocrinology, focussing on pathophysiology, autoimmune diseases and pediatric aspects.
Objectives	The goal of the course is to provide the student with fundamental knowledge on (the pathophysiology of) immune-endocrinology. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Pituitary function & growth Neuropeptides Hormones, receptors Thymic epithelial cells, thymocytes Adrenal gland & gonads Glucocorticoid resistance Dendritic cells & endocrine autoimmunity Thyroid hormones and affective disorders Thyroid Gland & Bone IGF-1 Fibroblasts and Graves' disease Endocrinopathy
Teaching format	Lectures
Lectures by	Hemmo Drexhage Leo Hofland Frank de Jong Sten Drop Rudi Hendriks Joop (J.A.M.J.L.) Janssen Jan Willem Koper Aart Jan van der Lely
Test format	Written exam

Course	Animal Models
Coordinators	Irma Bakker & Thijs Kuiken
Content	This course is concerned with animal models for infection and immunity, including use and usefulness, regulations, alternatives, examples, but also genetic engineering approaches for both the rodent host and the pathogen.
Objectives	The goal of the course is to provide the student with fundamental knowledge of animal models in studying infectious and immune diseases. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Comparative pathology Genetically modified laboratory animals SARS Influenza Experimental infection; natural infection Pre-clinical trials Vaccine development; drug development Disease pathogenesis Medical law Ethics Accredited Medical Review Ethics Committees (aMREC)
Teaching format	Lectures
Lectures by	Irma Bakker Wil Goessens Jurriaan de Steenwinkel Thijs Kuiken Ron Fouchier Martin Schutten
Test format	Written exam

Course	Microbiological- & Biosafety
Coordinators	Irma Bakker & Thijs Kuiken
Content	Week 3 is concerned with animal models for infection and immunity, including genetic engineering approaches for both the rodent host and the pathogen. Finally, microbiological safety and general biosafety aspects will be taught with respect to pathogens and genetically modified organisms (GMO).
Objectives	The goal of the course is to provide the student with basic knowledge on biosafety concerning clinical and laboratory studies of infectious and immune diseases. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Biological safety cabinets Respiratory protection device Pathogen classification Disinfection procedures
Teaching format	Lectures
Lectures by	Irma Bakker Wil Goessens Jurriaan de Steenwinkel Thijs Kuiken Ron Fouchier Martin Schutten
Test format	Written exam

WINTER COURSE 2

Winter Course 2: DISEASE SPECIFIC			ECTS = 6
Week 1	AM	Infections & Auto-immune Diseases	
	PM	Chronic Intestinal and Liver Inflammatory Diseases	
Week 2	AM	Neuro-immunological Diseases	
	PM	Infections & Immunodeficiencies	
Week 3	AM	Vaccines	
	PM	Clinical Pharmacology II	
Week 4	AM	Self study	Exam
	PM	Preparation for exam	

Course title	Wintercourse 2: Disease-specific immunity
Winter Course 2 coordinators	Jaap Kwekkeboom & Janneke Samsom
Summary	<p>A variety of diseases are due to dysregulation of the immune system. On the one hand, overactivation of the immune system results in auto-immune diseases, and on the other hand immunodeficiencies result in increased susceptibility to infections. Auto-immune diseases can occur either organ-specific or systemically, and are often elicited or aggravated by infections. In addition, unbalanced immune responses to micro-organisms result in immunopathological damage of vital tissues, which may be prevented by appropriate vaccination strategies. Recent insights in immune dysregulation are being applied to develop new treatment modalities.</p> <p>Fundamental and clinical aspects of dysregulation of the immune system in gut, liver and nervous system will be discussed as examples of local overactivation of the immune system. In addition, the role of infections in the elicitation and aggravation of autoimmune diseases will be highlighted. Development of research protocols to test clinical effectivity of new immunomodulatory drugs and vaccines will be discussed.</p>

Course	Infections & Auto-immune Diseases
Coordinators	Hemmo Drexhage, Rogier Hintzen & Herbert Hooijkaas
Content	A variety of diseases are due to dysregulation of the immune system. On the one hand, overactivation of the immune system results in auto-immune diseases, and on the other hand immunodeficiencies result in increased susceptibility to infections. Auto-immune diseases can occur either organ-specific or systemically, and are often elicited or aggravated by infections. In addition, unbalanced immune responses to micro-organisms result in immunopathological damage of vital tissues, which may be prevented by appropriate vaccination strategies. Recent insights in immune dysregulation are being applied to develop new treatment modalities and the role of infections in the elicitation and aggravation of autoimmune diseases will be highlighted.
Objectives	The goal of the course is to provide the student with fundamental knowledge of autoimmune diseases and the role of infections. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	The role of infections in the elicitation/aggravation of autoimmune diseases Campylobacter and GBS Enteroviruses and childhood diabetes Gastric autoimmunity and H. pylori infection LCMV mouse models of autoimmune diabetes Kilham virus and the autoimmune diabetes of the BB-DR rat HIV infection and depression Viruses, schizophrenia and bipolar disorder Infection and atherosclerosis Immunosuppressive drugs Immunomodulatory antibodies CNS demyelination
Teaching format	Lectures
Lectures by	Bart Jacobs Herbert Hooijkaas Rogier Hintzen Hubert Endtz Tom Cupedo Hemmo Drexhage Herold Metselaar Ernst Kuipers Nico Hartwig
Test format	Written exam

Course	Chronic Intestinal and Liver Inflammatory Diseases
Coordinators	Jaap Kwekkeboom & Janneke Samsom
Content	Autoimmune diseases can occur either organ-specific or systemically, and are often elicited or aggravated by infections. In addition, unbalanced immune responses to microorganisms result in immunopathological damage of vital tissues, including carcinogenesis. Fundamental and clinical aspects of dysregulation of the immune system in gut, liver and nervous system will be discussed as examples of local overactivation of the immune system.
Objectives	The goal of the course is to provide the student with fundamental knowledge of chronic intestinal and liver inflammatory diseases. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Inflammatory Bowel Diseases, Crohn's disease, Ulcerative Colitis, Celiac Disease. Fundamental and clinical aspects of chronic intestinal inflammatory disease Helicobacter pylori, gastric carcinoma Fundamental and clinical aspects of chronic inflammatory liver diseases HBV, HCV, chronic hepatitis, hepatocellular carcinoma Auto-immune hepatitis Immuno modulation in inflammatory liver diseases and liver transplantation Histopathology of inflammatory liver diseases and liver transplantation Immune responses in liver diseases and liver transplantation: from clinic to lab Effector and regulatory T-cells in viral hepatitis and liver transplant tolerance Dendritic cells and NK-cells in viral hepatitis and liver transplant rejection Tertiary lymphoid structures in auto-immune diseases Recurrence of viral hepatitis after liver transplantation
Teaching format	Lectures
Lectures by	Jaap Kwekkeboom Janneke Samsom Edward Nieuwenhuis Luc van der Laan Andrea Woltman André Boonstra Herold Metselaar Harry Janssen Rob de Knecht Janneke van der Woude Ernst Kuipers Pieter Zondervan
Test format	Written exam

Course	Neuro-immunological Diseases
Coordinators	Rogier Hintzen & Jon Laman
Content	<p>Overactivation of the immune system results in auto-immune diseases, and on the other hand immunodeficiencies result in increased susceptibility to infections. Auto-immune diseases can occur either organ-specific or systemically, and are often elicited or aggravated by infections. In addition, unbalanced immune responses to micro-organisms result in immunopathological damage of vital tissues. Recent insights in immune dysregulation are being applied to develop new treatment modalities.</p> <p>Fundamental and clinical aspects of dysregulation of the immune system in brain and nerves will be discussed and the role of infections in the elicitation and aggravation of autoimmune diseases highlighted.</p>
Objectives	<p>The goal of the course is to provide the student with fundamental knowledge of neuro-immunological diseases.</p> <p>Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.</p>
Keywords	<p>Neuro-immunopathology & Infection Neuro-immunological diseases Immune mediated polyneuropathies Central nervous system inflammation Demyelination in the CNS Inflammation and neurodegeneration Paraneoplastic syndromes Paraneoplastic antibodies – diagnostic criteria Role of the tumor in initiation of immune response Cellular and humoral effector mechanism</p>
Teaching format	Lectures
Lectures by	<p>Rogier Hintzen Jon Laman Bart Jacobs Pieter van Doorn</p>
Test format	Written exam

Course	Infections & Immunodeficiencies
Coordinators	Luc Gelinck & Martin van Hagen
Content	A variety of diseases are due to dysregulation of the immune system. On the one hand, overactivation of the immune system results in auto-immune diseases, and on the other hand immunodeficiencies result in increased susceptibility to infections. This course will discuss etiology, pathophysiology, clinical presentation and possibilities for treatment of primary and secondary immunodeficiencies and their related consequent infections.
Objectives	The goal of the course is to provide the student with fundamental knowledge of immunodeficiencies and the consequent infections related to these. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	SCID XLA CVID HIV-AIDS Opportunistic infections CNS infections
Teaching format	Lectures
Lectures by	Luc Gelinck Martin van Hagen Rogier Hintzen Paul van Daele Nico Hartwig Jaques van Dongen Mirjam van der Burg Menno van Zelm
Test format	Written exam

Course	Vaccines
Coordinators	Rob Gruters & Guus Rimmelzwaan
Content	Vaccination remains one of the most efficient means to prevent and eliminate infectious diseases. This course will discuss available vaccines, vaccination programs, vaccine types and vaccine development.
Objectives	The goal of the course is to provide the student with fundamental knowledge on vaccines and vaccine development. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Avian influenza, H5N1 Emerging infectious diseases Animal models Adjuvants SARS Cytotoxic T cells HIV
Teaching format	Lectures
Lectures by	Rob Gruters Guus Rimmelzwaan Ab Osterhaus Nico Hartwig Peter Hermans Luc Gelinck Charles Boucher Hans Rümke
Test format	Written exam

Course	Clinical Pharmacology II
Coordinators	Teun van Gelder & Ron Mathot
Content	As a sequel to the Clinical Pharmacology I course of the first Winter Course, this course discusses advanced aspects of clinical pharmacology. Recent insights in immune dysregulation are being applied to develop new treatment modalities. Development of research protocols to test clinical effectivity of new immunomodulatory drugs will be discussed.
Objectives	The goal of the course is to provide the student with advanced knowledge on clinical pharmacology. Specifically, the student needs to acquire sufficient knowledge on the items mentioned below as keywords.
Keywords	Pharmacologic intervention: immunosuppressive drugs Measurement of clinical outcome Surrogate markers Theranostics: monitoring effects of intervention
Teaching format	Lectures
Lectures by	Teun van Gelder Ron Mathot Johan Mouton David Burger
Test format	Written exam

STUDY DESIGN (CC01)			ECTS = 4
Week 1	AM	Study Design - lectures	
	PM	Study Design - excercises	
Week 2	AM	Study Design – lectures	
	PM	Study Design - excercises	
Week 3	AM	Self study	Exam
	PM	Preparation for exam	

Course	Study Design (CC01)
Coordinators	Jacqueline Witteman
Content	<p>In this course, the principles and practice of follow-up and case-control studies will be taught. The theory underlying the different design options will be discussed in depth. The course focuses on the classical approach but also addresses modern concepts. The practice of conducting follow-up and case-control studies with emphasis on issues of validity will be discussed. Lectures will be complemented by exercises using current examples of epidemiological studies.</p> <p>Participants will be asked to work out a study design and prepare a formal presentation.</p>
Objectives	<p>Understanding of main concepts of design of follow-up and case-control studies.</p> <p>Ability to design a follow-up or case-control study given a research question.</p> <p>Ability to discuss research papers with respect to aspects of validity.</p>
Teaching format	Lectures and exercises
Test format	Written exam

CLASSICAL METHODS FOR DATA ANALYSIS (CC02)			ECTS = 6
Week 1	AM	Classical Methods for Data Analysis - lectures	Exam
	PM	Classical Methods for Data Analysis - excercises	
Week 2	AM	Classical Methods for Data Analysis - lectures	
	PM	Classical Methods for Data Analysis - excercises	
Week 3	AM	Classical Methods for Data Analysis - lectures	
	PM	Classical Methods for Data Analysis - excercises	
Week 4	AM	Self study	
	PM	Preparation for exam	

Course	Classical Methods for Data Analysis (CC02)
Coordinators	Maria de Ridder and Eric Boersma
Content	<p>During the first week, this course will emphasize the basic applications of biostatistics in the analysis of medical research data. The course comprises lectures and daily personal computer practicals in which the widely used statistical software package SPSS will be introduced. Topics are: types of data; location and variability measures; samples and populations; distributions; confidence intervals; hypothesis testing; comparing two means or proportions, interval estimates for relative risk, and risk difference and oddsratio.</p> <p>Topics covered in the second week will compare more than two groups (continuous data; categorical data) with parametric and non-parametric methods, stratified data analysis (in particular Mantel Haenszel methods), and survival analysis, relationships between two variables (correlation, simple linear regression).</p> <p>The last part of the course is devoted to an extensive discussion of the multiple linear regression model, including analysis of (co)variance. During the lectures, especially in the last week, time will be spent on exercises.</p>
Objectives	Understanding and using basic applications of biostatistics in the analysis of medical research data.
Teaching format	Lectures and exercises
Test format	Written exam

SEMINARS, JOURNAL CLUBS AND OTHER MEETINGS

Department	Gastroenterology & Hepatology	
Journal Club		
Research working discussion	Monday	10.30-11.30 (Gastroenterology)
	Friday	09.00-10.15 (Hepatology)
Seminars	Thursday	12.30-13.30
Symposia	Erasmus MC Liver Day	
Clinical meeting	Thursday	17.00-18.00

Department	Immunology	
Journal Club	Thursday	09.00-10.00
Research working discussion	Monday	09.00-10.00
Seminars	Tuesday	16.00-17.00 (every 2 nd Tuesday)
Symposia	Tuesday	13.00-17.00 (4 times a year)
Clinical meeting		

Department	Medical Microbiology & Infectious Diseases	
Journal Club	Thursday	08.30-09.30
Research working discussion	Tuesday	10.00-12.00 (Staphylococci)
	Tuesday	16.00-18.00 (plenary; once per month)
Seminars	Tuesday	18.00-20.00 (every 2 months)
Symposia	4x per year	
Clinical meeting	Monday	09.00-10.00
	Friday	09.00-10.00

Department	Virology
Journal Club	Variable
Research working discussion	Monday 12.00-13.00
Seminars	Monday 12.00-13.00
Symposia	Annual
Clinical meeting	Wednesday 12.00-13.00

Department	Pediatrics – Infectious Diseases & Immunology
Journal Club	Tuesday 8.30-9.30
Research working discussion	Tuesday 8.30-9.30
Seminars	Thursday 12.45-13.30
Symposia	
Clinical meeting	Monday 8.30-9.00

Department	Pediatrics - Gastroenterology
Journal Club	Tuesday (1 x p 2 wks) 9.00-11.00
Research working discussion	Tuesday (1 x p 2 wks) 9.00-11.00
Seminars	Incidentally
Symposia	1 x p 2 years Mucosal Immunology
Clinical meeting	Once weekly wk clinical round

Department	Internal Medicine - Transplantation Medicine
Journal Club	1 x p 2 wks Tuesday 9-10
Research working discussion	Friday 9-10 and 1 x p 2 wks Tuesday 9-10
Seminars	1 x p month Monday 17-19
Symposia	1 x p year 3 days, 1 day spring, 1 day autumn, with Dutch Transplantation Society
Clinical meeting	1 x p 2 wks Friday 13-14

Department	Hematology
Journal Club	Weekly
Research working discussion	Research round 1 x p 2 weeks Wednesday 17-19
Seminars	Erasmus Hematology lectures monthly Monday Experimental hematology in progress monthly
Symposia	Incidentally
Clinical meeting	1 x p week Tuesday 8.30-12.00

Department	Rheumatology
Journal Club	Thursday 16.30-18.00
Research working discussion	Thursday 16.30-18.00 (partly combined with Immunology)
Seminars	See Immunology
Symposia	See Immunology
Clinical meeting	partly Thursday 16.30-18.00

Department	Pulmonology
Journal Club	1 x p 2 wks Tuesday 12-13
Research working discussion	Monday 9.00-10.30
Seminars	See Immunology
Symposia	1 x p 2 years Mucosal Immunology
Clinical meeting	Tuesday 15.30-17.30

Department	Dermatology
Journal Club	See Immunology
Research working discussion	See Immunology
Seminars	See Immunology
Symposia	See Immunology, sometimes separately
Clinical meeting	1 x p 2 mnths with patient demo 18.30-21.30

Department	Neurology
Journal Club	1 x p 2 wks Thursday 15-.00-16.00
Research working discussion	
Seminars	Tuesday 13.00-14.00
Symposia	1 x p year: MS, GBS, Post Infectious Diseases etc.
Clinical meeting	Thursday 13.00-14.00

Department	Urology
Journal Club	Monday 11.45-12.30 & 1 x p 2 wks 19.00-21.00
Research working discussion	1 x p 2 wks Monday 19.00-21.00
Seminars	1 x p mnth 13.00-14.00
Symposia	
Clinical meeting	4 x p wk, 1 hour each

