

Master of Science Integrated Immunology



August, 2018

**Module Handbook for the
Master of Science Integrated Immunology**

**Department of Biology
Friedrich-Alexander-Universität Erlangen-Nürnberg**

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With reference to: vorbehaltlich der Zustimmung des Senats

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1) Structure of the Master in life sciences: Integrated Immunology

Semester	Master of Science Integrated Immunology			
1	Basic Immunology Lectures, Seminars and Tutorials 10 ECTS	Integrated Laboratory Course Basic Immunology 10 ECTS	Cell-and molecular biology Tutorials 5 ECTS	Softskills (elective) imaging, bio-informatics programming animal sciences genetic engineering summerschool total 10 ECTS
2	Translational Immunology Lectures, Seminars and Tutorials 10 ECTS	Integrated Laboratory Course Translational Immunology 10 ECTS	Clinical Immunology Tutorials, Bedside visits 5 ECTS	
3	Practical project work Laboratory rotations including international laboratories, coordination by professor 1:1 with student 15 ECTS		Theoretical project work develop a research project 1:1 with professor, presentation during research weekend 10 ECTS	Becoming a scientist winter school, international meetings, meet the professor, graduate school committee 5 ECTS
4	Master thesis incl. defense 30 ECTS			

2) Study plan for the Master in life sciences: Integrated Immunology

Code	Modul	Kurs	SWS				total ECTS	Workload-Verteilung in ECTS				Art / Umfang der Studien-/Prüfungsleistung	Faktor
			V	Ü	P	S		1. Sem.	2. Sem.	3. Sem.	4. Sem.		
II-MA-M1	Basic Immunology**	Basic Immunology	3				10	2,5				PL: Klausur 90 Minuten	1
		Tutorials to Basic Immunology		5				5					
		Seminar to Basic Immunology				3		2,5					
II-MA-M2	Integrated Laboratory Course	Integrated Laboratory Course			10		10	8				SL: Praktikumsprotokoll und mündl. Referat	0
		Tutorials to Integrated Laboratory Course		2				2					
II-MA-M3	Cell-and molecular biology	Cell-and molecular biology	3				5	2,5				PL: Klausur 45 Minuten	1
		Tutorials to Cell-and molecular biology		3				2,5					
II-MA-M4	Translational Immunology**	Translational Immunology	3				10		2,5			PL: Klausur 90 Minuten	1
		Tutorials to Translational Immunology		5					5				
		Seminar to Translational Immunology				3			2,5				
II-MA-M5	Integrated Laboratory Course	Translational Immunology			10		10		8			SL: Praktikumsprotokoll und mündl. Referat	0
		Seminar to Translational Immunology		2					2				
II-MA-M6	Clinical Immunology**	Clinical Immunology	2				5		2,5			PL: Klausur 45 Minuten	1
		Tutorials Clinical Immunology			2				2,5				

Code	Modul	Kurs	SWS				total ECTS	Workload-Verteilung in ECTS				Art / Umfang der Studien-/Prüfungsleistung	Faktor
			V	Ü	P	S		1. Sem.	2. Sem.	3. Sem.	4. Sem.		
II-MA-M7	Practical project work	Laboratory rotations including international laboratories			15		15			15		SL: Praktikumsprotokoll und mündl. Referat	0
II-MA-M8	Theoretical project work	Theoretical project work			10		10			8		PL: Schriftl, Ausarbeitung, 25 Seiten (100%) SL: Seminarvortrag	1
		Seminar to project work				2				2			
II-MA-M9	Softskills*	imaging, bioinformatics, animal sciences, genetic engineering clinical study design			2	2	10	5	5			SL: mündlich oder schriftlich*	0
II-MA-M10	Becoming a scientist	winter school**, international meetings**, meet the professor, graduate school committee					5			5		SL: mündlich oder schriftlich*	0
II-MA-M11	Master thesis	Master thesis					30				30	PL: Master thesis, 75 Seiten (100%) SL: wiss. Verteidigung	1
SWS bzw. ECTS			11	17	49	10		30	30	30	30		
Summe SWS und ECTS			97				120						

* Wählbar aus dem Bereich der Softskills der NatFak., TechFak und MedFak. Art und Umfang der Prüfung sind abhängig vom konkreten didaktischen Charakter des von der bzw. dem Studierenden gewählten Moduls und dem Modulhandbuch zu entnehmen. Als mündliche Prüfungsleistungen werden bspw. Seminarvorträge (30 min) oder als schriftliche Prüfungsleistung das Schreiben eines Essays (10 Seiten) durchgeführt.

** Module offen für Studierende aus anderen Masterstudiengängen (Integrated Life Sciences, Master Molekular- und Zellbiologie, Molecular Sciences)

3) Supervision and support for the Master Life Sciences: Integrated Immunology at the Department of Biology of the Friedrich-Alexander-Universität Erlangen-Nürnberg

→ **Studiendekan** (General enquiries concerning the studies)

Prof. Dr. Andreas Feigenspan

Department of Biology, Friedrich-Alexander-Universität Erlangen-Nürnberg
Staudtstr. 5, 91058 Erlangen, Room A1-02.326
Telefon: 09131/ 85 28065, E-Mail: bio-studiendekan@fau.de

→ **Head of the Prüfungsausschuss Master Integrated Immunology**
(Enquiries concerning examinations during the studies)

Prof. Dr. T.b.d

Department of Biology, Friedrich-Alexander-Universität Erlangen-Nürnberg

Coordination of the Master programme:

Dr. Anja Glanz (Organisation and procedures of the studies)

Department of Biology, Friedrich-Alexander-Universität Erlangen-Nürnberg
Erwin-Rommelstr. 3, 91058 Erlangen, Room 02.136/137
Tel. 09131 - 85- 28494, E-Mail: anja.glanz@fau.de

→ **Study Service Center**

Dr. Susanne Morbach

Department of Biology, Friedrich-Alexander-Universität Erlangen-Nürnberg
Staudtstraße 5, 91058 Erlangen, Room A2-02.183
Tel. 09131 – 85 22011, E-Mail susanne.morbach@fau.de

→ **Student advisory service**

Prof. Dr. Falk Nimmerjahn (Academic counseling)

Department of Biology, Friedrich-Alexander-Universität Erlangen-Nürnberg
Erwin-Rommelstr. 3, 91058 Erlangen, Room 02.136/137
Tel. 09131 - 85- 25050, E-Mail: falk.nimmerjahn@fau.de

4) Presentation of the Master in Life Sciences: Integrated Immunology

The master program Integrated Immunology is implemented by the Department of Biology, the Faculty of Medicine and the University Hospital Erlangen. It is taught in English and will provide in depth knowledge about basic, translational and clinical concepts in immunology. In addition, an advanced knowledge in molecular and cellular biology will be provided to enable a better understanding of immunological processes and their molecular and cellular basis. Through basic lectures, seminars and tutorials the students will actively participate in acquiring a detailed understanding of the complex interplay of cells in the immune system and the role of immunology in health and disease. The theoretical modules are combined with integrated laboratory courses enabling the students to plan, perform and interpret immunological experiments. Elective softskill courses in imaging, bioinformatics, and animal sciences will allow the students to deepen their knowledge according to their individual interests. Furthermore, a clinical immunology module, which includes bedside visits in different clinics of the University Hospital Erlangen will demonstrate how an impaired immune response can trigger autoimmune pathology in humans, which therapeutic options are available to treat the patients and how immunomodulatory therapies are used to treat infections and cancer. Mentoring programs will ensure the success of the learning process of individual students and allow them to constantly interact with the teaching personnel. Based on this knowledge the students will realize the need for future research in immunology and will start to develop research strategies which can address these open questions in the modules practical and theoretical project work. To expose the students to the global character of immunological research, the module practical project work will include a three month stay in a laboratory abroad, which will help the students to start building a network and foster social skills. Through the participation in a winter school in immunology, international conferences, and meetings with professors and scientists working in companies, the students will learn to identify future career options and how to use their network to find a position of interest. In the 6 month master thesis the students will demonstrate that the theoretical and practical knowledge they have acquired allows them to address an immunological question independently with state of the art immunological methods.

1	Module name	II-MA-M1: Basic Immunology	Total number of ECTS credits
2	Courses/lectures	WS – Lecture: Basic Immunology (3 SWS) WS – Tutorial: Tutorials to Basic Immunology (5 SWS) WS – Seminar: Basic Immunology (3 SWS)	10 ECTS
3	Lecturers	Prof. Dr. L. Nitschke, Prof. Dr.,T. Winkler, Prof. Dr. D. Vöhringer, Prof. Dr. D. Dudziak and others	

4	Module coordinator	Prof. Dr. L. Nitschke, Prof. Dr. T. Winkler
5	Contents	<p>Lecture:</p> <ul style="list-style-type: none"> - Basic concepts in immunology - Innate immunity - Antigen recognition in lymphocytes - The development of lymphocytes - The humoral immune response - Cellular immune responses <p>Tutorials:</p> <p>In small groups (e.g. 5 students) the students will solve problems in basic immunology by problem-based learning</p> <p>Seminars:</p> <p>The students will present topics of basic immunology in oral talks</p>
6	Learning objectives and skills	<p>Students are able to</p> <ul style="list-style-type: none"> - understand the principles of the immune system - understand the principles of antigen recognition - explain and distinguish different immune responses - independently solve basic immunological problems - understand and summarize specific topics in immunology and present them orally - independently develop working hypotheses and to adapt existing models and programs to test these hypotheses
7	Prerequisites	Not required
8	Integration in curriculum	Compulsory module, 1 st semester
9	Module compatibility	M.Sc. Integrated Immunology, M.Sc. Integrated Life Sciences, M.Sc. Molekular- und Zellbiologie, M.Sc. Molecular Sciences
10	Method of examination	EA: Written examination 90 min
11	Grading procedure	Grade of written exam
12	Module frequency	Annually in the winter semester
13	Resit examinations	Once
14	Workload	Contact hours: 165 h Independent study: 135 h
15	Module duration	1 semester

16	Teaching and examination language	English
17	Recommended reading	Janeway's Immunobiology, Ed. Murphy & Weaver, Garland publishing Inc. Cellular and Molecular Immunology, Ed. Abbas, Lichtman, Pillai, Elsevier Immunity, Ed. DeFranco, Locksley, Robertson, Oxford University Press

1	Module name	II-MA-M2: Integrated Laboratory Course Basic Immunology	Total number of ECTS credits
2	Courses/lectures	WS – Practical course: Basic Immunology (10 SWS), mandatory attendance WS – Tutorial: Tutorials to Basic Immunology (2 SWS)	10 ECTS
3	Lecturers	Prof. Dr. L. Nitschke, Prof. Dr.,T. Winkler, Prof. Dr. D. Vöhringer, Prof. Dr. D. Dudziak and others	

4	Module coordinator	Prof. Dr. L. Nitschke, Prof. Dr. T. Winkler	
5	Contents	<p>Course:</p> <ul style="list-style-type: none"> - identification of the organs of the immune system in mice - isolation and purification of immune cells from laboratory mice - detailed characterization of immune cells by flow cytometry - in vitro stimulation of immune cells - quantification of humoral and cellular immune responses in vitro and in vivo - histological analysis of immune organs - DNA and RNA based techniques for quantifications of immune responses - genetic engineering of mice <p>Tutorials:</p> <p>In small groups (e.g. 5 students) the students will design experimental setups for the generation and the analysis of mice with defined mutations in genes of the immune system</p>	
6	Learning objectives and skills	<p>Students are able to</p> <ul style="list-style-type: none"> - isolate immune cells from laboratory animals - perform cellular characterizations of immune cells by flow cytometry including detailed quantitative analyses - characterize humoral and cellular immune responses against model antigens - perform cell culture experiments with immune cells - plan and perform basic techniques in molecular biology for the molecular analysis of innate and adaptive immune responses - understand, summarize and apply major laboratory techniques in immunology - independently develop experimental strategies to test a scientific hypothesis 	
7	Prerequisites	Not required	
8	Integration in curriculum	Compulsory module, 1 st semester	
9	Module compatibility	M.Sc. Integrated Immunology	
10	Method of examination	CA: Laboratory protocol (10 pages) and presentation (15 min)	
11	Grading procedure	pass / fail	
12	Module frequency	Annually in the winter semester	
13	Resit examinations	Twice	
14	Workload	<p>Contact hours: 180 h</p> <p>Independent study: 120 h</p>	
15	Module duration	1 semester	

16	Teaching and examination language	English
17	Recommended reading	Janeway's Immunobiology, Ed. Murphy & Weaver, Garland publishing Inc. Cellular and Molecular Immunology, Ed. Abbas, Lichtman, Pillai, Elsevier Immunity, Ed. DeFranco, Locksley, Robertson, Oxford University Press

1	Module name	II-MA-M3: Cell and molecular biology	Total number of ECTS credits
2	Courses/lectures	WS – Lecture: Cell and molecular biology (3 SWS) WS – Tutorial: Tutorials to Cell and molecular biology (3 SWS)	5 ECTS
3	Lecturers	Prof. Dr. Falk Nimmerjahn, Prof. Dr. Lars Nitschke, and others	

18	Module coordinator	Prof. Dr. Falk Nimmerjahn and Prof. Dr. Lars Nitschke
19	Contents	<ul style="list-style-type: none"> - Cell structure and compartments - Control of gene expression - Cell metabolism and communication - Cell Cycle and Apoptosis - Cytoskeleton and Cell Adhesion - Cancer
20	Learning objectives and skills	<p>The students should be able to</p> <ul style="list-style-type: none"> - describe and explain basic concepts of cell structure - describe and explain different concepts of gene regulation and expression - describe and explain concepts of cell metabolism and communication - describe and explain advanced concepts of cell cycle and apoptosis - read, present and analyse current primary scientific literature on cell biology - train their ability for discussion and teamwork by working in small groups - give and receive critical feedback to and from fellow students
21	Prerequisites	Basic knowledge in molecular biology recommended
22	Integration in curriculum	Compulsory module, 1st semester
23	Module compatibility	M.Sc. Integrated Immunology
24	Method of examination	EA: Written examination 45 min
25	Grading procedure	Grade of written exam
26	Module frequency	Annually in the winter semester
27	Resit examinations	Twice
28	Workload	Contact hours: 90 h Independent study: 60 h
29	Module duration	1 semester
30	Teaching and examination language	English
31	Recommended reading	Molecular Biolog of the Cell, 5 th edition; Alberts, Johnson, Lewis, Raff, Roberts, Walter; Garland Science, Taylor & Francis Group.

1	Module name	II-MA-M4: Translational Immunology	Total number of ECTS credits
2	Courses/lectures	SS – Lecture: Translational Immunology (3 SWS) SS – Tutorial: Tutorials to Translational Immunology (5 SWS) SS – Seminar: Translational Immunology (3 SWS)	10 ECTS
3	Lecturers	Prof. Dr. Klaus Überla, Prof. Dr. David Vöhringer, and others	

4	Module coordinator	Prof. Dr. David Vöhringer and Prof. Dr. Klaus Überla	
5	Contents	<ul style="list-style-type: none"> - Immunology of Infectious Diseases - Tumor Immunology - Autoimmunity and Allergy - Neuroimmunology - Immunodeficiencies 	
6	Learning objectives and skills	<p>The students should</p> <ul style="list-style-type: none"> - describe and explain basic concepts of microbiology and infectious diseases - describe and explain immune responses to pathogens and tumors and their immune escape mechanisms - describe and explain concepts of prophylactic and therapeutic immunizations - describe and explain break of tolerance and development of hypersensitivity reactions. - understand major therapeutic strategies against autoimmunity and allergy - describe and explain immune responses in the central nervous system - understand complex mechanisms of neuroimmunological diseases - understand the pathogenesis of immunodeficiencies and their therapies - read, present and analyze current primary scientific literature - train their ability for discussion and teamwork by working in small groups - give and receive critical feedback to and from fellow students 	
7	Prerequisites	Modules Basic Immunology, Integrated Laboratory Course “Basic Immunology”, and Cell and Molecular Biology or equal qualifications recommended	
8	Integration in curriculum	Compulsory module, 2 nd semester	
9	Module compatibility	M.Sc. Integrated Immunology M.Sc. Integrated Life Sciences, M.Sc. Molekular- und Zellbiologie, M.Sc. Molecular Sciences	
10	Method of examination	EA: Written examination 90 min	
11	Grading procedure	Grade of written exam	
12	Module frequency	Annually in the summer semester	
13	Resit examinations	Once	
14	Workload	Contact hours: 165 h Independent study: 135 h	
15	Module duration	1 semester	
16	Teaching and examination language	English	

17	Recommended reading	Janeway's Immunobiology, Ed. Murphy & Weaver, Garland publishing Inc. Cellular and Molecular Immunology, Ed. Abbas, Lichtman, Pillai, Elsevier Immunity, Ed. DeFranco, Locksley, Robertson, Oxford University Press
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1	Module name	II-MA-M5: Integrated Laboratory Course Translational Immunology	Total number of ECTS credits
2	Courses/lectures	SS –Practical Course: Translational Immunology (10 SWS), mandatory attendance SS – Tutorial: Tutorials to the Practical Course (2 SWS)	10 ECTS
3	Lecturers	Prof. Dr. Klaus Überla, Prof. Dr. David Vöhringer, and others	

4	Module coordinator	Prof. Dr. David Vöhringer and Prof. Dr. Klaus Überla	
5	Contents	<ul style="list-style-type: none"> - Detect and propagate pathogens - Characterize immune responses to pathogens and vaccines - Usage of tissue culture and animal models of infectious and allergic diseases, autoimmune disorders, and tumor immunology 	
6	Learning objectives and skills	<p>The students should</p> <ul style="list-style-type: none"> - obtain skills for detection and propagation of pathogens - obtain skills for characterization of specific immune responses - describe and explain in vitro and in vivo models for the study of immune responses - understand complex mechanisms of immune pathogenesis 	
7	Prerequisites	Modules Basic Immunology, Integrated Laboratory Course “Basic Immunology”, and Cell and Molecular Biology recommended	
8	Integration in curriculum	Compulsory module, 2 nd semester	
9	Module compatibility	M.Sc. Integrated Immunology	
10	Method of examination	CA: Laboratory protocol (10 pages) and presentation (15 min)	
11	Grading procedure	pass/fail	
12	Module frequency	Annually in the summer semester	
13	Resit examinations	Twice	
14	Workload	<p>Contact hours: 180 h</p> <p>Independent study: 120 h</p>	
15	Module duration	1 semester	
16	Teaching and examination language	English	
17	Recommended reading	<p>Janeway’s Immunobiology, Ed. Murphy & Weaver, Garland publishing Inc.</p> <p>Cellular and Molecular Immunology, Ed. Abbas, Lichtman, Pillai, Elsevier</p> <p>Immunity, Ed. DeFranco, Locksley, Robertson, Oxford University Press</p>	

1	Module name	II-MA-M6: Clinical Immunology	Total number of ECTS credits
2	Courses/lectures	SS – Lecture: Clinical Immunology (2 SWS) SS – Seminar: Clinical Immunology (2 SWS), mandatory attendance	5 ECTS
3	Lecturers	Prof. Dr. Gerhard Krönke, Prof. Dr. Aline Bozec, and others	

4	Module coordinator	Prof. Dr. Gerhard Krönke and Prof. Dr. Aline Bozec	
5	Contents	<ul style="list-style-type: none"> - Clinical insights into systemic autoimmune diseases (RA, SLE) - Organ-specific inflammatory and autoimmune diseases (IBD, MS) - Autoinflammatory diseases (incl. FMF, gout) - Clinical aspects of inherited and acquired immunodeficiencies (incl. AIDS) - Immunotherapy of cancer - Transplantation Medicine 	
6	Learning objectives and skills	<p>The students should</p> <ul style="list-style-type: none"> - describe and explain the pathophysiology and clinical picture of prevalent inflammatory and autoimmune diseases. - describe and explain the pathophysiology and clinical picture of autoinflammatory diseases. - describe and explain the basis and clinics of inherited and acquired immunodeficiencies. - describe and explain the currently available concepts of cancer immunotherapy. - gain overview about the way of action and potential side effects of Glucocorticoids and modern immunosuppressants and Biologics. - understand the treatment strategies during the therapy of prevalent autoimmune and inflammatory diseases and during transplant rejection. - participate in seminars studying relevant clinical case reports - participate in clinical ward rounds. - gaining overview about the design and conduction of clinical trials. 	
7	Prerequisites	Modules Basic Immunology, Integrated Laboratory Course “Basic Immunology”, and Cell and Molecular Biology or equal qualifications recommended	
8	Integration in curriculum	Compulsory module, 2 nd semester	
9	Module compatibility	M.Sc. Integrated Immunology M.Sc. Integrated Life Sciences, M.Sc. Molekular- und Zellbiologie, M.Sc. Molecular Sciences	
10	Method of examination	EA: Written examination 45 min	
11	Grading procedure	Grade of written exam	
12	Module frequency	Annually in the summer semester	
13	Resit examinations	Twice	
14	Workload	Contact hours: 60 h Independent study: 90 h	
15	Module duration	1 semester	

16	Teaching and examination language	English
17	Recommended reading	Janeway's Immunobiology, Ed. Murphy & Weaver, Garland publishing Inc. Cellular and Molecular Immunology, Ed. Abbas, Lichtman, Pillai, Elsevier Immunity, Ed. DeFranco, Locksley, Robertson, Oxford University Press

1	Module name	II-MA-M7: Practical project work	Total number of ECTS credits
2	Courses/lectures	3 rd semester (WS) – Laboratory course in selected external research laboratories (15 SWS) Mandatory Attendance	15 ECTS
3	Lecturers	Lecturers of the Integrated Immunology program	

4	Module coordinator	Prof. Dr. D. Dudziak, Prof. Dr. T. Winkler
5	Contents	Laboratory course: The students will perform an individual research project in an external laboratory, preferentially in an international laboratory (3 month), mentored by an external and an internal lecturer. Progress reports will be given in the external laboratories. Presentations of the results of the projects of all students will be presented and discussed in a mandatory workshop. A report has to be delivered in written form.
6	Learning objectives and skills	Students <ul style="list-style-type: none"> - gain deepened insights into external research laboratories - acquire strong communications skills - will be able to independently plan and perform small research projects - will be able to document and summarize their research projects - will be able to discuss their progress in an external research environment - will be able to productively work and integrate in a research team
7	Prerequisites	Basic Immunology course including integrated laboratory course (II-MA-M1 and II-MA-M2) recommended
8	Integration in curriculum	Compulsory module, 3 rd semester
9	Module compatibility	M.Sc. Integrated Immunology
10	Method of examination	CA: Progress report (10 pages) and seminar presentation (15 min)
11	Grading procedure	pass / fail
12	Module frequency	individually planned
13	Resit examinations	twice
14	Workload	Contact hours with mentor: 10 h Preparations of progress reports and seminar: 40h Laboratory course: 400 h
15	Module duration	1 semester
16	Teaching and examination language	English
17	Recommended reading	Individual publication of the external research laboratory

1	Module name	II-MA-M8: Theoretical project work	Total number of ECTS credits
2	Courses/lectures	3 rd semester (WS): Theoretical project work (10 SWS) Seminar on project work (2 SWS)	10 ECTS
3	Lecturers	Prof. Dr. Falk Nimmerjahn, Prof. Dr. Christian Bogdan and others	

4	Module coordinator	Prof. Dr. Christian Bogdan
5	Contents	Preparation of an immunological text, e.g. <ul style="list-style-type: none"> - grant application for a scientific project - review article for a scientific journal - chapter for a scientific book / text book - chapter for the English version of the Wikipedia encyclopaedia
6	Learning objectives and skills	The students should <ul style="list-style-type: none"> - comprehensively summarize the state-of-the-art knowledge of a defined immunological topic - critically discuss conflicting data in basic and/or clinical immunology - extract key results from the current scientific literature to provide a succinct summary on an immunological theme or problem - adequately cite and understand a body of literature - identify open questions and matters of debate in basic and/or clinical immunology and develop a research plan (including appropriate methodological approaches) to resolve these scientific issues - give and receive critical feedback to and from fellow students
7	Prerequisites	Modules “Basic Immunology”, “Translational Immunology” and “Clinical Immunology”; Integrated Laboratory Courses “Basic Immunology” and “Translational Immunology” recommended
8	Integration in curriculum	Compulsory module, 3 rd semester
9	Module compatibility	M.Sc. Integrated Immunology
10	Method of examination	(a) written immunological text/chapter (maximum 25 pages) (b) oral presentation summarizing the key points of (a) (max. 30 min.)
11	Grading procedure	(a) grade of chapter; (b) pass/fail
12	Module frequency	Annually in the winter semester
13	Resit examinations	Twice
14	Workload	study hours: 10 SWS x 15 weeks = 150 h (including contact with supervisor) Seminar (presentation and discussion of the projects of all students of the cohort): max. 2 SWS x 15 = 30 h Preparation and literature studies = 120 H

15	Module duration	1 semester
16	Teaching and examination language	English
17	Recommended reading	Original research articles, review articles and immunological text books relevant for the topic

1	Module name	II-MA-M9: Softskills	Total number of ECTS credits
2	Courses/lectures	Depending on module	10 ECTS
3	Lecturers	Depending on module	

4	Module coordinator	Prof. Dr. F. Nimmerjahn, Prof. Dr. L. Nitschke, Prof. Dr. T. Winkler
5	Contents	<p>Students chose a module of the key skill modules which are offered by the FAU. Key skill modules of the university are offered for all courses and can therefore not be attributed to certain subjects. Students have free choice which module of key skills they want to take. Offered key skill modules comprise more general topics, such as:</p> <ul style="list-style-type: none"> - Presentation skills - Languages - Culture, history, science and technology - Intercultural communication <p>or more specific topics such as:</p> <ul style="list-style-type: none"> - cellular imaging techniques - bioinformatics - animal sciences - genetic engineering - design of clinical studies
6	Learning objectives and skills	<p>Students are able to</p> <ul style="list-style-type: none"> - develop job-related competences (soft skills) which supplement the topics directly related to the education in science - extend the general knowledge - lead to inter-disciplinary knowledge and science approaches
7	Prerequisites	Not required
8	Integration in curriculum	1 st semester and 2nd semester
9	Module compatibility	M.Sc. Integrated Immunology
10	Method of examination	SL: oral or written, depending on module
11	Grading procedure	pass/fail
12	Module frequency	Depending on module
13	Resit examinations	twice
14	Workload	300 h
15	Module duration	2 semester
16	Teaching and examination language	English

17	Recommended reading	Depending on module
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1	Module name	II-MA-M10: Becoming a scientist	Total number of ECTS credits
2	Courses/lectures	3 rd Semester (WS): Winter School in Immunology (2 SWS) Attending one International Meeting in Immunology (2 SWS) Meet the Professor and Participation in Graduate School Committee (1 SWS) Mandatory Attendance	5 ECTS
3	Lecturers	Prof. Dr. Falk Nimmerjahn, Prof. Dr. Christian Bogdan, Prof. Dr. Klaus Überla, Prof. Dr. Diana Dudziak and others	

4	Module coordinator	Prof. Dr. Falk Nimmerjahn
5	Contents	<ul style="list-style-type: none"> - Winter school on Immunology - Participation in an International Meeting on Immunology - Meet the Professor - Work in graduate school committee
6	Learning objectives and skills	<p>The students should</p> <ul style="list-style-type: none"> - Understand advanced lectures in immunology - Advance their knowledge about the role of immune cells in the steady state and during infection, cancer, and autoimmunity - give feedback to advanced lectures - train their ability to discuss with experts (professors, speakers) advanced concepts of immunology - advance their communicational, organisational and social skills by participating in the graduate school committee
7	Prerequisites	Modules Basic Immunology, Integrated Laboratory Course "Basic Immunology", and Cell and Molecular Biology or equal qualifications recommended
8	Integration in curriculum	Compulsory module, 3rd semester
9	Module compatibility	M.Sc. Integrated Immunology
10	Method of examination	pass / fail
11	Grading procedure	Not applicable
12	Module frequency	Annually the winter semester
13	Resit examinations	twice
14	Workload	Contact hours: 90 h Independent study: 60 h
15	Module duration	1 semester
16	Teaching and examination language	English

17	Recommended reading	Fundamental Immunology, William E. Paul, Wolters Kluwer Nature Reviews Immunology, Nature Springer Publishing Group Nature Reviews Microbiolgoy, Nature Springer Publishing Group Nature Immunology, Nature Springer Publishing Group Immunity, Ed. DeFranco, Locksley, Robertson, Oxford University Press
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1	Module name	Intergrated Immunology II-MA-M11 Master Thesis	30 ECTS credits
2	Courses/lectures	4 th semester (SS) Master Thesis	
3	Lecturers	Lecturer of the Departments Biology or Faculty of Medicine	

4	Module co-ordinator	Lecturer of the Department of Biology or Faculty of Medicine
5	Contents	<ul style="list-style-type: none"> • Independent work on an actual topic of the respective research area within a fixed period (6 months) • generate a scientific report • oral presentation and discussion of the results (30 min) within a seminar
6	Learning targets and skills	<p>The students are</p> <ul style="list-style-type: none"> • able to work independently with experimental molecular, cell biological and immunological methods in vitro and in vivo on a specific scientific question • are able to describe experimental results professionally according to the demands/terminology in immunology and molecular and cellular biology • able to present the results of the scientific project in a report • are able to apply the acquired skills in future research projects in immunology, cell and molecular biology
7	Recommended prerequisites	none
8	Integration in curriculum	4th semester
9	Module compatibility	M.Sc. Integrated Immunology
10	Method of examination	PL: Master thesis (75 pages minimum) SL: defend thesis in seminar
11	Grading procedure	Master Thesis 100%
12	Module frequency	WS or SS
13	Workload	900 h
14	Module duration	1 semester
15	Teaching language	teaching language: English examination language: English
16	Recommended reading	none